

A Social Practice Theory Perspective to Exploring the
Lived Experiences of Physical Activity in People with
Type-2 Diabetes in Urban Nigeria

Thesis Submitted for the Degree of Doctor of Philosophy

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Abstract

This thesis aims to gain a greater understanding of the social, material and historical processes underlying physical activity participation in the lived experiences of people with type-2 diabetes in Urban Nigeria. Using social practice theory and life-course perspective as guiding theoretical frameworks, a qualitative narrative inquiry was conducted with thirty-five people with type-2 diabetes receiving outpatient care at the University College Hospital Ibadan, Oyo state, Nigeria. Through a multi-modal research design, data were collected in three phases: Firstly, a narrative interview study was conducted to obtain biographical accounts of how people's relationship with physical activity has evolved over their life course. Secondly, participants took part in a one-week activity tracking and diary study to capture their daily life patterns of activity. Thirdly, the diary study was followed up with a visual elicitation interview co-explore their captured data to gain deeper access to the context of their daily lives and how physical activity fits within this context. Additionally, an informal contextual inquiry involving observations and discussions with healthcare professionals was conducted to help build a bigger picture of the context in which people lived.

Four separate analyses of the research data were performed. The first involved a case-based narrative analysis of six of the thirty-five participants' data to understand the nuances and peculiarities of their individual lived experiences. This was followed by a cluster analysis of participants' daily activities to identify groups of participants with similar patterns of activities. The third included a thematic analysis of participants' experiences of physical activity over the life course. Lastly, a separate thematic analysis was conducted to understand participants' knowledge about physical activity as part of their type-2 diabetes management. The cluster analysis of people with type-2 diabetes' daily activities identified six participant sub-groups, with members of each group having similar patterns of activities. Physical activity patterns also varied across the life course and were strongly implicated in processes including changing social roles within the family life trajectory, transitions to retirement, ageing, type-2 diabetes diagnosis, gender norms, absence of an exercise culture, and negative age stereotypes.

The research makes three contributions. Firstly, it makes an empirical contribution by providing an in-depth multi-layered account of the socio-historical dynamics of physical activity in the lived experiences of people with type-2 diabetes in an urban Nigerian context. Secondly, the research offers a methodological contribution by demonstrating how combining SPT with concepts from life-course perspectives can facilitate a relational and temporal approach to exploring the lived experiences of physical activity in people with Type-2 diabetes in Urban Nigeria. Thirdly, the research findings contribute to the growing theoretical debates that physical activity engagement is not a static or linear behaviour but a dynamic, ongoing process of change that encompasses an interplay of transitions, turning points, and social interactions in people's lives.

Impact statement

This thesis presents findings from a qualitative narrative inquiry into the lived experiences of physical activity in people with type 2 diabetes in Ibadan, Nigeria. The research findings outlined in this thesis can potentially impact public health policy, clinical practice, people with type-2 diabetes, and academia.

To my knowledge, this study is the first to provide an in-depth account of the contextual processes influencing physical activity participation of people with type-2 diabetes receiving care at a tertiary care institution in Urban Nigeria. Therefore, the research findings provide the Nigerian ministry of health with formative knowledge that can guide them in their considerations of developing contextually and culturally sensitive policies and interventions aimed at promoting physical activity for managing non-communicable diseases such as type-2 diabetes in an urban Nigerian context. Moreover, this thesis provides healthcare professionals responsible for diabetes care in Nigeria with the opportunity to understand their patients as socially situated individuals. By presenting the voices of various patients with type-2 diabetes in Ibadan, this thesis invites healthcare professionals to learn about the lives and challenges of those they care for outside the clinic and consider their perspectives when providing support for physical activity for diabetes management. I plan to realise the above impacts through publication of findings in policy and practitioner journals in Nigeria.

The academic impact of this work lies in the integration of social practice theory and life-course perspective to advance our knowledge beyond the dominant framing of physical activity as individual behaviour. In demonstrating the value of this integrated approach for highlighting the social, material, and temporal dynamics of people's lived experiences and physical activity engagement, this work can contribute to theoretical debates concerning the relationship between individuals and social practices.

Methodologically, this work contributes to the applications of visual elicitation methods for studying everyday life. The study employed a multi-modal approach which combines diary tools and wrist-worn triaxial accelerometry to support participants' reflective engagement with the research to stimulate narratives about the intricacies of daily life that may otherwise

escape their conscious awareness. This approach to data gathering was instrumental to developing our understanding of the nuances of the everyday life contexts of participants. It illustrated how quantifiable dimensions of physical activity could be leveraged as research tools to elicit contextual narratives about people's routine activities. This work can encourage other researchers considering designing similar studies to adopt similar methods. The multi-modal approach encouraged people with type-2 diabetes to not only engage with the research process but also to review and reflect on their physical activity and sedentary patterns in the context of their daily lives. I plan to realise the above impacts by disseminating my research findings through publications in peer-reviewed journals and relevant conference presentations.

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List of Abbreviations

DAN	Diabetes Association of Nigeria
HCI	Human Computer Interaction
HCP	Healthcare Professionals
LCP	Life-course Perspective
LMIC	Low-and-Middle-Income Countries
MOP	Medical Outpatient Clinic
NCD	Non-Communicable Disease
NI	Narrative Inquiry
SCT	Social Cognitive Theory
SDT	Self-Determination Theory
SPT	Social Practice Theory
SSA	Sub-Saharan Africa
T2DM	Type-2 diabetes Mellitus
UCH	University College Hospital

Chapter 1: Introduction

1.1 Rationale

In this section, I provide a background to the initial motivation and aim of my thesis and describe how the purpose and scope of the research evolved to focus on taking a social practice theory perspective to explore the lived experiences of people with type-2 diabetes in Urban Nigeria.

Non-communicable diseases (NCDs), consisting mainly of type 2 diabetes, cardiovascular diseases, and chronic respiratory diseases, have emerged as the leading cause of mortality worldwide (WHO, 2018). The burden of NCDs is highest in low-and-middle-income countries (LMIC), where about 80% of these deaths occur (WHO, 2018). Nigeria, the largest economy and most populous country in Sub-Saharan Africa (SSA), with an estimated population of over 200 million faces a double burden of infectious diseases and NCDs (Maiyaki & Garbati, 2014). In 2016, it was estimated that NCDs accounted for about 29% of total deaths in Nigeria (WHO, 2016). A significant proportion of these deaths were among the working-age population (under 60 years of age) (WHO, 2016). The burden of premature mortality and morbidity not only places an enormous strain on the already overburdened health systems but also human and economic development in Nigeria (Maiyaki & Garbati, 2014). This could also have a significant impact on the total burden of NCDs in SSA and the numbers will continue to grow unless effective interventions are implemented.

Physical inactivity, a major modifiable risk factor for NCDs, is one of the leading causes of global mortality, accounting for about 3.2 million deaths yearly (Kohl et al, 2012; WHO, 2016). Therefore, physical activity promotion has been recognised as a “global public health priority” (Kohl 3rd et al., 2012). Significant evidence shows that sufficient levels of physical activity lower the risk of NCDs and improve the overall quality of life (Warburton et al., 2006). However, about one-third of the world’s adult population remains physically inactive (Hallal et al., 2012). In Nigeria, researchers have suggested that the so-called “epidemiological transition” from the predominance of communicable diseases to NCDs is likely driven by rapid urbanisation and modernisation experienced in the past decades (Akpan & Ekpenyong, 2013). About half of the population in Nigeria now resides in urban areas and the numbers progress

annually (Akpan & Ekpenyong, 2013). This is argued to have led to reduced opportunities for physical activity marked by more sedentary types of jobs and increased dependence on “passive” modes of transportation (Akpan & Ekpenyong, 2013; Maiyaki & Garbati, 2014). It is therefore imperative to explore and design effective interventions that will help increase levels of physical activity in people’s everyday lives.

To this end, the initial aim of the thesis was to explore ways digital technology can support people to maintain active lifestyles in Urban Nigeria. However, due to the limited qualitative literature on physical activity practices and promotion in Nigeria, I conducted a preliminary scoping study to explore the research problem and uncover salient themes to guide further literature review and define the research scope. The preliminary scoping study employed an exploratory qualitative research design to understand perceptions of physical activity and underlying influences of participation in people living in two major cities of Nigeria, Lagos and Abuja. The findings from the study highlighted a greater emphasis on the social context in influencing physical activity among participants. This motivated a review of relevant theories applied in physical activity intervention studies to gain a theoretical understanding of what constitutes social influences of physical activity that can be used to guide the design of the main study.

The literature review revealed that previous studies have traditionally employed behaviour change strategies based on psychological theories to inform the design of physical activity interventions (Hekler et al., 2013). The implicit assumption of these psychological theories that inform the design of these technologies is that individuals are rational decision-makers with the ability to change their behaviours through their own volition (Hekler et al., 2013). However, psychological theories of behaviour change, and their applications have been widely criticised for their narrow and reductionist view of change, which tends to overlook the socially embedded and dynamic nature of health behaviours like physical activity (Lupton, 2014).

In response to such criticisms, there is a growing interest in exploring social practice theory, which accounts for the dynamic interplay between people’s activities and their wider social and material contexts within everyday life processes, as an alternative perspective for

broadening our understanding of health-related behaviours (Cohn, 2014; Blue et al., 2016; Maller, 2015). SPT, rooted in the fields of sociology, anthropology, and philosophy, takes social practices such as cycling, playing football, or cooking, rather than the individuals who perform them, as a unit of analysis and design (Maller, 2015; Kuijer et al., 2013). It conceptualises human actions as a set of routinised practices, situated within a wider social context, constituting interrelated elements, and interrelated practices that co-evolve over time and across space (Shove et al., 2012). Sociologists believe that applying SPT as a frame will enhance our understanding of the practices we wish to change, which forms a relevant starting point for supporting change through design (Shove et al., 2012). To date, this approach has been applied to other kinds of design problems related to environmental sustainability, but not physical activity.

Therefore, I sought to extend this growing interest by exploring what insights and possibilities a social practice perspective may offer in understanding ways to support physical activity in urban Nigeria through design. I subsequently decided to further refine the scope of the research to focus on people with type-2 diabetes, a population with a health-related motivation to integrate physical activity as part of their management practices. Through research relationships between UCL and University College Hospital (UCH), Ibadan, Nigeria, I was presented with an opportunity to conduct my research with people with type-2 diabetes receiving care at the hospital.

1.2 Research Aims

My research aims for the main study evolved to explore the social, material, and historical dynamics influencing physical activity in the lived experiences of people with type-2 diabetes in Ibadan, Nigeria.

1.2.1 Research Questions

To address the above aims, the research asks the following questions:

- How is physical activity experienced and understood in the everyday lives of people with type 2 diabetes in Ibadan, Nigeria?
- How have physical activity patterns of people with type-2 diabetes in Ibadan evolved over their life course?
- What key social, material and historical dynamic processes influence this evolution?

- What does this understanding imply for the design of physical activity interventions and public policy?

1.3 Overview of the Research Location and Context: Nigeria

1.3.1 Geo-political Context

Nigeria is a country in Western Africa, covering an area of 923,768 square kilometres. It shares land borders with Niger to the north, Chad and Cameroun to the east, Benin to the west and its southern coastline with the Gulf of Guinea (Graham, 2004). Nigeria is the most populous country in sub-Saharan Africa, with a population of over 200 million (Amare et al., 2021). It is also a plural society with over three hundred ethnic groups and over five hundred spoken languages and dialects (Osaghae & Suberu, 2005). The three major ethnic groups (and languages) include the Hausa in the north, the Igbo in the southeast, and the Yoruba in the southwest (Osaghae & Suberu, 2005). The different ethnic groups formerly existed independently as parts of empires, chiefdoms and kingdoms before the British conquest in the 19th century (Ranger, 1993). Nigeria was subsequently formed as a country in 1914, under British colonial rule, following the amalgamation of these diverse ethnic entities into a single geopolitical state (Odegowi, 2011). It, however, gained independence from British colonial rule in 1960 and became a republic in 1963 (Odegowi, 2011). Nigeria presently comprises thirty-six states, grouped into six geopolitical regions: the Northeast, Northwest, Northcentral, Southwest, Southeast, and Southsouth (Odegowi, 2011) (Figure 1).

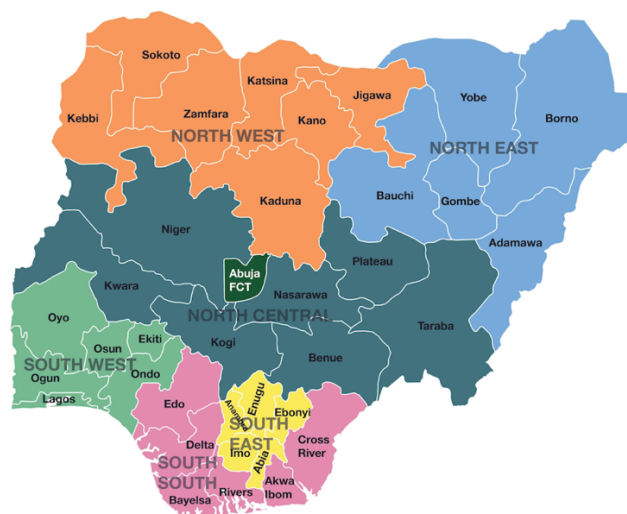


Figure 1: Map of Nigeria Showing States and Geo-political Regions

1.3.2 Societal Transitions and Physical Activity

Historically, from the pre-colonial era through the early post-independence period, Nigeria was an agrarian economy, with agriculture accounting for about 70 % of the country's Gross Domestic Product (Ogen, 2007). In the 1960s, over 80 % of the country's population resided in rural areas and mainly relied on peasant farming practices for subsistence and income (Ogen, 2007). However, following the oil boom in Nigeria in the 1970s, the country witnessed rapid economic growth and urban development, which spurred unprecedented rural-to-urban migration (Aliyu & Amadu, 2017). The development of other sectors of the economy and infrastructural developments in urban areas, including Lagos and Ibadan, created employment opportunities that drew young people, in search of better socio-economic opportunities, from the rural and agricultural economy to urban and industrial areas (Aliyu & Amadu, 2017). According to the World Bank (2019a), approximately 51.2% of Nigeria's population lives in urban areas, while 48.8% live in rural areas.

The epidemiological transition from the predominance of communicable diseases to NCDs in low-and middle-income countries like Nigeria has been attributed to increasing urbanisation and migration, which have brought about shifts in lifestyle, including physical activity and dietary patterns (BeLue et al., 2009). For instance, the transition from rural farming practices to white-collar jobs has reduced opportunities for people to engage in physically demanding tasks in their daily lives (Atkinson et al., 2016). Additionally, the shift from active forms of transport practices such as walking and cycling common in rural areas to increased dependence on motorised transport in urban areas in Nigeria has been associated with decreased opportunities for physical activity (Olojede et al., 2017).

Moreover, Nigeria's urban infrastructure provides limited support for active transportation (Olojede et al., 2017). Similarly, based on my experience growing up in Abuja and my observations during my fieldwork in Ibadan (two major cities in Nigeria), there appears to be a lack of infrastructure for cycling, such as bicycling lanes, and inadequate pedestrian infrastructure for walking. For instance, in Ibadan, sidewalks tend to be crowded and occupied by parked cars, street vendors and people engaging in business and other informal activities, leaving limited space for pedestrian movement. These conditions make walking and cycling for leisure or as active modes of transportation less viable for people.

Interestingly, while relatively more walkable sidewalks can be observed in middle-and high-income neighbourhoods, only a few people engage in walking as commuting or leisure practice. This may be partly because walking and cycling are often perceived as practices of the poor in many West African societies (Pochet & Cusset, 1999).

1.3.3 Cultural Concepts and Health Practices

It has been established that culture plays a crucial role in influencing people's health beliefs and health-seeking practices (Jegede, 2002). According to Jegede (2002), people's health beliefs and practices in Nigeria are influenced by both indigenous traditions and the Western healthcare system.

1.3.3.1 Cultural Beliefs Regarding Body Size and Weight

Many cultures in Nigeria have traditionally associated having a large body size as a symbol of good health, wealth, beauty and happiness (Renzaho, 2004). This cultural conception of large body size as a status symbol is pervasive among men and women of all ages in Nigeria and many Sub-Saharan African cultures (Renzaho, 2004). On the contrary, being thin or having a small body size is seen as a sign of illness and poverty (Ibrahim & Jegede, 2017). Therefore, people engage in intentional weight gain to show off their wealth, beauty and good health (Ibrahim & Jegede, 2017).

An example of intentional weight gain practices is noted among some ethnic groups in the south-south region of Nigeria, who have customary rituals where prospective brides are kept in fattening rooms for a long time and fed large portions of food to gain weight and look more attractive to their future grooms (Chigbu et al., 2021). They are also prevented from engaging in physical tasks to ensure they gain enough weight to 'look beautiful and healthy' (Chigbu et al., 2021). The rise in obesity and NCDs in SSA, including Nigeria, has been attributed to such socio-cultural beliefs and practices (Renzaho, 2004). Nevertheless, Ibrahim and Jegede (2020) noted that with increasing Westernisation and globalisation, large body size preferences are becoming less prevalent in modern Nigerian societies.

1.3.3.2 Healthcare systems and Practices in Nigeria

During the pre-colonial era in Nigeria, indigenous health practices were the main health system in different ethnic communities (Egharevba et al., 2015). These traditional healthcare practices are rooted in the cultural values and norms of the people, with various ethnic groups having different belief systems about health and managing the health (Egharevba et al., 2015).

In some cultures, such as the Yoruba of the southwestern region of Nigeria, chronic illnesses are traditionally believed to be caused by supernatural forces such as sorcery, witchcraft, and ancestral evil spirits (Borokini & Lawal, 2014). Therefore, these diseases ought to be prevented and treated by employing spiritual interventions (Borokini & Lawal, 2014). It is also believed that certain herbs, roots and tree barks have medicinal and magical healing effects and are thus used as preventive, rehabilitative and curative measures to ward off evil spirits and witchcraft (Ozioma & Chinwe, 2019). Traditional health practitioners specialising in herbal medicines and spiritual healing are consulted to prescribe remedies to prevent or treat various illnesses (Ozioma & Chinwe, 2019).

The colonial era brought about the advent of modern (biomedical) knowledge systems in Nigeria, characterised by the introduction of Christianity, formal Western education, and Western medicine and technology (Ademiluyi & Aluko-Arowolo, 2009). During this period, several efforts were made to repress and relegate indigenous health practices to the background in favour of Western medicine (Abdullahi, 2011). The Nigerian health system has since undergone multiple transformations and reforms that have led to the development of a modern (biomedical) healthcare system at the country's primary, secondary and tertiary levels of government (Adefolaju, 2014).

Primary healthcare services operate at the community level and serve as community residents' first point of contact (Makinde et al., 2018). They are managed by local government authorities and primarily provide basic preventive care and treatment for common minor illnesses and maternal and child health services (Makinde et al., 2018). Secondary healthcare facilities, managed by the state ministry of health, provide specialised care to patients referred from primary healthcare facilities through in-patient and out-patient services (Makinde et al., 2018). The federal ministry of health provides tertiary healthcare at the

national level through institutions, including university teaching hospitals and federal medical centres (Makinde et al., 2018). Tertiary healthcare institutions operate through referrals from primary and secondary care facilities and provide highly specialised care to patients with chronic, complicated or more severe health problems (Makinde et al., 2018). Secondary and tertiary healthcare facilities are primarily located in urban areas, while primary care facilities are mainly in rural areas (Makinde et al., 2018). Participants in the main study were recruited from the University College Hospital (UCH), Ibadan, the first tertiary health institute in Nigeria, established in 1957 (Ojewale et al., 2021). It is located in Ibadan North local government area, one of the five metropolitan areas of Ibadan. UCH, Ibadan, serves as a major referral centre for hospitals in the southwestern region and other parts of the country (Ojewale et al., 2021).

The present-day (post-independence) Nigerian society operates a pluralistic healthcare system, with the traditional health system existing alongside the modern health system (Adefolaju, 2014). Many people, particularly those in rural areas, have continued to rely on traditional health beliefs and practices as complementary or alternative to biomedical health practices for preventing and managing health conditions (Adefolaju, 2014). Although it was beyond the scope of this thesis to explore the juxtaposition of traditional and biomedical healthcare concepts and practices, it provides important background into the healthcare context in Nigeria.

1.4 Thesis Structure

This thesis has ten chapters. **Chapter Two** provides a detailed report of the preliminary scoping study conducted with fifteen adults in Lagos and Abuja to explore factors influencing physical activity in an urban Nigerian context. The chapter describes the qualitative research methodology and data collection method employed using remote interviews. It also describes the thematic data analysis process and presents research findings. The chapter concludes with a summary of key findings which directed the focus of the subsequent literature review in Chapter 3 and the main study.

Chapter Three presents a review of relevant literature for the study. It begins by providing a background on type-2 diabetes and its relationship with physical activity. It then provides a critical review of relevant theoretical approaches employed in physical activity research in the

field of Human Computer Interaction (HCI). Following this, the chapter explores the relevance of social practice theory for the main study and proposes an integrated approach combining social practice theory with a life-course perspective as a guiding framework for the main study. Chapter three concludes by defining and outlining the research aims and questions for the main study.

Chapter Four describes the research design and methods employed in the main study. It presents the rationale for using qualitative narrative inquiry as the research design. It then describes the research process, including sampling and recruitment, data collection methods and data management. Finally, the chapter provides a discussion on reflexivity and researchers' positionality and ethical considerations for the study.

Chapter Five presents a narrative analysis and narrative summary of the lived experiences of six research participants. It describes the method and process of data analysis and presents narrative summaries of six participants to highlight the nuances and idiosyncrasies of their lived experiences with type-2 diabetes.

Chapter Six presents a qualitative cluster analysis of participants' everyday activities to categorise groups of participants based on their patterns of activities. It describes the data analysis process, presents the findings, and summarises the key findings.

Chapter Seven presents the thematic data analysis and findings of participants' physical activity embedded into their everyday practices over the life course to understand how key life transitions and turning points interact with their experiences of 'doing physical activity' and 'being physically active'. It describes the data analysis process, presents the findings, and summarises the key findings.

Chapter Eight presents the thematic data analysis and findings of participants' accounts of how they construct knowledge about physical activity as part of their type-2 diabetes management practices. It explores the primary sources of health information regarding exercise as part of diabetes management among participants and the role of these sources in

promoting exercise as part of diabetes management. The chapter describes the data analysis process, presents the data analysis findings, and provides a summary of the key findings.

Chapter Nine discusses the key findings of the main study (from Chapter Five through Chapter 8) in relation to the literature and outlines the key contributions of the research. It also provides a discussion of the implications of the findings to public health policy, clinical practice and future research. The chapter concludes with a reflection of the strengths and limitations of the research.

Chapter 2: Preliminary Scoping Study on influences of Physical Activity in Urban Nigeria

2.1 Introduction

During the initial stages of my PhD research, when I was still seeking to refine my research scope and exploring this limited research space where very little work has been done around physical activity practices and promotion in Nigeria, I conducted a preliminary scoping study as a first step towards exploring important aspects of current practices of physical activity in an urban Nigerian context that may be an interesting direction to investigate further. In this chapter, I describe the qualitative research methodology and data collection method employed for the study. I also describe the thematic data analysis process and present research findings. I conclude the chapter with a summary of key findings which directed the focus of the subsequent literature review in Chapter 3 and the main study.

2.2 Aim

The study aimed to explore current practices of physical activity and factors influencing participation among people living in Urban Nigeria.

2.3 Methodology

I employed a qualitative research approach using semi-structured one-on-one remote phone interviews to achieve the study's aims. I conducted the interviews by phone rather than face-to-face as I was in London and the research participants were in Nigeria. This allowed me to gain access to participants within a short timeframe. I obtained ethical clearance for the study from UCLIC departmental committee (ref. UCLIC/1213/015).

2.3.1 Participants

The sample consisted of 15 adults (7 males and eight females) living in urban centres of the two major cities of Nigeria – Lagos and Abuja. Participants ranged in age from 18 to 65, with the majority of participants between the ages of 25 to 34. Thirteen participants were employed full-time, two were self-employed, and one was unemployed. In terms of education, all participants had at least a bachelor's degree, with six having a master's degree and one having a doctorate.

2.3.2 Sampling and Recruitment

I used a combination of convenience and snowball sampling to recruit participants for the study. I employed this sampling strategy because it was the most appropriate and most accessible approach to recruit participants, given the logistical and time constraints. Eligible participants were invited to participate through friends, colleagues and family primarily by word of mouth. Those who volunteered to participate were contacted to schedule an interview date and time convenient for them. They also received a copy of the study's information sheet via email with a detailed description of the study that included the information necessary for the participant to give informed consent. Participant demographic information is shown in the table below:

Participants	Gender	Age Range	Education Level	Employment Status
P1	Female	45 - 54	Bachelors	Employed Full-time
P2	Male	25 - 34	Bachelors	Employed Full-time
P3	Male	25 - 34	Bachelors	Self-employed
P4	Male	35 - 44	Bachelors	Employed Full-time
P5	Male	25 - 34	Bachelors	Employed Full-time
P6	Female	25 - 34	Masters	Employed Full-time
P7	Male	25 - 34	Masters	Employed Full-time
P8	Male	25 - 34	Masters	Employed Full-time
P9	Female	25 - 34	Masters	Employed Full-time
P10	Male	55 - 64	Masters	Employed Full-time
P11	Female	25 - 34	Doctorate	Unemployed
P12	Female	25 - 34	Bachelors	Employed Full-time
P13	Female	18 - 24	Masters	Employed part-time
P14	Female	45 - 54	Bachelors	Full-time Housewife
P15	Female	25 - 34	Masters	Self-employed

Table 1: Preliminary Study Demographic Information

2.3.3 Data Collection

All interviews were conducted over the phone at a date and time convenient to participants. I read an introductory script to participants at the beginning of the phone interview and obtained verbal consent from each participant before proceeding with the interview questions. I also collected demographic information such as age, gender, education level, and employment status. Each interview followed a semi-structured interview guide. It started with open-ended questions about healthy living and then moved to more focused questions probing participants about their experiences with physical and factors influencing their participation. All interviews were audio recorded using voice recording software once consent was obtained. I transcribed all interviews verbatim and then analysed them using NVivo software, a qualitative data analysis tool. Each interview lasted between 30 to 45 minutes and was conducted between the end of April and the beginning of May 2016.

2.3.4 Data Analysis

Given the study's exploratory nature, I employed an inductive thematic analysis. Therefore, the data analysis was guided by emergent themes. The data analysis followed the six steps outlined by Braun and Clarke (2006) summarised below.

2.3.4.1 *Familiarisation with the interview data*

I transcribed the interviews verbatim and wrote down initial notes during transcription. I read each transcript thoroughly – at least twice- and highlighted and commented on keywords within the interview.

2.3.4.2 *Forming initial codes*

I then conducted a sentence-by-sentence open coding of each transcript, and I reviewed the codes generated across all transcripts to get a sense of which codes were repeating and which seemed to be outliers.

2.3.4.3 *Collating of codes into categories and themes*

I then clustered similar and interrelated codes into different descriptive categories, which were subsequently grouped into specific themes. Along with this, I created a mind map to visualize patterns and relationships between codes and categories. From this, I developed a first-level descriptive analysis of the content pertaining to the research aim.

2.3.4.4 *Defining and Naming themes*

I iteratively challenged relationships among the codes, categories, and themes until quotes within a theme formed a coherent pattern. Once I had made all the decisions regarding the interpretation of data, I defined and finalised the emergent themes.

2.4 Results

The themes that emerged from the study were grouped under the following overarching themes: Current practices of physical activity and influences of physical activity participation. Two themes emerged under current practices of physical activity: leisure-time exercise and household activities. Five themes emerged under the influences of physical activity participation: personal health goals, social experience and support, neighbourhood environment, limited gender-appropriate exercise facilities, and 'it is not part of the Nigerian lifestyle to exercise'.

2.4.1 Current practices of physical activity

2.4.1.1 *Leisure time exercise*

Most participants described their physical activity practices as leisure time exercises such as walking, jogging, going to the gym, swimming, cardio workouts, participating in sports like football and basketball, yoga, skipping, and group fitness classes. However, most participants reported walking as their preferred physical activity. They often described walking as a leisure activity rather than a mode of transport or as a natural part of their daily routine. Participants reported taking walks after working hours or late evening for at least 30 minutes daily or most days. For example, P10 and P16 stated:

I walk religiously every night. From 11 pm to 12:15 pm. I usually do my walks in the evening, like now before I go to bed, so that I get a sounder sleep -P10

I take little walks around my neighbourhood after work for about 40 minutes, I would say and on average, four times a week - P16.

2.4.1.2 Household activities

Six female participants also stated that their daily activities in the home involved engaging in household chores which provided them with some physical activity. They further explained that this kept them standing as they cooked and cleaned the house. For example, P15 stated:

So at home I actually love cooking, so I cook a lot, I make breakfast, lunch and dinner for my husband and me, like every day, and I keep busy standing and moving around doing other house chores. - P15

Several participants considered other everyday activities like moving around the house and climbing up and down the stairs as examples of physical activity within their daily routines at home:

I will get up just to move around, grab something, move upstairs downstairs, you know, then come back and sit down. I go up the staircase and down like 10 to 15 times a day at home -P12

2.4.2 Influences of Physical Activity Participation

2.4.2.1 Personal Health Goals

A majority of participants expressed the desire to be physically active and reported making efforts to incorporate exercise into their leisure time. Participants described their reason for engaging in exercise as a way of keeping healthy:

Exercise helps your heart to pump well and function well; it helps your lungs, and it helps all of the organs in your body to function properly. Because when you do a lot of physical activity, you are forced to take a lot of fluids, you drink much water, you hydrate your system. And then you tend to exercise your muscles so you wouldn't have weak muscles. So, I believe that physical activity actually helps the organs to function better. - P3

When you exercise, you will have better blood circulation healthy heart and lungs. You have better strength; your endurance level is improved. It also helps your cognition; you are able to think better, and think clearly. You won't fall sick as often as you would if you eat healthily and are physically active. -P8

Participants viewed physical activity as a crucial means to realising their goals to maintain the desired weight and avoid getting a chronic condition in the future as a key motivation for incorporating physical activities into their lifestyle. For example, P3 and P10 stated:

I have a tendency to put on weight if I sit down in one place, so I try to be active to maintain a manageable weight. I will try to maintain a proportionate body mass index. And when I add a little weight sometimes, I find it difficult going upstairs, like I am dragging myself up. I want to be able to run upstairs and run down – P10

I am trying to avoid being overweight, I think I am gaining weight, and it is not a good thing; when you gain weight or the more you gain weight, the more susceptible to falling sick, you know, and then you just become lazy and all that. So, I wouldn't say I have fallen to either of them, but you know I am going towards preventive measures. Basically, so I don't get to a point where you know I am very, I become lazy, I become ill because of my weight and all that. Those are my primary motives – P3

Several participants voiced their concerns about their perceived risk of developing chronic diseases due to family history or witnessing people around them with chronic diseases motivates them to keep an active and healthy lifestyle. For example, P11, P12 and P13 stated:

I do have a high risk of being diabetic and having high blood pressure just because of my family history, so my goal is to stay active to help me not getting those diseases even though some genetic diseases no matter what you do, you might still get it. But you have a lesser chance of getting it if you do these other things that would benefit your life in the future– P11.

[...] My family background is actually the major reason but um, apart from that my husband has high blood pressure so I try my best to; from seeing people around me, I try my best to keep active and healthy. Because there is a lot of diseases out there and I would hate for me to find out that, um maybe in the next few years, I will find out that I have a major ailment. Which should have been avoided by diet and exercise in my previous years so I just try my best to keep as healthy as I can –P12

Because my profession, I understand what it is like when someone does not stick to being active or try to maintain a healthy lifestyle. You see all sorts of diseases that can be avoided just by changing your lifestyle and making lifestyle modifications, that makes me stay healthy, for myself and my family – P9

Moreover, one participant, P12 reported that certain life circumstances, like being diagnosed with a health problem, served as a turning point that triggered a perceived need to make lifestyle changes:

About three years ago I was told that I was pre-diabetic. Which is like borderline from becoming diabetic and because of my background, and understanding what diabetes really means, then the complications that comes with diabetes I chose to completely change my lifestyle that is when I would say, I started like working out, going to the gym, [...] just because I was just focused on making sure in the future, I don't get

diabetes. So that has been my initial motivation and that is still the motivation that I still think about when I chose to work out or eat healthy – P12

2.4.2.2 Shared experience and support

Leisure time physical activities such as walking, running or “going to the gym” were regarded as social experiences, with participants often citing it as something they did in the company of friends, family, neighbours or significant others as agents of social support. Participants also expressed that these social interactions formed an integral and enjoyable part of their exercise experience. For example, P2, P5, P16 and P11 stated:

It's more enjoyable when you have people around doing that same activity with you. When I started going to the gym, it was because of the people around me. So, you work with this class of people and then it's X time, and everybody is packing up to hit the gym. I did gym for quite a period last year, and that was because it was a clique thing. So, I think the influence of people around you could also affect how one does physical activities. – P5

For me, I enjoy group activities. Um, yeah, like going to the group fitness classes is more fun for me than just running around my neighbourhood. So, I would also prefer if I had to run then I would do like a 5KM run, with friends or not just friends but people I meet there as opposed to just running by myself which I don't find so much fun. – P16

Yes, so I definitely have like two or three friends that I love exercising with and we all have those days that we are like ooh, I just want to stay in front of the TV and just watch this show but what we do is just we motivate each other. Like you know, set a time that we are going to exercise, remind ourselves of, you know, why we want to do it, and how we feel after we work out. You know, so I do have friends that motivate me. I motivate them as well, and just being in the same vicinity as them while we are working out is like you push yourself, oh I'm tired. Still, they say no you can do it, ten more minutes, you know what I mean, so, it is nice to have people around you as you are working out because you push yourself to do more than you think you could. – P11

In the city center where we play the basketball, I have met a lot of interesting people who motivate you in this way. They call you when you haven't come around and you do the same. You have like a community supporting you. We discuss our goals; we discuss diet, we discuss some of our limitations and so on. [...] We have like a mini support group where I play basketball –P2

Conversely, several participants described the absence of support from others as a factor that hindered them from being as physically active as they would like to be and wished they had other people in their lives to push them. For example, P3 stated:

“If I had someone who is interested, my neighbour, partner, or something, that would have really helped. So, most of the time I have to motivate myself, and you know it has not been easy. That has been my primary challenge for exercising”. – P3

2.4.2.3 Neighbourhood environment

Some participants mentioned that they felt uncomfortable exercising within their busy neighbourhood. They described feeling uneasy about people around seeing them and wondering why they were walking around the neighbourhood. For instance, P12 and P14 explained:

I think it is discouraging because when I started going out for a walk, I was like oh no, do I have to go? because my house is like on a very busy street. So, sometimes you know I don't want people seeing me walking down. – P12

When you brisk walk or jog in the morning, which is usually busy, people look at you weirdly like Oh! Look at that person; what are they doing? – P14

Some participants mentioned that there were no proper footpaths on which they could walk, as infrastructures for pedestrians are misused and inaccessible, discouraging people from walking to places:

In Abuja, there are paved roads for pedestrians, but they are not used. You find either people pouring dirt or sometimes domestic waste or parking a vehicle, and you have to be dodging moving vehicles -P10

2.4.2.4 Limited gender-appropriate exercise facilities

Female participants in the study described difficulty accessing gender appropriate facilities such as women-only gyms or swimming facilities. They described feeling uncomfortable exposing their bodies or exercising within a mixed group of people. For example, P15 and P11 explained:

It hasn't really been that easy for me to go swimming because there are many places, a lot of men, and you know I don't really feel comfortable. So maybe unless I find an all-female swimming place, I don't think I will be swimming anytime soon. And then going to the gym, um, people are not as comfortable, seeing other people around them, but I think with men it is a lot easier, but females are a bit more self-conscious,

so they wouldn't want to go to the gym because they feel like everyone is looking at them. So, there are a few percentages of people that are motivated to exercise – P15

I know this type of mentality in our culture, like women not going to the gym; it's all guys, especially if she is married. So that tends to put many people off. - P11

2.4.2.5 'It is not part of the Nigerian lifestyle to exercise.'

Most participants shared their perceptions about the culture of physical activity in Lagos and Abuja. They mostly expressed that it is not in the 'Nigerian lifestyle' or culture to exercise and therefore believed that most people in Abuja and Lagos were physically inactive. For instance, P11 and P12 stated:

In general, on average, I would say we are more on the sedentary side. It is not part of our lifestyle to specifically engage in physical activity to be healthy. Because of our lifestyle, we are a society where people hardly walk to places, and I think people are just so comfortable with not being active that it is so hard for them to get dressed and like go to the gym -P11

For us over here, like I said, most of us don't exercise much. All the exercise you just have to do is maybe move from one place to another you know just walk and things like that no physical exercise like that you know. – P12

Participants further elaborated that most people in Nigeria only actively engaged in exercise after finding out about having a health problem:

I don't think people are more on the active side. I feel people only exercise when they have a health issue or gain weight. I believe it is our typical attitude or mentality, we don't have this urge to maintain. We like repairing. Sometimes people don't realise they are sick, or you have been ill for some time. But many people don't bother until they have a complication –P10

I do not think I know anyone trying to keep fit, except an aunt who was overweight and wanted to lose it. We do not have that culture of trying to stay fit until something happens, except among the younger generation. – P9

I think most people just think feel like ok as long as I am not obese, and I am not overeating every day, I am fine. They may not be fit but look healthy, so people feel that they look okay and won't do anything about it. They don't know whether their heart is failing, but as long as they look healthy and are not in the hospital, it is okay. – P16

Two participants commented that this sedentary culture is something common to the urban populations:

Well, I don't know whether it is a culture that just emerged among the urban elites. The rural people walk to the farm, the market, and ride bicycles, but we come out of our house we, jump into the car, drive to the office, you know, come home, sit down, and watch television. – P10

2.5 Summary of Key Findings and Discussion

This preliminary scoping study explored people's experiences with physical activity and perceptions of factors influencing physical activity in an urban Nigerian context. From the findings, participants described engaging in several physical activities, including going to the gym, group fitness classes, sports activities, and house chores, and identified leisure walking as their most common form of exercise. It is noted that the interview data did not capture discussions about unstructured forms of physical activity in as much breadth and depth as structured forms of physical activity. This may result from unstructured physical activity being more incidental and habitual and, thus, more difficult to articulate or recall accurately during an interview. I considered this in the design of the subsequent main study, where I complemented in-depth interview studies with diary studies that capture the contextual details of people's daily lives. Thereby not ignoring the mundane, difficult-to-recall aspects of everyday practices.

The key themes related to influences of physical activity that emerged from the inductive thematic analysis were centred around motivations and barriers to physical activity. Based on the findings, motivations for physical activity included the desire to meet personal health goals and having a shared experience and support from social networks such as family, friends, colleagues and neighbours in exercise participation. Barriers to physical activity included having limited gender-appropriate exercise facilities for women. Female participants felt uncomfortable exposing their bodies while exercising in specific public spaces like gyms and swimming pools. The findings also revealed that people felt uncomfortable exercising in their neighbourhood environment due to inaccessible footpaths and concerns about public perceptions. Participants also believed that people in urban Nigeria are physically inactive because exercise is not a culture of the Nigerian people. They claimed that people don't feel

the need to exercise until they develop a health problem that forces them to change their lifestyles.

The overwhelming emphasis on the social context in influencing physical activity participation among participants highlighted an opportunity to explore further what role the social and physical environment plays in influencing physical activity and what aspects of these social influences need to be considered and supported to design culturally appropriate interventions. To this end, I reviewed relevant and prominent theories on health behaviours and social influences that are applied in physical activity research to have a theoretical understanding of social influences on physical activity behaviour and behaviour change. This exercise helped me to identify appropriate theoretical frameworks to frame the design and analysis of my subsequent main study.

2.6 Limitations

One limitation of this study was the use of convenience and snowball sampling, which may have biased the sample towards participants with relatively homogenous backgrounds and circumstances. Most participants were young adults, had higher education levels, and were somewhat concerned about their health and well-being. Participants' higher education level might have led to higher general knowledge and awareness about physical activities and their health implications. Moreover, a second limitation is the recruitment technique: By only interviewing participants that were acquainted with people within my social circle, the diversity of the research sample was limited in a way that could alter the representation of the population. Nevertheless, this preliminary scoping study provided rich insights into key social factors that offered directions for further investigation. To further define the scope of the research, the main study focused on patients with type-2 diabetes, a population for whom that physical activity will benefit their diabetes management.

Chapter 3: Literature Review

Some sections of the literature review presented in this chapter were previously published in: **Ismaila H.**, Blandford A., Fottrell E. (2017). 'Exploring the Relevance of Social Practice Theory to Inform the Design of Technologies for Supporting More Physical Activity in Everyday Life', paper presented at the 1st GetAMoveOn Annual Symposium, London, United Kingdom, 25 May 2017.

3.1 Introduction

This chapter presents a review of relevant literature for the study. It begins by providing a background on type-2 diabetes and its relationship to physical activity. It then provides a critical review of relevant theoretical approaches employed in physical activity research in the field of Human Computer Interaction (HCI). Following this, the chapter explores the relevance of social practice theory for the main study and proposes an integrated approach combining social practice theory with a life-course perspective as a guiding framework for the main study. The chapter concludes by defining the research aims and questions for the main study.

3.2 Type-2 Diabetes Mellitus

Type-2 diabetes mellitus (T2DM) is a chronic metabolic condition that results from the body's inability to produce enough insulin (insulin deficiency) or respond effectively to the insulin produced (insulin resistance) (Kahn et al., 2006). Insulin is a hormone secreted by the pancreas to help carry glucose from the bloodstream into the cells in the body, where it is utilised as an energy (Mukhtar et al., 2020). However, when the pancreas does not produce adequate insulin or use the hormone effectively, it results in a build-up of glucose in the bloodstream (hyperglycaemia) (Mukhtar et al., 2020). Over a prolonged period, uncontrolled hyperglycaemia may lead to chronic complications, including coronary heart diseases, kidney failure, nerve damage, blindness, lower limb amputations and premature deaths (Lorber, 2014). T2DM is associated with both modifiable and non-modifiable risk factors (Alberti et al., 2007). Non-modifiable risk factors include advancing age, family history, and ethnic background (Alberti et al., 2007). Modifiable risk factors include physical inactivity, nutrition, being overweight or obese, high blood pressure and high blood cholesterol (Alberti et al., 2007).

3.2.1 Prevalence and Burden of Type-2 Diabetes Mellitus

Diabetes mellitus is a significant global health problem affecting about 537 million people worldwide, over 90% of whom have T2DM (IDF, 2021). This number has risen from 415 million in 2015 and is projected to grow to 783 million by 2045 (IDF, 2015; IDF, 2021). Diabetes accounted for 6.7 million deaths and caused at least 966 billion US dollars in health expenditure in 2021 alone. The prevalence of diabetes is rising more rapidly in low-and-middle-income countries (LMICs) compared to high-income countries, with about 80% of people with diabetes now living in LMICs. The rising prevalence of T2DM in LMICs has been attributed to increasing urbanisation, an ageing population, decreasing physical activity levels and rising incidence of overweight and obesity (IDF, 2021).

In 2021, it was estimated that 24 million people in Sub-Saharan Africa are living with diabetes (IDF, 2021). According to IDF (2021), Nigeria records the second highest number of people living with diabetes (after South Africa) in SSA, with 3.6 million cases. However, previous studies have argued that diabetes cases are largely underdiagnosed and under-reported in Nigeria (Abdulrashid et al., 2021). There is also no national data available on the incidence of diabetes in Nigeria (Abdulrashid et al., 2021).

T2DM imposes an additional strain on healthcare systems in Nigeria, which are already challenged with a high burden of infectious diseases (Fasanmade & Dagogo-Jack, 2015; Maiyaki & Garbati, 2014). Additionally, in Nigeria, the cost of diabetes treatment is largely out-of-pocket expense. The National Health Insurance Scheme (NHIS), a social health insurance scheme in Nigeria, covers only federal government workers and their families. In contrast, other private health insurance programs cover people working in the private sectors. These forms of insurance coverage account for less than 10% of patients with diabetes, and as a result, the cost of care is primarily borne by patients and their families (Fasanmade & Dagogo-Jack, 2015). This places an enormous socio-economic burden on patients, their families and the nation at large due to high direct costs of treatment and indirect costs from loss of productivity from disability and premature deaths (Maiyaki & Garbati, 2014).

3.2.2 Relationship between Physical Activity and Type-2 Diabetes Mellitus

3.2.2.1 *Physical Activity*

Physical activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure (Caspersen et al., 1985). Therefore, physical activity encompasses a broad spectrum of activities that occur in the waking hours of everyday life. Physical activity can be grouped into two broad categories: planned physical activity and incidental physical activity (KURÇER, 2018). Planned physical activity, also referred to as exercise, is a structured form of physical activity that is done to improve or maintain health and fitness (Caspersen et al., 1985). Incidental physical activity, on the other hand, is an unstructured form of physical activity that occurs during daily tasks in the home, at work, during leisure, and while commuting (Ross & McGuire, 2011). Both categories of physical activity can be performed at varying intensity levels. The measure, metabolic equivalent of task (MET), is used to quantify an activity's energy expenditure and characterise the intensity level of the activity (Byrne et al., 2005). For example, an activity that expends less than 1.5 METs is considered sedentary, between 1.5 – 2.9 METs is regarded as light-intensity physical activity, between 3.0 – 5.9 METs is regarded as moderate-intensity physical activity, and 6.0 METs above, is considered vigorous-intensity physical activity (Ainsworth et al., 2011).

3.2.2.2 *Health Benefits of Physical Activity for People with Type-2 Diabetes*

Physical activity is a cornerstone in the prevention and management of T2DM (Hayes & Kriska, 2008). The general recommendation for physical activity for people with type-2 diabetes is to undertake at least 150 minutes (spread across three days) per week of moderate-intensity physical activity (Colberg, 2012). Significant evidence suggests that regular physical activity can prevent or delay the progression of T2DM and its associated complications (Gill & Cooper, 2008; Lakka & Laaksonen, 2007). Even a single bout of moderate-intensity physical activity has been shown to lower blood glucose levels and improve insulin action for up to 72 hours after the activity, depending on the activity duration, intensity levels, and subsequent food consumption (Colberg, 2012). The rapid increase in energy demands during physical activity increases glucose uptake from the bloodstream through insulin-dependent and independent pathways (Marriott, 1994). Moreover, recent evidence showed that breaking up prolonged sitting time (7 hours) and replacing it with short, frequent bouts (3 minutes every 30 minutes)

of light-intensity walking and simple resistance activities significantly reduces blood glucose levels in people with type-2 diabetes (Bailey & Locke, 2015; Dempsey et al., 2016). Nevertheless, long-term engagement in physical activity of moderate intensity has been shown to improve insulin sensitivity and blood glucose control, reduce weight, and improve cardiovascular and musculoskeletal functions in people with type-2 diabetes (Colberg, 2012; Lakka & Laaksonen, 2007).

3.2.3 Behavioural Theories and Approaches in HCI Research for Physical Activity

This section provides a summary and critique of traditional theoretical approaches to understanding and designing for physical activity. Grounding physical activity interventions on sound theoretical foundations has been strongly advocated in public health and HCI research (Buchan et al., 2012; Hekler et al., 2013; Stawarz et al., 2015). Researchers argue that interventions promoting health behaviours such as physical activity are likely more effective if grounded in appropriate theory (Davis, 2011). Physical activity research draws predominantly on behavioural theories from social psychology in an attempt to address the challenges of adopting and sustaining a physically active lifestyle (Buchan et al., 2012). Additionally, within HCI, researchers have increasingly explored the use of behavioural theories to inform the design and underlying design strategies of digital technologies that aim to encourage physical activity (Hekler et al., 2013; Orji & Moffatt, 2018). The most prominent behavioural theories used in both physical activity and HCI research include goal setting theory (Locke & Latham, 1990), the transtheoretical model (Prochaska & DiClemente, 1986), self-determination theory (Deci & Ryan, 1985) and social cognitive theory (Bandura, 1977).

3.2.4 Prominent Behavioral Theories

3.2.4.1 Goal Setting Theory

Goal setting theory by Locke and Latham (1990) is a theory of motivation based on the premise that [conscious] human behaviour is goal-directed. It describes how goals can be used to motivate behaviours and achieve new or increased levels of behavioural performance (Locke & Latham, 1990). Goal setting theory asserts that **specific** and challenging (but attainable) goals result in higher levels of behavioural performance than easy, general goals or no goals (Locke & Latham, 1990).

According to Locke and Latham (1990), the goal-behavioural performance relationship is strongest when an individual is committed to achieving a goal they set for themselves (**goal**

commitment). Goal commitment, however, depends on how important achieving the goal is to the individual (**perceived importance**) and the confidence that they have in their ability to achieve that goal (**self-efficacy**) (Locke & Latham, 1990). Furthermore, goals are more effective when combined with **feedback** regarding performance because it allows individuals to track their progress towards achieving a goal and then adjust their efforts to match what is required to achieve the goal (Locke & Latham, 1990).

Goal setting theory is commonly used to inform the design of digital interventions that encourage physical activity, particularly activity tracking applications (e.g., (Consolvo et al., 2009; Khot et al., 2014; Munson & Consolvo, 2012)). Goal setting accompanied by feedback on goal achievement is considered a key feature in the design of activity-tracking applications (Khot et al., 2014). A prominent example is the work of Consolvo et al. (2009), who explored some aspects of goal-setting theory in the design of the UbiFit Garden application to encourage physical activity. UbiFit is an application that uses on-body sensor technology to enable users to set goals for the physical activity levels they aim to achieve, self-monitor their daily physical activity, and achieve goals (Consolvo et al., 2009). It includes strategies for making goal commitment more effective such as incentives, feedback on performance, and improving user's self-efficacy towards goal achievement (Consolvo et al., 2009).

3.2.4.2 *Trans-Theoretical Model*

The Trans-theoretical model (TTM) by Prochaska and DiClemente (1986) is a stage-based model that conceptualises behaviour change as a **process** that takes place in a series of **stages** over time. It postulates that people move through five stages when changing their behaviour. These stages are an individual moving from lacking awareness or being unwilling to change a health behaviour (**pre-contemplation**), to considering the possibility of making a health behaviour change (**contemplation**), getting ready to make the health behaviour change (**preparation**), to taking action (**action**), to maintaining the desired health behaviour over time (**maintenance**). Some versions of the TTM include a relapse and termination stage (Prochaska & DiClemente, 1986). In the TTM, behaviour change is viewed as a cyclical process rather than a linear one. Individuals can progress and relapse to previous stages several times before achieving the maintenance stage. The transition between scenes is determined by the concept of **self-efficacy** – the confidence an individual has in their ability to engage in a

particular behaviour and **decision balance**, the outcome of individual assessment of the pros and cons of behaviour. (Prochaska & DiClemente, 1986)

Studies in HCI have used TTM to tailor physical activity interventions according to the stage of the individual's behaviour change (e.g., (de Vries et al., 2016; Ferron & Massa, 2013; Hamper et al., 2016)). For example, De Vries et al. (2016) employed TTM to design a smartphone application to support individuals through text messages, to lead a physically active lifestyle. The application included and examined personalised motivational messages tailored to an individual's stage of readiness to make a change and important processes of change in that stage (De Vries et al. 2016).

3.2.4.3 *Self-determination theory*

Self-determination theory (SDT), proposed by Deci and Ryan (1985), is a theory of human motivation that distinguishes between different types of motivation based on varied reasons or goals that give rise to action. It postulates that an individual's tendency to adopt and maintain specific behaviour depends on their motivation (Deci & Ryan, 1985). According to SDT (1985), motivation is a gradual process from no intention to engage in a particular behaviour to engaging in a behaviour to achieve an outcome motivated by external factors such as reward, avoidance of negative consequences etc. (**extrinsic motivation**), and finally engaging in a behaviour or activity for the inherent enjoyment and satisfaction of the behaviour itself (**intrinsic motivation**) (Deci & Ryan, 1985). Motivation needs to be self-determined (intrinsic) rather than externally controlled (extrinsic) for behaviour to last. Intrinsic motivation is achieved when three fundamental psychological needs are satisfied: **autonomy** (the need to feel in volitional control of one's behaviour), **competence** (the need to feel capable of achieving the desired outcome) and **relatedness** (the need to feel connected to others) (Deci & Ryan, 1985).

Physical activity interventions based on SDT focus on motivational strategies to promote autonomy, relatedness and competence (e.g. (Cercos & Mueller, 2013; Rooksby et al., 2015)). Rooksby et al. (2015) applied constructs of SDT in their design of 'Pass the ball', an activity-tracking application that aims to support users' motivation and physical activity participation through collaboration and competition. It uses gamification strategies to enhance social

relatedness and competence, whereby users compete in teams and take turns in tracking their activity to score points for their team (Rooksby et al., 2016).

3.2.4.4 *Social Cognitive Theory*

Social cognitive theory (SCT) by Bandura (1977) postulates that human behaviour results from the interaction between personal (cognitive and biological), behavioural and environmental factors (perceived contextual barriers and opportunities). SCT proposes a set of core constructs that influence and determine behaviour and behaviour change: knowledge, self-efficacy, outcome expectations, self-regulation, perceived barriers, and perceived social support (Bandura, 1977).

Knowledge refers to information about the risks and benefits of engaging in certain behaviours and is a precondition for behaviour change. However, additional influences are required to enact behaviour change (Bandura, 1977). **Self-regulation** refers to how people exercise control over their motivations and behaviour when pursuing goals. This involves the skills to set personal goals, plan strategies to meet those goals, monitor progress towards the goals, and adjust accordingly. **Outcome expectation** refers to an individual's perception of the outcome that might result from engaging in specific behaviour and the perceived value (cost and benefit) of that outcome. **Perceived barriers** include an individual's beliefs about personal and environmental factors that may impede or make performing a behaviour difficult. **Perceived social support** refers to an individual's perception of readily available support from friends, family, and others (Bandura, 1977). Lastly, **self-efficacy**, the central focus of SCT, is described as the extent to which an individual believes in their capabilities to engage in certain behaviour that will result in an expected outcome. According to SCT, the higher an individual's confidence to perform an activity, the more likely they are to engage in sustained engagement in that activity (Bandura & Wessels, 1994).

According to Bandura and Wessels (1994) four sources of self-efficacy include **enactive mastery experience** (one's experiences with success or failure in previous performances), **social modelling** (comparing one's performance to the achievements of others), **verbal persuasion** (encouragement or positive feedback from others) and **physiological and**

affective states (one's responses and emotional reactions to performing a specific behaviour) (Bandura, 1994).

The application of SCT in HCI interventions has mainly focused on increasing an individual's self-efficacy through self-monitoring and social comparison of physical activity (Anderson et al., 2007). A widely cited example is Shakra (Anderson et al., 2007), a mobile application for monitoring and sharing physical activity information. The application infers three states of physical activity: stationary, walking and driving and displays the user's current state of activity, the amount of time that the user was active per day, and a historical overview of their activity level through the week. It also facilitates sharing and comparing users' activity levels (daily or weekly) among friends and family to encourage reflection and self-efficacy through social modelling (Anderson et al., 2007).

3.2.5 Theory-Informed Design Approaches to Physical Activity Behaviour Change

The application of behavioural theories to inform the design of technology to motivate greater physical activity in everyday life has contributed to the development and use of theoretically informed design strategies employed in both HCI research and commercial applications (Hekler et al., 2013; Munson, 2012). An example of a comprehensive framework encapsulating these strategies is Michie et al.'s (2013) CALO-RE taxonomy, which includes 40 behaviour change techniques (BCTs) drawn from behavioural theories. BCTs refer to strategies included as 'active ingredients' of interventions contributing to behaviour change. The CALO-RE taxonomy was developed based on systematic reviews of interventions to encourage physical activity (Michie et al., 2013). It was specifically designed to help intervention designers identify, apply and evaluate evidence based BCTs in physical activity and healthy eating interventions (Michie et al., 2013). The taxonomy has also been used to identify BCTs currently employed in mobile applications that promote physical activity (Sullivan & Lachman, 2017).

Middelweerd et al. (2014) conducted a content analysis on 64 mobile applications designed to promote physical activity in adults based on the BCT taxonomy. They reported that these apps' three most common techniques were goal setting, self-monitoring, and feedback. Mercer et al.'s (2016) critical analysis of wearable activity trackers using the CALO-RE

taxonomy revealed that physical activity applications also integrate BCTs related to self-monitoring, feedback and goal setting, and social support.

Similarly, Orji and Moffatt (2016), in their review of persuasive technology literature on health and wellness, also found self-monitoring and performance feedback, goal-setting, gamification, and social influence as the four main strategies used to motivate physical activity. However, central to these applications is the concept of 'self-tracking' of daily physical activities (also known as activity tracking) using smartphones and wearable devices (Lupton, 2014; Sullivan & Lachman, 2017).

3.2.5.1 Self-Tracking of Physical Activity

Self-tracking of physical activity involves using sensing technology to objectively measure and provide information regarding one's daily physical activities (Sullivan & Lachman, 2017). Everyday life is increasingly permeated by ubiquitous sensing technologies (smartphones and wearable devices) that enable continuous tracking and real-time feedback of users' daily physical activity - in the form of step counts, distance, activity duration, stairs climbed, calorie consumption, heart rate and progress over time - through the use of built-in sensors such as pedometers, accelerometers, GPS and altimeters (Piwek et al., 2016). There has also been a proliferation of activity-tracking devices (for example, Fitbit, apple watch, jawbone up, Nike + fuelband and other smartphone apps such as MyFitnessPal and nudge) currently on the market that aims to encourage people to be more physically active, through daily tracking.

Self-tracking provides a means for individuals to set goals, track progress, analyse, share, compare and self-reflect on information about their daily physical activities, with the idea that this increased 'self-knowledge' will catalyze making informed choices towards 'self-improvement' and behaviour change (Lupton, 2016). The assumption is that through feedback and self-reflection, individuals can evaluate their performance about their set goals and adjust accordingly. This assumption relates to goal setting theory and social cognitive theory constructs that emphasise the importance of self-regulatory processes (goal setting, self-monitoring, feedback and self-evaluation) in driving behaviour change. The data collected can be shared and compared with friends, including gamification mechanisms such as competition to enhance motivation. This social interaction feature is consistent with

the principles of both SCT and SDT: The relatedness construct of SDT and the social modelling construct of SCT, which are theorised to influence motivation and self-efficacy. Therefore, to motivate physical activity, self-tracking applications are, in principle, designed to enhance self-knowledge and self-regulation, increase autonomy over one's health and well-being, and facilitate social support.

3.2.6 Critique of Behavioural Approaches to Physical Activity Behaviour Change

While the application of behavioural theories discussed above is valuable in addressing individual and interpersonal aspects of behaviour, they have received overlapping criticisms regarding their usefulness in providing an appropriate framework for understanding and effecting sustainable changes in physical activity (Buchan et al., 2012; Hekler et al., 2013; Cohn, 2014). Firstly, these behavioural theories and their applications have been criticised for their emphasis on rational reasoning and decision-making that tend to ignore the routinised and dynamic nature of the physical activity, as well as the practicalities and contingencies of everyday life (Biddle & Mutrie, 2007; Buchan et al., 2012; Horrocks & Johnson, 2014). Secondly, they have been criticised for maintaining an individual-centric focus on behaviour change that tend to downplay the broader dimensions of physical activity (Buchan et al., 2012; Blue, 2016).

3.2.6.1 *Emphasis on rational decision-making*

The implicit premise of these behavioural theories is that individuals are rational, autonomous decision-makers with the ability to control their behaviours through their volitions (Cohn, 2014). Underlying this is an assumption that an individual's decision to perform a behaviour like physical activity is primarily based on a reflective process of rational assessment, in which individuals weigh the expected cost and benefits of their behavioural choices (Maller, 2015). However, some scholars in psychology criticise this assumption for failing to consider the non-rational aspects of the decision-making (Kurz et al., 2015; Sheeran et al., 2013). They argue that most individual decision-making or behaviours are not purely determined by rational reasoning and deliberate analysis but are socially influenced and occur automatically, often triggered by environmental cues (Kurz et al., 2015). For example, habitual behaviours and routine activities may be normalised into individuals' everyday lives and involve less rational and conscious thought (Kurz et al., 2015).

It has been argued that performing health-related activity like physical activity is not a single or one-off event solely based on rational decision-making, but a varied set of activities embedded in the routines of everyday life (Blue et al., 2016). Performing physical activity is a dynamic process made up of various activities repeated in varied and complex patterns, occurring in different times and spaces of everyday life (Buchan et al., 2012). Moreover, beyond the planned and structured physical activities, mundane physical activities are routinely performed within the various settings of everyday life, including, work, transportation, leisure and household domains (Bauman et al., 2012).

Therefore, the usefulness of these behavioural theories becomes more limited when it comes to changing patterns of activities in daily life that are embedded in daily routines and do not require such an ongoing, reflective decisional process or much conscious effort (Blue, 2016, Maller, 2015). For instance, theory-informed strategies such as self-tracking of physical activity promote the rhetoric of “self-knowledge through numbers”: a critical assumption that quantitative data indicating an individual’s bodily activities can lead to greater self-knowledge and, in turn, lead to self-reflection, with the expectation that the rational evaluation of these data will result in behaviour change (Lupton, 2014). However, the representation of an individual’s physical activity as reducible to quantified measures, and behaviour change as an outcome of self-regulatory processes, has been argued to oversimplify and conceal the social embeddedness of physical activity and the dynamics and contingencies of everyday life that influence physical activity (Cercos et al., 2016). Critics suggest that these quantifiable dimensions of self-tracking are implicated in different social, cultural, historical and material aspects of everyday life and health, and such relationships cannot be treated in isolation or reduced to measurable variables, resulting in a linear process of rational considerations (Cercós et al., 2016).

3.2.6.2 Focus on Individual social cognitions, mostly abstracted from the societal context

Digital interventions for physical activity promotion that draws upon these behavioural theories tend to be narrowly designed around individual behaviour change, aimed at influencing an individual’s social cognitive variables that are theorised to determine behaviour, such as knowledge, self-efficacy beliefs, self-regulation skills, perceived social support, readiness to change, and autonomy (Spotswood, 2016). However, scholars in social

sciences argue that by primarily focusing on individual social cognitive processes involved in motivation and behaviour, these behavioural theories provide a narrow framing of human activity that underestimates the role that the wider society plays in shaping health behaviours like physical activity (Buchan et al., 2012; Maller, 2015). They suggest that individuals do not live in a vacuum; instead, their activities occur in and are shaped by a range of social, cultural, historical, and environmental forces acting within the homes, schools, workplaces, neighbourhoods and communities in which they live (Buchan et al., 2012).

Furthermore, studies have shown that physical activity patterns and associated health outcomes vary across and within societies according to many sociocultural and geographical factors, including race, ethnicity, gender, socioeconomic status, and the built environment (Powell et al., 2004). Also, within the context of everyday life where physical activity (or lack thereof) is experienced through routines, individuals have different physical activity patterns in various social settings. Every setting has particular characteristics that may influence how individuals engage in physical activity.

Additionally, self-tracking of physical activity tends to emphasise the discourse of individual agency and responsibility for health improvements while ignoring the underlying social and structural determinants (social, economic and environmental conditions) of health that constrain people's ability to achieve health benefits such as poverty, limited access to care, poor living conditions and so on (Lupton, 2014; Spotswood, 2016). Hence, behavioural theories may not fully explain or produce significant changes in physical activity participation without considering these broader issues (Blue, 2016).

Although some of the theories, for example, SCT and SDT, take into account some social and material influences; they do so in the form of social cognitions (individuals' perception of their social and physical environment) that impact an individual's motivation, opportunity and ability to engage in behaviour (Cohn, 2014). They do not encounter the everyday contextual and situational conditions within which the individuals and their actions are situated. The contextual factors are therefore relegated to a limited influence on individual behaviour, merely considered as yet more variables (perceived social influence, perceived opportunities, and barriers in the individual decision-making process (Cohn, 2014; Holman, 2017).

In recent years, several critics of behavioural approaches have attempted to move the focus of public health research beyond individual behaviour towards a more socially situated account of human activities within everyday life (Maller, 2015). Researchers within public health and sociology have argued for a shift in theoretical perspective, suggesting that social practice theory (SPT), which takes everyday practices within their socio-material context as the central focus of analysis, provides an alternative approach for conceptualising everyday health-related practices, including physical activity (Cohn, 2014; Blue et al., 2016; Maller, 2015). Rather than explain causal relationships, practice theory provides a conceptual frame to guide us in generating empirical research questions about how and why people do what they do and in unravelling key influences of change and stability (Warde, 2005; Shove et al., 2012).

Recent studies in public health and social science literature are starting to examine health practices such as smoking practices (Blue et al., 2016; Keane et al., 2016), snacking practices (Twine, 2015), alcohol consumption practices (Supski et al., 2017) and physical exercise practices (Blue et al., 2016) to explore the relevance of a practice-based approach and its implication for public health research and intervention. However, no study has yet been found to apply this approach to understanding physical activity practices among people with type-2 diabetes.

To conclude, the thematic analysis of my preliminary scoping study revealed a greater emphasis on the importance of social support networks in motivating physical activity in an urban Nigerian context. These findings inspired further questions about the broader influences of the social environment and what constitutes social motivations for physical activity. However, these traditional behavioural approaches put less emphasis on the social context of physical activity. Therefore, having considered the limitations of behaviour change approaches in informing the design of physical activity interventions, I sought to explore what possibilities a more practice-oriented approach might offer in understanding the social context of physical activity.

3.3 Social Practice Theory

Social practice theory is a sociological approach grounded in the early works of social theorists Bourdieu (1990) and Giddens (1984) and more recent developments by Schatzki (1996), (Reckwitz, 2002), Warde (2005) and Shove et al. (2012). SPT is, therefore not a unified or coherent theory but rather a synthesis of theoretical perspectives that share a focus on social practices, such as walking, cycling, swimming, or using the stairs, as the fundamental unit of social analysis (Nicolini, 2012). Different scholars have defined social practices differently (Maller, 2015). A widely cited definition of social practice is that by Reckwitz (2002), who describes it as:

“A routinised type of behaviour which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, ‘things’ and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge”.

Schatzki (1996) describes a social practice as a “temporally unfolding and spatially dispersed nexus of doings and sayings”. More recently, Shove et al. (2012) – building on Reckwitz (2002) and Schatzki (1996) - developed an SPT model for analysing social practices. According to this framework, a social practice comprises three interdependent elements: *materials, meanings* and *competencies* (Shove et al., 2012). Whilst different practice theorists have approached the idea of social practices and how they transform over time from different (complementary and sometimes conflicting) perspectives (see Schatzki, 1996; Reckwitz, 2002; Warde, 2005; Nicolini, 2009), this paper primarily follows Shove et al.’s conceptualisation of the dynamics of social practices, which they highlight in their book, *The Dynamics of Social Practice: Everyday Life and How It Changes*.

3.3.1 Elements of Social Practice

Shove et al.’s (2012) analysis of the elements of practice is based on Reckwitz’s (2002) observation of how practices are constituted, which they simplify into three elements: materials, meanings, and competencies.

Materials refer to all physical (human and non-human) elements utilised to perform a practice, including objects, infrastructure, technologies, and the human body itself (Shove et al., 2012). In swimming, for example, these can include a body of water (swimming pool, ocean, lake, river), the swimmer’s own body, a swimsuit and other swimming equipment.

Meanings are the 'social and symbolic significance' attached to why a particular practice is performed at any given moment (Shove et al., 2012). For example, swimming is performed for various reasons, including recreation, fitness and health, competition, travel and spiritual cleanliness. Competencies include the knowledge and skills required to perform that practice (Shove et al., 2012). Competencies necessary for swimming include having aquatic skills (e.g., breathing regulation, floating, swimming strokes and moving in water) and knowledge about water safety. When carrying out a practice such as swimming, individuals - regarded as 'carriers' or practitioners of practices- actively bring together a combination of certain materials available, meanings they attach to performing the practice at that moment, and their competencies in performing in that practice (Shove et al., 2012).

3.3.2 Dynamics of Social Practices

According to Shove et al. (2012), practices emerge, persist, shift and disappear when links between these elements are made, sustained and broken. Therefore, social practices' emergence, reproduction and transformation can be analysed by examining the dynamic relationships between the elements that constitute specific practices and the relations between them. Shove et al. (2012) draw on Schatzki (1996) to introduce the concepts of *practice-as-entity* and *practice-as-performance* to describe how practices exist both as social entities and as individual performances. Practice-as-entity refers to the composition of interconnected elements that is recognisable and socially shared across time and space. In contrast, practice-as-performance is the active integration of the elements, through the specific act of doing a particular practice, by a practitioner, in a given moment in time and space (Shove et al., 2012). While practice performances are shaped by practice-as-entity, it is through recurrent performances that practices (as entities) emerge, persist, and transform over time (Warde, 2005).

To illustrate, the practice of swimming is a popular water locomotion activity practised by a wide range of people across the world. It involves relationships between the human body and body of water, knowledge and skills on how to swim, and the different reasons for swimming (i.e., practice as an entity). All of these elements are integrated when a person performs the act of swimming (i.e., practice-as-performance). Swimming performances vary, as different people swim in various bodies of water, for various reasons, under different conditions, and

using different swimming techniques. However, the varied performances can still be recognised (by an observer) as a practice of swimming. Moreover, swimming has existed from ancient times until today because people across societies have continued to perform and, in the process, transform it from a means of survival to recreational activity and even a competitive sport. The recursive relationship between practice-as-entity and practice-as-performance highlights the dynamics of practices over time: how the links between the three elements are made, re-made, and broken (Shove et al., 2012).

3.3.2.1 How Practices Emerge and Persist

A single instance of performing an activity - by a single practitioner - on its own does not immediately constitute a social practice (Shove et al., 2012). When a group of people continually perform an activity in (more or less) similar ways over time and space, interdependencies between all three elements are formed, reproduced and reinforced. Over time, this establishes a pattern of activities - held together by a relatively stable combination of elements - which people can recognise and talk about as an entity (practice-as-entity) (Shove et al., 2012). Thus, a social entity emerges when links between particular meanings, materials and competencies are established and reproduced through continual performances.

Moreover, a practice-as-entity exists and persists as long as the links between the constituting elements are constantly reproduced through repeated and 'more or less faithful performances' by practitioners across time and space (Shove et al., 2012). Therefore, a practice's survival depends on its ability to capture and retain a population of practitioners committed to continuing to perform a practice in a particular way. When a significant number of practitioners who were previously committed to performing a practice persistently fail to re-enact it (across time and space), the links between the constituting elements begin to disintegrate (Shove et al., 2012).

3.3.2.2 How Practices Change

According to Shove et al. (2012), "Practices change when new elements are introduced or when existing elements are combined in new ways". When a new element is introduced to

the practice, for instance, the introduction of new technology, this may form new meanings to the practice and may require new competencies, which can potentially disrupt how a practice is usually performed, or the emergence of a new practice over time (Shove et al., 2012). For instance, before the industrial revolution, household practices such as doing laundry were primarily performed manually (hand washing) and demanded considerable muscle power. However, the introduction of “labour-saving” devices such as washing machines into household practices in the 20th century has reduced the time and the level of physical exertion required to perform these practices, forging new meanings of ease, timesaving, and convenience (Lanningham-Foster et al., 2003).

Furthermore, while recurrent performances stabilise a practice entity over time, they can also potentially bring about change in the practice (Shove et al., 2012). Every version of a given practice is slightly different from the others, as practitioners combine different sets of elements of the practice depending on the situation in time and space, materials available, the competencies of the practitioner, and meanings attached to their performance (Hui, 2016; Shove et al., 2012). Also, once recruited to a practice, practitioners start as novices, and, as they develop their competencies through performances, they adapt, improvise and experiment with different ways of performing a practice (Warde, 2005). Over time, slight modifications in performances can lead to variations in practice-as-performance or change in practice-as-entity, as old links are broken, and new links are established (Shove et al., 2012).

3.3.3 Relationships between Practices

According to (Shove et al., 2012), practices do not occur in isolation; they often link with other practices in everyday life. People's daily lives comprise various practices coordinated in time and space. When practices co-exist or occur in the exact location, they may overlap and influence each other to form “loosely connected bundles” (Shove et al., 2012). Individual practices may also bundle together through shared elements, and changes in elements in one practice can lead to changes in another (Shove et al., 2012). For instance, kitchen practices such as cooking and doing the dishes are often connected by shared space, materials, and meanings. Cooking a meal may mean washing the dishes after, even if cooking and doing the dishes are two different practices. However, practice bundles may form tighter co-dependent relationships (referred to as complexes), where it becomes difficult to separate them as

distinct entities (Shove et al., 2012). Like elements of practices, the relationship between practices requires continual reproduction (through performances) to persist over time (Shove et al., 2012).

Practice bundles and complexes are formed and broken due to collaboration and/or competition between practices (Shove et al., 2012). Practices require limited resources of time and space for their performance: Since only a limited number of practices can be performed at the same time and/or space, the spatio-temporal arrangements of people's daily lives may support or inhibit the performance of certain practices (Shove et al., 2012). In a collaborative relationship, practices share limited resources and mutually support each other (e.g., cooking and doing the dishes). In contrast, in a competitive relationship, they compete for these resources or elements, and the performance of one practice may rule out the performance of another (e.g., driving to work vs cycling to work) (Shove et al., 2012).

To conclude, a social practice perspective allows us to think about physical activity as a configuration of interrelated elements that are constantly reproduced and transformed over time and exists as part of a wider nexus of practices in the organisation of everyday life. It is, however, important to note that SPT does not explain causal relationships nor prescribe strategies for change but instead provides a set of key concepts to guide us in generating empirical research questions about how certain practices emerge, persist and change over time and space (Nicolini, 2017; Shove et al., 2012; Warde, 2005).

3.3.4 Relationship between Practices and People

In previous sections, I discussed the relationships between elements of practices and between practices and their implications for understanding the dynamics of social practices. In this section, I elaborate on the relationships between people and practices and their significance in understanding the dynamics of practices.

Whilst practice theorists prioritise social practices such as physical activity as the fundamental unit of social analysis, the relationship between practices and people who perform the practices is nevertheless significant to understanding social change. Reckwitz (2002) conceptualises people as 'carriers of practice', who as 'bodily and mental agents', 'carry' and 'carry out' social practices. To distance themselves from individualistic accounts of human

behaviour, Shove et al. (2012) attribute the body performing the practice, meanings attributed to performing the practice, and the competencies necessary for performing the practice as constituent elements of practices and not qualities of the individual. Practise theorists agree that practices are enacted by multiple groups of people, and their recurrent performances hold significant consequences for the future of practices they are performing. As Shove et al. (2012) put it, *“the contours of any one practice – where it is reproduced, how consistently, how long, and on what scale – depend on changing populations of more and less faithful carriers or practitioners”*. By implication, this could mean that practices pre-suppose people and cannot exist without people (Schatzki, 2017). However, Schatzki (2017) argues that the relationship between practices goes beyond this conception, and practices are just as real as people are.

Schatzki (2017) describes the relationship between people and practices as mutually constitutive and that people and practices equally contribute to most aspects of social existence. Schatzki (2017) argues that while practices comprise people's actions, social life and human co-existence transpire within the context of bundles of practices and material arrangements. Against this backdrop, Schatzki (2017) proposes that ‘people’s lives proceed on the background of bundles.’ This suggests that bundles of practices are always already in existence when people are born and begin to participate in them, as other people have carried on practices before them. According to Shove et al. (2012), accidents of births, history, location, and existing social networks are essential in determining which practices people initially encounter and carry on. They further note that:

The chances of becoming the carrier of any one practice are closely related to the social and symbolic significance of participation and to highly structured and vastly different opportunities to accumulate and amass the different types of capital required for and typically generated by participation (Shove et al., 2012).

Moreover, Shove et al. (2012) shed light on the dynamic relationship between people and social practices in their account of how people become carriers of practice. While people proceed with their lives perpetuating and transforming the practices that they are recruited to, they are (at the same time) constantly taking up and dropping out of different practices as they move through the life course (Shove et al., 2012; Schatzki, 2017). Therefore, according

to Shove et al. (2012), the trajectories of social practices depend on the performances of changing cohorts of carriers.

Practices over the course of their trajectories are carried out by a changing population of people, while people will carry out varying sets of practices over their life course. Shove et al. (2012) contend that it is essential to pay attention to issues of access and how commitment changes over an individual's life-course combine to define the trajectories of social practices. They suggest that describing how people and practices change, reproduce, and transform each other, requires "turning back and forth between the lives of practitioners and those of the practices they carry" (Shove et al., 2012).

3.3.5 Daily Paths and Life Paths

Shove et al. (2012), borrowing time geographic concepts from Allan Pred (1981) elaborate on the relationship between *daily paths* and *life paths* of individuals and their practices. Pred's work (1981) concerns how people's everyday practices across the life course contribute to social change. According to Pred (1981), the path concept suggests an individual's biography is "*ever on the move with them and can be conceptualised and diagrammed at daily or lengthier scales of observations as an unbroken, continuous path through time-space.*" (Pred, 1981).

The *life path* (biographical) and *daily path* (every day) concepts represent the sequence of activities and movements of people through time and space (Greene, 2017). The *daily path* involves a series of activities within the time-space of every day. In contrast, the *life path* involves long-term institutional roles with which individuals are associated over their lives, in domains such as family, work and education (Hards, 2011).

Pred (1981) argues that every action and event that consecutively make up the individual's life has temporal and spatial attributes. Relatedly, Shove et al. (2012) note that, as with the dynamic nature of practices, people's lives are not static; they go through transitions such as having children, changing occupations, or moving to another country, that can bring about shifts in their daily practices (Shove et al., 2012). The practices that people may incorporate

within their daily paths are constrained by their inability to engage in spatially dispersed activities simultaneously and by finite time resources. Therefore, when people go through transitions, the details of their day (daily paths) are structured by priorities. Adjustments in participation in one realm of practice can invariably result in changes in other domains of practice, which are of consequence for their life paths as a whole (Pred 1981; Shove et al., 2012).

An analysis of the daily path facilitates an exploration of the relational and contextual processes shaping patterns of practices at the micro-level of lived experience. In contrast, an analysis of the life path helps to reveal the impact of people's socio-historical experiences and how the multiple social roles they have held along the way have influenced their engagement in particular practices (Greene, 2018).

Spurling (2010) drew on Pred's daily path and life path concepts to examine the everyday practices and careers of academic sociologists in universities in the UK and how these intersect with institutional and policy change processes. The study employed a qualitative methodology involving in-depth interviews exploring retrospective accounts of current everyday activities of the academics and a retrospective comparison between current daily activities and those at previous points in their careers (Spurling, 2010). Following their findings, the author concluded that integrating the temporality of people's lives into social practice theories offers new ways of understanding social change. Considering everyday practices of academics across their careers helped draw attention to the dynamic processes involved in the relationship between individuals and institutions, which had otherwise not been previously considered (Spurling, 2010).

Similarly, Hards (2011) employed a narrative life-course methodology to examine how individuals' participation in sustainable practices develops over the life course. Based on their findings, the authors conclude that SPT and time geography offer valuable concepts for exploring the dynamic nature of people's participation in practices and how this is connected with broader social processes. The author suggested that a narrative life-course methodology provides an experiential, contextual and temporal approach that is useful for generating rich

and multi-layered analysis that can reflect the complexity of people's actions to address climate change (Hards, 2011).

More recently, drawing inspiration from Hards (2011), among others, Greene (2018) adopts concepts from social practice theory and life-course perspectives to explore how people's everyday energy practices intersect with biographic and socio-technical change processes. The author argues that previous practice-oriented studies have paid less attention to people's lives while emphasising the dynamic nature of practices. According to Greene (2018), Pred's (1981) daily path and life path concepts offer two analytical scales for engaging with the dynamic interplay between people and social practices through time and space. Greene (2018) employed a multi-modal biographic approach to explore patterns and processes of the everyday energy practice on daily and life paths. The study involved three stages of data collection, including a biographic interview study, practice diaries and follow-up interviews. The author concluded that the findings from the study highlighted the importance of situating consumption practices in a historic and socio-material context. Rather than being solely driven by individual choice and deliberation, people's consumption practices were intricately implicated in evolving identities, roles, social contexts and relationships. This research sought to adapt Greene's (2018) approach by combining key concepts from SPT and life-course perspective (LCP) to explore the dynamic intersection of physical activity as a set of socially situated practices and the lived experiences of people with type 2 diabetes.

3.4 A Life-course Perspective

A life course refers to "the sequence of socially defined events and roles that the individual enacts over time", and "these events do not necessarily proceed in a given sequence, but rather constitute the total of the person's experience" (Giele & Elder, 1998). An LCP provides an analytical framework for understanding processes underlying patterns of stability and change in people's everyday practices within broader historical and socio-cultural contexts (Hutchison, 2010).

Rooted in the field of sociology, the LCP was initially proposed by sociologist Glen Elder (1974) in his longitudinal work on the impact of the great depression of the 1930s on families in the US (Elder, 2018). It has since emerged as an interdisciplinary study of human lives, bringing

together the fields of sociology, anthropology, human development, demography, psychology, economics, and epidemiology (Mayer, 2009). Like SPT, the LCP is not an explicit or coherent theory. Still, it provides principles and concepts to guide empirical understanding of people's lives "at the nexus of social pathways, developmental trajectories, and social change" (Daaleman & Elder, 2007).

3.4.1 Key Concepts of Life-course Perspective

Trajectories, transitions, and turning points are key concepts of the LCP that are most useful for examining stability and change through an individual's life course (Elder Jr, 1994). A **trajectory** refers to the long-term pattern of continuity and change in a particular life domain or institution, such as family, education, or work pathways. According to LCP, an individual's life course comprises multiple, parallel and interdependent trajectories such as family, work, education, and health. Each trajectory constitutes a series and combinations of various transitions. **Transitions** refer to discrete changes in social roles and status over a fixed period: for example when starting school, leaving home, starting a career, getting married, becoming a parent, and retiring (Elder Jr, 1994). According to the LCP, over the course of an individual's life, they experience many transitions in and out of social roles within multiple life trajectories (Elder Jr, 1994). **Turning points** involve transitions or events that bring about a substantial change in the direction of an individual's life trajectories, for example, the onset of chronic disease (Elder Jr, 1994).

3.4.2 Key Principles of Life-course Perspective

Additionally, Elder et al. (2003) propose five key principles of the life course perspective. They include life-span development, linked lives, timing in lives, historical time and place, and human agency.

3.4.2.1 Life Span Development

The principle of life-span development proposes that an individual's development is a lifelong process, and earlier life experiences impact later life experiences. Therefore, an individual's life cannot be fully understood without reference to earlier life contexts (Elder Jr, 1994). In relation to understanding an individual's experiences with physical activity, it is essential to consider earlier life contexts that may have impacted these experiences.

3.4.2.2 Linked lives

The linked lives principle proposes that people's lives are interconnected with the lives of other people, such as family members, friends, and other social systems (Elder Jr, 1994). These relationships play an influential role in individuals' life trajectories. Therefore, people's lives cannot be understood in isolation from the social relationships in which they are embedded (Elder Jr, 1994).

3.4.2.3 Timing

The principle of timing proposes that the consequences of life events and transitions can vary depending on the timing of the individual's life in which they occur (Elder Jr, 1994).

3.4.2.4 Historical Time and place.

The principle of time and place proposes that people's lives are embedded in and shaped by the historical times and places they experience over their lifetime (Elder Jr, 1994). This implies that an individual is born at a particular time in history and within a specific geographical context which impacts the constraints and opportunities they experience over the course of their lives. This is very relevant when exploring physical activity patterns because certain factors in time and place can make one more or less physically active (Elder Jr, 1994).

3.4.2.5 Human agency

The principle of human agency proposes that people are active agents of their life trajectories and can decide their course of action (Elder Jr, 1994). However, the extent to which they can exert agency is within the constraints and opportunities provided by their historical context and social structures (Elder Jr, 1994).

Using these key principles to guide inquiry promotes a multi-layered understanding of people's lives over time and across changing contexts (Elder et al., 2003).

3.5 A Combined Social Practice and Life-Course Approach to Understanding Physical Activity

LCP and SPT overlap in their dynamic, contextual, and relational approaches to social analysis. LCP directs attention to continuity and change in people's lives in the context of the broader historical and socio-contexts in which these lives unfold. SPT approaches direct attention to continuity and change in everyday practices in the context of the broader historical and socio-contexts in which these practices unfold. To this end, this research sought to combine concepts from SPT and LCP to explore the life paths of people with type-2 diabetes concerning their everyday physical activity practices, and to understand how key life patterns and processes interact with these practices.

3.5.1 Research Aim

This research aims to gain a greater understanding of the social, material, and dynamic processes influencing physical activity in the lived experiences of people with type-2 diabetes in Ibadan, Nigeria.

3.5.2 Research Questions

The research questions for the study include:

What role does physical activity play in the everyday lives of people with type-2 diabetes and how has this transformed over their life course?

- How is physical activity experienced and understood in the everyday lives of people with type 2 diabetes in Ibadan, Nigeria?
- How have physical activity patterns of people with type-2 diabetes in Ibadan evolved over their life course?
- What key social, material and dynamic processes influence this evolution?
- What does this understanding imply for the design of physical activity interventions and public policy?

Chapter 4: Methodology

4.1 Introduction

This chapter describes the research design and methods employed in the main study. The chapter presents the rationale for using qualitative narrative inquiry as the research design. It further describes the research process, including sampling and recruitment, data collection methods and data management. Finally, the chapter provides a discussion on reflexivity and researchers' positionality and ethical considerations for the study.

4.2 Research Design

The study employs qualitative narrative inquiry as a methodological approach to gain an in-depth understanding of people with type-2 diabetes' lived experiences and how these experiences have shaped their relationship with physical activity over the course of their lives. Qualitative research is a research approach concerned with an in-depth exploration, description and interpretation of the subjective experiences of research participants within their natural setting and the meanings they attach to those experiences (Bryman, 2016).

4.2.1 Narrative Inquiry

Narrative Inquiry (NI) is a tradition of qualitative research premised on the assumption that people lead storied lives, and it is through telling stories that people give meaning to their experiences (Connelly & Clandinin, 1990; Riessman, 2008). According to Clandinin (2016), narrative inquiry is "an approach to the study of human lives conceived as a way of honouring lived experience as a source of important knowledge and understanding". Therefore, using storytelling to understand people's lived experiences forms the basis of NI as a qualitative methodology. NI was initially developed as a research methodology by Michael Connelly and Jean Clandinin in 1990 in their work on teachers' practical knowledge (Clandinin, 2016; Connelly & Clandinin, 1990)

Connelly and Clandinin (1990) drew on John Dewey's (1938) pragmatic philosophy of experience and notions of continuity, interaction, and situation, to frame narrative inquiry within a metaphorical three-dimensional space: temporality, sociality, and place. Clandinin and Rosiek (2019) describe Dewey's (1938) conception of experience as "a changing stream that is characterized by continuous interaction of human thought with our personal, social

and material environment". According to Dewey (1938), reality is based on lived experiences, and we learn by reflecting on these experiences. The temporality dimension attends to Dewey's (1938) notion of continuity of experience. It suggests that "every experience both takes up something from those which have gone before and modifies in some way the quality of those which come after" (Dewey, 1938). This continuous nature of experience guides the researcher to inquire into the past, present, and future of the experience under investigation (Clandinin, 2016).

The sociality dimension relates to Dewey's (1938) notion of interaction which speaks to the relationship between personal and social conditions of an individual's experience (Clandinin & Rosiek, 2019). Clandinin (2006) echoes Dewey's view of interaction in stating: "people are individuals and need to be understood as such, but they cannot be understood only as individuals. They are always in relation, always in a social context". Therefore, this dimension prompts the researcher to inquire into individuals' narratives in relation to broader social, cultural, and institutional narratives within which experiences are embedded (Clandinin & Rosiek, 2019).

Another crucial aspect of the social dimension of experience is the ongoing relationship between the researcher and the participants. According to Clandinin (2006), narrative inquiry is a relational inquiry such that it involves a "collaboration between researcher and participants, over time, in a place or series of places, and in social interaction with milieus". During the research process, the researcher works collaboratively with the participants to co-construct the participants' narratives of experiences and, in the process, co-create and co-negotiate meanings of the storied experiences through the three-dimensional narrative inquiry space (Clandinin, 2006). The researcher's implication in the context of inquiry (and interpretation) demands ongoing reflexivity regarding who they are in relation to the participants and how their identities, lived experiences, positions, and subjectivities impact the narratives they co-create with the participants (Clandinin, 2006). Lastly, the place dimension refers to the influence of the physical environment on an individual's experience and inquiry. This dimension draws the researcher's attention to the different contexts where individuals' experiences occur as they unfold over time (Clandinin, 2006)

The simultaneous consideration of all three dimensions of experience; when and where an experience takes place, and how the experience involves the self and other people, is what makes narrative inquiry unique to other qualitative research methods such as phenomenology, grounded theory, ethnography, and case study (Connelly & Clandinin, 2012). For example, narrative inquiry overlaps with phenomenology in its focus on people's lived experiences. (Creswell & Poth, 2016). However, phenomenological research seeks to describe the structure and essence of a group's shared experience rather than to understand how people's experiences unfold across time and space through storytelling (Moustakas, 1994)

Narrative inquiry was best suited for this research because it offers a methodology that supports exploring the lived experiences of physical activity in people with type-2 diabetes within a historical, social, and material context. This approach is consistent with the key premises of SPT and LCP that view social practices and people's lives (respectively) as ever-changing, socially situated, and context-dependent. Therefore, employing a narrative inquiry methodology enabled me to integrate relevant concepts from SPT and LCP to explore the intersection of people's lives, physical activity, and the socio-material and historical context.

4.3 Research Process

4.3.1 Research Setting

The research took place in Ibadan, the capital of Oyo state, in Southwestern Nigeria. Ibadan covers a total land area of about 3,080 square kilometres (1,190sq. mi), making it the country's largest city by geographical area (Olusa, 2020). It is also the third most populous city in Nigeria after Lagos and Kano, with a population of over 3.5 million (NPC, 2022). Ibadan comprises 11 local government areas (LGAs): Five of these LGAs are within the metropolis and are classified as urban areas. In contrast, the other six LGAs are classified as peri-urban areas (Okunade, 2020). The inhabitants of Ibadan are primarily of the Yoruba ethnic group, although other people from various ethnic and sub-ethnic groups also inhabit the city. While English is Nigeria's official language, Yoruba is the indigenous language of Southwestern Nigeria, including Ibadan.

I recruited research participants from the medical outpatient clinic (MOP) at University College Hospital (UCH), Ibadan. UCH, Ibadan serves as a major tertiary care referral centre in

Nigeria, located within the Ibadan North LGA. Established in 1957, It is the first tertiary hospital in Nigeria (Nwagwu & Oshiname, 2009). The hospital has various speciality and sub-speciality units, providing inpatient and outpatient services. The diabetes clinic runs weekly (every Monday) at the MOP. It provides follow-up care to outpatients with diabetes mellitus from different socio-economic backgrounds in Oyo state and across the country.

4.3.2 Research Assistants

During data collection, I worked closely with two local research assistants who - at that time - were master's students in public health at the University of Ibadan and had previous experience in carrying out qualitative fieldwork. The two research assistants were females in their twenties, of Yoruba ethnicity, and fluent in Yoruba and English. The initial aim of working with local research assistants was to help bridge any language and cultural barriers that may occur between my research participants and me. However, the research assistants not only served as interpreters/translators and cultural brokers but also assisted me with coordinating study logistics, participant recruitment, scheduling interviews and accompanying me to interviews.

My local supervisor, a consultant endocrinologist at UCH, recruited the research assistants and introduced them to me when I arrived in Ibadan. Before kicking off recruitment and data collection, I spent my first few days in Ibadan training my research assistants and making initial arrangements for recruitment. During my initial meeting with the research assistants, I gave them an overview of my research and elaborated on their roles and responsibilities for the project. I then provided them with my research plan and interview guide (ahead of our next meeting the following day) to familiarise them with the research's purpose and goals. Once they reviewed the research plan, we discussed my plans and expectations for each stage of the data collection process in greater detail. I also answered any questions related to the project and working arrangements. The research assistants were paid for their time every month.

4.3.3 Sampling Strategy

I employed a purposive sampling strategy to recruit participants for the study. Purposive sampling is a technique whereby participants are deliberately selected according to pre-determined criteria that are more likely to generate valuable data for the research questions in focus (Bryman, 2012). The inclusion criteria included people 18 years and older, diagnosed with type-2 diabetes, registered for care at the diabetes clinic, at the Medical Outpatient Clinic, UCH, Ibadan, and residing in Ibadan. I excluded people who could not give informed consent due to physical or cognitive impairment and patients who were under admission to the hospital from the study.

4.3.4 Recruitment Process

Patients with type-2 diabetes were invited to participate in the study during their routine visit to the diabetes clinic at the MOP, UCH, Ibadan, which is held every week on Mondays, between 9:00 a.m. and 1:00 p.m. The research team (my two research assistants and I) remained at the clinic during their operating hours for nine weeks. Each week, several potentially eligible participants were identified (based on the inclusion criteria) and introduced to the study by the doctors responsible for their care on that visit at the end of their consultation. If interested in learning more about the study, the doctors introduced the patients to the research team in the clinic's waiting area.

Using doctors as gatekeepers ensured that the potential participants met the inclusion criteria, and the doctors could utilise their clinical judgement in determining whether the participant was 'medically sound enough' to participate. However, one problem initially encountered with relying on doctors for referrals was that doctors were usually too busy and time-pressured during a clinical consultation and sometimes forgot to inform patients about the study. As a result, in a debrief meeting with the doctors regarding the recruitment process two weeks into the study, it was agreed that we take an additional step of actively reminding the doctors to refer potential participants to the research team rather than passively waiting for them to do so. Over time, as familiarity and rapport were established with the clinical team, I noticed that it became easier for them to refer patients without being reminded.

After being introduced to the patient, the research team verbally explained in detail the purpose of the study and what their participation in the study involved. We also provided each patient with a participant information sheet and allowed them to ask questions. Using doctors as gatekeepers for recruitment could cause participants to feel pressured to participate in the research; there may have been a concern that if they did not agree to take part, this could negatively affect the care they received from the clinic. Therefore, we made it clear that their participation was voluntary; their decision to take part or not to take part in the study would not affect the care that they were receiving, and their doctors would not be informed of their decision to accept or to decline to participate in the study. For patients who did not speak English, or those who preferred to communicate in Yoruba, my RAs assisted with the recruitment process.

If patients were interested in participating in the study, the initial plan was to conduct the preliminary interviews on the same day, in a private room in the clinic, and have the patients return to the clinic for a follow-up interview after completing their one-week diary study. The decision to conduct the interviews in the clinic setting was mainly due to the convenience of accessing participants during their clinic visits and maximising my safety and that of my research participants. As a 'non-Yoruba-speaking visiting researcher based in the United Kingdom, I was cognizant that I could be treated with suspicion and that the intentions of my study could easily be misconstrued. Therefore, the clinic setting afforded an environment in which the safety of the researcher and the participant could be maintained.

However, the plan to conduct the interviews only in the clinic proved difficult because patients were mainly in a hurry to leave the clinic, go home and rest, or return to their businesses or other engagements rather than wait to take part in a one-hour interview. Typically, all patients arrive at the clinic as early as 7:00 a.m. and then wait to be seen by their doctors, with little indication of how long the waiting will last. Most patients end up waiting a long time (3 to 5 hours) in the waiting room before they are attended to, so by the time they have had their appointment, they are already tired and less likely to wait any further.

My research assistants and I attempted to approach patients in the clinic's waiting area and invite them to participate in the study before their consultation. However, patients were

mostly irritable and reluctant because of the long and unpredictable wait time, preferring to consult with the doctor and leave immediately instead of being interviewed and possibly missing their turn to see the doctor. Moreover, patients also expressed reluctance to make additional visits to the clinic to participate in the study due to work, travel difficulties, and other commitments. Therefore, it is inconvenient for them to commit their time to travel multiple times to the clinic. Ultimately, these issues prevented us from recruiting participants during the first week of recruitment.

As a result of the recruitment challenges encountered in the initial week of recruiting patients, the initial plan was adapted to keep the process flexible and convenient for the participants. It was then decided that the interviews could be held at the participants' preferred time and location. Therefore, in the subsequent weeks, potential participants were informed that the interviews would be conducted at a convenient time and place, such as in their home, workplace, hospital, or neutral meeting place. Once patients expressed interest in participating in the study, they were asked to provide their contact details and indicate their preference for the location and time of the interview. Interested patients were contacted the following day (or a couple of days after) to confirm if they were still interested in participating and in arranging a time and a place for the interview. At this point, some patients were recruited, some declined to participate, and some were not contactable. Interview locations included an office room at the outpatient clinic, participants' homes, and participants' places of work/business.

Although the study aimed to achieve a relatively even representation of gender among participants, I recruited more women than men (with an approximate ratio of 4:3). This reflected the observation that noticeably more women than men routinely attended care at the diabetes clinic. During the recruitment process, I realised that significantly more women than men were recruited into the study. It was more challenging to access male patients due to the lower number of male patients at each diabetes clinic day. I became concerned that my sample would have a disproportionate gender representation, so I asked the doctors to focus on introducing only male participants for the rest of the study.

Giving participants the flexibility to choose the location of the interviews and being more sensitive to their needs and respectful of their time was a facilitator to encourage them to participate in the study. The revised approach provided another avenue to build and strengthen rapport with the participants, thereby giving them a sense of control and ownership in the research process. This made them more willing to participate in the study (of their own volition). I addressed concerns related to my safety and that of my research assistants by ensuring that we were accompanied by a male driver who took us to participants' homes or workplaces and waited for us until we were done.

4.3.5 Research Participants

The study population included adults diagnosed with type-2 diabetes, registered for care at the diabetes clinic, and residing in Ibadan. Thirty-five participants, fifteen men and twenty women, took part in the study. Participants' ages ranged from 35 and 83 years: Twelve participants were between 35 - 54 years, ten were between 55 - 64 years, and thirteen were 65 years and older. Participants varied in level of education from having no formal education to earning university degrees: Two participants had no formal education, four had primary school education, ten had up to secondary school education, twelve had national certificate in education (NCE) degree, three had a bachelor's degree, three had a master's degree, and one had a PhD degree. Participants were also engaged in several occupations, the majority (fourteen) of which were traders (small business owners), eleven participants were retired, five were employed full-time as teachers, two were employed full-time as nurses, one was employed full-time as a cleaner, one was employed full-time as a police officer, one was a self-employed lawyer, and one was unemployed. Participants resided in communities across nine out of the eleven LGAs in Ibadan.

The majority (twenty-six) of the participants lived in communities within four Semi-urban LGAs, whereas nine lived in communities within five Urban metropolitan LGAs in Ibadan. About half (seventeen) of the participants had a monthly income below the minimum wage of 18,000 naira; six participants had a monthly income between 18,000 naira – 30,000 naira, three had a monthly income between 31,000 naira – 51,000 naira, three had a monthly income between 51,000 naira – 100,000 naira, three earned between 101,000 naira – 150,000 naira, and three earned above 150,000 naira. All participants owned a mobile phone, with the

majority (twenty-five) owning a basic mobile phone, nine owning a smartphone, and one owning both.

No.	Gender	Age	Education	Occupation
P1	Female	67	N.C.E	Retired Teacher/ Trader
P2	Male	81	Professional Certificate	Retired
P3	Female	47	Secondary	Trader
P4	Female	45	Secondary	Trader
P5	Female	43	N.C.E	Cleaner
P6	Male	44	Master's Degree	Teacher
P7	Female	69	N.C.E	Retired Teacher/ Trader
P8	Female	35	Bachelor's Degree	Nurse
P9	Female	56	N.C.E	Teacher
P10	Female	55	O.N.D	Trader
P11	Male	47	Secondary	Trader
P12	Female	65	N.C.E	Teacher
P13	Male	34	PhD	Lecturer
P14	Female	44	Master's Degree	Nurse
P15	Female	48	Master's Degree	Teacher
P16	Male	53	Secondary	Trader
P17	Male	68	Primary	Artisan
P18	Female	55	Secondary	Trader
P19	Female	42	N.C.E	Civil Servant
P20	Male	61	Bachelor's Degree	Retired Engineer
P21	Male	67	Secondary	Retired
P22	Male	78	Master's Degree	Retired/poultry farming
P23	Male	74	Secondary	Retired
P24	Male	62	H.N.D	Retired
P25	Male	73	Master's Degree	Lawyer
P26	Male	83	Secondary	Retired
P27	Female	53	O.N.D	Trader

P28	Female	75	N.C.E	Retired Teacher/Petty Trader
P29	Female	64	Primary	Petty Trader
P30	Female	58	N.C.E	Police woman
P31	Male	83	Bachelor's Degree	Chief of DAN
P32	Female	63	Secondary	Trader
P33	Female	64	Primary	Trader
P34	Female	70	Secondary	Unemployed
P35	Female	58	Primary	Trader

Table 2: Participants Demographic Information

4.4 Data Collection Methods

To address the research questions, I collected data in three stages using qualitative methods: Narrative interviews, diary studies, and visual elicitation interviews. I also conducted an informal contextual inquiry to help build a bigger picture of the context in which people lived. The triangulation of methods enabled an exploration of the research questions from multiple angles to ensure rigour and corroborate findings.

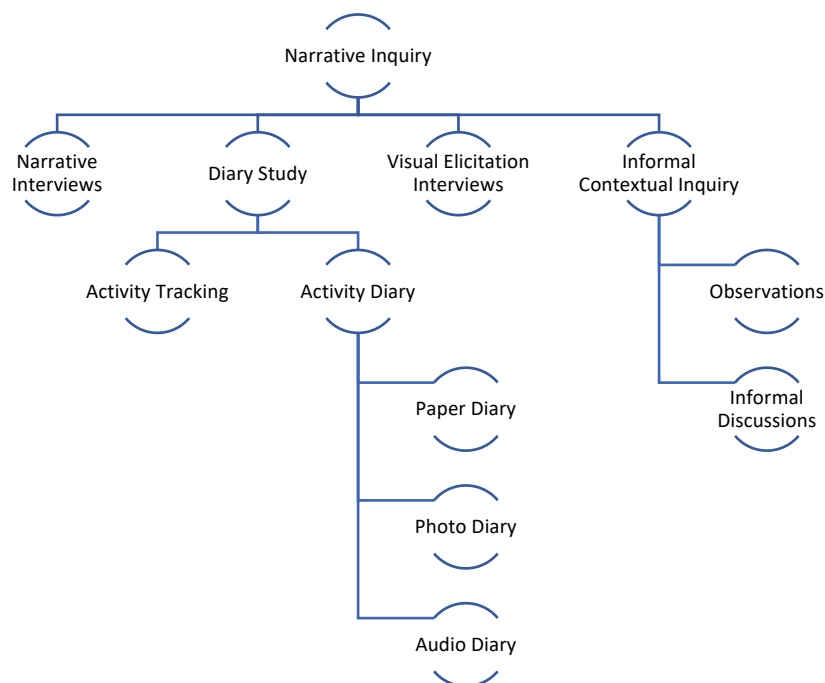


Figure 2: Data Collection Methods Diagram

4.4.1 Narrative Interviews

The first data collection stage included a one-on-one narrative interview to elicit a biographical account of how and why participants' relationship with physical activity has evolved over the life course. I conducted the interviews with the help of my two research assistants, who served as translators and co-interviewers. The research team conducted the interviews at locations convenient to each participant, including the participant's home, place of work or trade, or a private room at the medical outpatient clinic. The research team also conducted the interviews in English or Yoruba, depending on each participant's preference. I led the interviews in English, while my research assistants led the interviews in Yoruba.

At the beginning of the interview, I went through the information sheet with the research participants to ensure informed consent. After providing support, participants responded to a brief questionnaire regarding socio-demographic information, including their age, gender, ethnicity, household members, education levels, occupation, monthly income, length of diagnosis, and mobile phone access and use. I used both an unstructured and semi-structured interview guide that allowed participants to tell their stories in a conversational manner and also allowed me to ask questions with broad themes in mind. The interview guide (Appendix A) included the following broad themes: Life history and experiences of physical activity across the life course, both before and after diagnosis of type-2 diabetes; experiences of living with type-2 diabetes, and perceptions of the role of physical activity in the management of type-2 diabetes. While some participants narrated in detail about their experiences without the need for much probing, others needed considerable probing with more detailed questions.

Interviews lasted approximately 60 to 90 minutes. All the interviews were audio-recorded and transcribed verbatim. After the narrative interview, I introduced participants to the diary study and explained its purpose. I then provided each participant with a pack containing a wrist-worn accelerometer, paper diary booklet, digital camera and audio recorder, and accompanying step-by-step instructions. I also demonstrated how they could use each tool to capture their everyday activities during this period.

4.4.2 Diary Study

The purpose of the diary method is to capture people's activities in their natural environments from their perspective to explore aspects of everyday life that are difficult to observe directly by researchers over time (Bryman, 2012). It is also helpful in understanding mundane, routine activities that might be difficult to recall or discuss retrospectively and are, therefore less accessible to researchers using only traditional qualitative interview methods (Bryman, 2012; Martin & Hanington, 2012). Rather than relying on participants' recollection of activities all at once, diaries provide a means for participants to capture, reflect on and narrate their experiences as they occur daily in their environment (Martin & Hanington, 2012). For this study, a diary method was used to better understand contextual influences that shape participants' physical activity.

After conducting the initial interview, I invited participants to wear a wrist-worn accelerometer and keep a diary to record details of their daily activities over a period of one week before taking part in a follow-up visual elicitation interview discussing the diary study. The diary study aimed to capture an in-depth picture of participants' daily routine patterns that may be more difficult to access during interviews. The goal of the diary study was to (provide a basis for further discussion) and help participants to elaborate on their day-to-day experiences in greater depth during the subsequent follow-up interviews. While designing the diary study, I considered the potential diversity in socio-demographic backgrounds among the participant sample, such as educational background, literacy levels, and digital competencies. As a result, I included flexible options of using paper, audio, or visual diary tools to provide more accessible ways for participants to capture their daily experiences (detailed below).

I verbally explained to each participant how to complete the seven-day diary study. I also provided a diary pack which included a pen, paper diary booklet, a digital camera, an audio recorder, a wrist-worn accelerometer, and written instructions on completing the diary. I encouraged participants to use whatever tool or combination of tools they felt most comfortable using for the diary study. I also clarified to the participants that they had complete discretion over the information they wished to share in their diaries and could document as much or as little as they wanted. During the week of the diary study, the

research team contacted participants at least once to check that they were not having issues with the diary activities and encouraged them to maintain the diary. After completing the diaries, I collected the diaries and accelerometers from participants and scheduled a date and time for the visual-elicitation interviews. To maximise recall, I scheduled the activity within a week from when the participant ended the diary study.

4.4.2.1 Paper diary

I provided each participant with an option of a paper diary in the form of a small booklet. I asked them to record every time they started a new activity throughout their day, up to a period of one week. I chose written paper diaries over digital text input because most of my participants did not have access to devices that supported the meaningful textual recording of their daily activities. The diary design was based on the time geographic diary method (Ellegård, 1999), which aligns with the three dimensions of narrative inquiry, documenting the temporal, spatial, and social context of people’s daily activities. The headings in the diary included the following prompts: what time it was, what activity was being performed, in what posture the activity was being performed (e.g., sitting, standing, lying, walking), where it was being performed, and together with whom it was performed. I asked participants to fill in as many details as possible about their daily activities. Moreover, to encourage reflection, I also included a space where participants could comment on how they felt about their activities that day, whether the day was a typical day or whether they did something different at the end of each day. Some of the paper diary booklets were translated to Yoruba by my research assistants for participants who could not read and write in English and/or preferred to complete the diary in Yoruba.

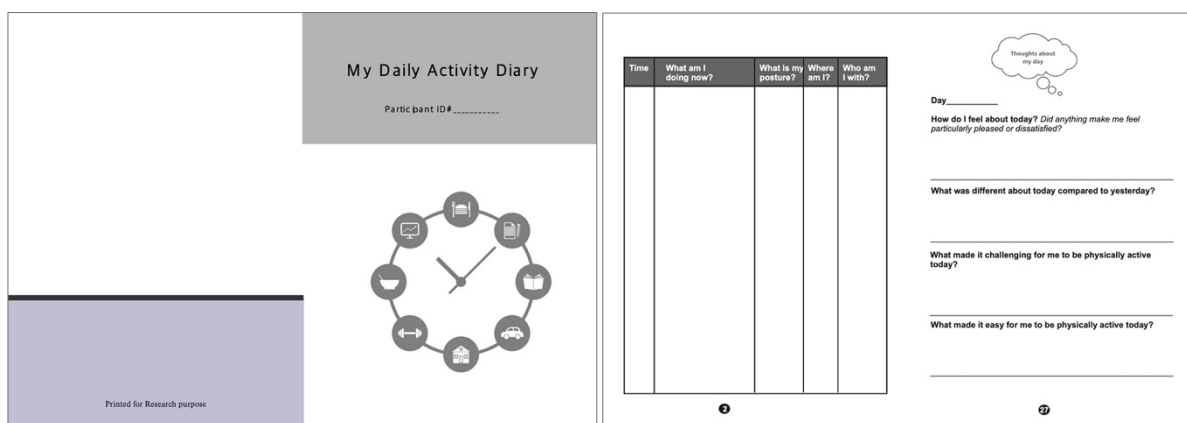


Figure 3: Paper Diary Booklet

Generally, the paper diary was the most used diary option for participants. Twenty-two participants kept a paper diary alone, while eight kept a paper diary in combination with a visual diary. Many participants stated that they chose to complete a paper diary because they were more familiar with keeping logs using pen and paper. The paper diaries varied in the level of details of completion. In the initial design of the paper diary, I employed an unstructured format for the activity timeframe, enabling participants to record activities as they occur and in their own words. However, one of the main challenges encountered with the open format was that some participants often did not provide accurate timing of the activity. There were also time gaps between some reported activities that indicated gaps in activity entry. To mitigate this challenge, I adapted the paper diary design to include a more structured 24-hour time grid with a fixed time interval of 30-minutes. The structured format encouraged more engagement with the diary than the unstructured format. Nonetheless, during the follow-up visual elicitation interviews, I was able to gain clarification about details that were unclear or absent in the diaries and ask whether the activities recorded represented a typical week.

4.4.2.2 *Visual diary*

I provided a digital camera as an option for participants to visually capture their activities throughout the course of their day through photos or videos for seven days. I used the digital camera (Canon IXUS 185) because it is small, takes clear pictures and is easy to use. I encouraged participants to take photos of objects, spaces, or situations that would help them recall the moment of activity. The camera automatically recorded the date and time of the images captured.



Figure 4: Visual Diary Camera (Canon IXUS 185)

About ten participants used photos to document aspects of their daily lives. Many participants, particularly older participants, did not feel comfortable using or collecting the digital camera. Some participants thought it will be difficult for them to use the cameras, while others thought they did might lose or destroy the camera. Participants mostly used the visual diary as a complementary tool to visualise certain details in the paper diary that they felt were interesting to show.

4.4.2.3 *Audio diary*

I provided participants with an audio recorder as an option to keep an audio record of their daily activities over a period of one week. Like the paper diary, when providing an audio description of their activities, I asked participants to include details of what time it was, what activity was being performed, in what posture it was being performed, where it was being performed, and together with whom it was performed. I also invited participants to comment on how they felt about their activities, whether the day was a typical day or whether they did something different at the end of each day. Only two participants used the audio recorder as part of their diary study. These participants used the audio diary because they could not communicate in writing. One of the participants complemented the audio with pictures.



Figure 5: Audio Diary Recorder

4.4.2.4 *Triaxial Accelerometer*

In addition to the self-reported diary tools, I provided participants with a wrist - worn Geneactiv triaxial accelerometer to automatically measure their daily activity patterns in terms of intensity levels. Advances in sensing technology have made it feasible for

researchers to gather continuous, unobtrusive, objective data on people's daily activity patterns (Patel et al., 2012). Wearable sensors such as triaxial accelerometers, pedometers and heart rate monitors are widely used to quantify daily sedentary time and physical activity levels (Patel et al., 2012). Data collected from these wearable sensors are usually time-series data, which are often represented through numbers and data visualizations to facilitate sensemaking and self-reflection (Patel et al., 2012). While quantifiable dimensions of physical activity are implicated in temporal, spatial, social and material aspects of everyday life, there is potential for using these activity sensing devices as research tools to elicit contextual information about people's daily routine activities.

After an in-depth survey, I chose this device because it provides the benefit of collecting raw, unfiltered data and the flexibility of using different open-source tools to analyse the data. I asked participants to wear the accelerometer on their non-dominant wrist during their waking hours for seven days. As the Geneactiv accelerometer has a long battery life and is waterproof, participants were able to wear it throughout their day. It also includes a temperature sensor, which enables researchers to determine how long the device was worn and whether it was removed at any point.



Figure 6: Geneactiv Wrist-worn Accelerometer

4.4.3 Activity Tracking Data Processing and Visualization

To prepare for the visual elicitation interviews, I downloaded the raw data from the accelerometer for each participant onto a computer using the Geneactiv software (provided by Activinsights). I converted the data into 60-second epoch (.csv) files for analysis. I then entered the file in the Geneactiv open source excel macro, which classifies activity as

sedentary, light, moderate, or vigorous intensity, based on validated intensity cut points (Schaefer et al., 2014). The excel macro generated a spreadsheet with a large dataset of per-minute physical activity intensity readings over 24-hour periods- 1440 data points per day. It also generated the amount of time (in minutes) per day spent in sedentary, light, moderate, or vigorous activities.

I converted the dataset into a graphical representation to support sensemaking and afford recognition of activity patterns. The goal was to create a clear and simple graphical representation that could facilitate visual comparisons between the different activity levels and tell a visual story about people’s activity patterns in their day-to-day lives. Therefore, we created a simple line graph for each day of the week that was captured by the accelerometer (Figure 7).

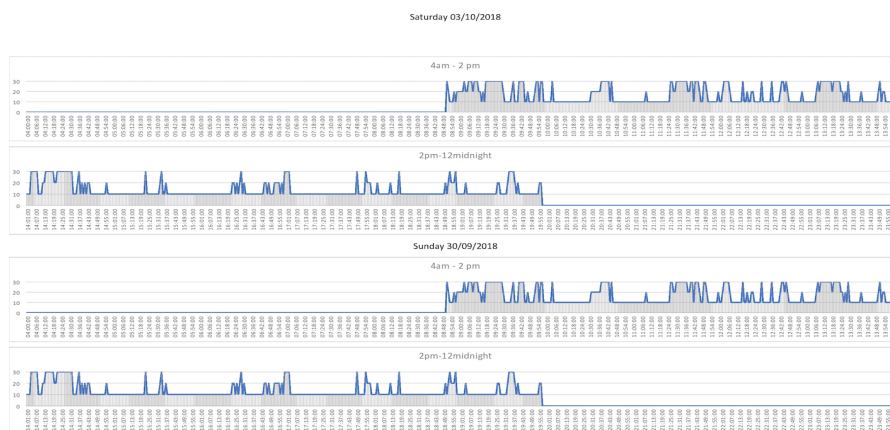


Figure 7: Activity Data Visualization

On the graph, time was plotted on the horizontal axis, while the different activity levels were plotted on the vertical axis. I assigned an arbitrary threshold value - in increments of 10 - for each activity intensity level on the vertical axis. For example, the value of 10 represented sedentary, 20 represented light intensity, 30 defined moderate intensity, and 40 represented vigorous intensity. I presented time in five-minute intervals for the horizontal axis, plotted over a 24-hour period. I plotted the timeline at five-minute intervals to ensure sufficient granularity to provide meaningful distinctions between the times spent in different physical

activity states. However, given the scale of the data, I divided the graph for each day into two 12-hour periods, 12:00 am to 12:00 noon and 12:01 pm to 11:59 pm, to achieve clearer visualisation of the data. To enable easy data exploration and interaction with the graphs, we printed the charts on A3-sized paper, which supported the desired granularity and scale.

4.4.4 Visual elicitation interviews

I conducted a visual elicitation interview where my research assistants and I worked with each participant to co-explore their captured data. Visual elicitation methods, rooted in ethnography, anthropology and sociology, involve a range of approaches that integrate visual representations in research to stimulate in-depth reflection and facilitate the articulation of lived experiences (Crilly et al., 2006). These visual representations include, but are not limited to, photographs, videos, and graphical representations such as charts, graphs, drawings, timelines and maps (Crilly et al., 2006). The elicitation process typically involves a collaborative dialog between the researcher and the participant, including negotiated interpretations and moments of shared understanding (Crilly et al., 2006). Researchers have noted that the strength of visual elicitation lies in its capacity to evoke 'deeper elements of human consciousness' than words alone (Bagnoli, 2009; Crilly et al., 2006).

The visual elicitation interviews took place in each participant's home, workplace, or at the MOP clinic. The goal of the interview was to stimulate reflection and elicit a narrative account of the participant's daily activities. Visualising the physical activity data provided a shared point of reference where the creation, negotiation and translation of knowledge about participants' daily activities took place. I aimed to gain deeper access to the context of participants' everyday life patterns. While the participants - whom the data concern - are considered the experts in their own daily lives, due to the mundane and tacit nature of everyday life activities, sharing knowledge about the details of their daily life activities requires reflection on one's actions (Bagnoli, 2009). The goal of the data visualisation was to facilitate this reflection and knowledge-sharing process for the participants. However, as stated in the previous section, none of the participants had prior experience with activity tracking. They were unfamiliar with graphical representation of physical activity patterns to support reflection and awareness. It became my role as the researcher to utilise my expert knowledge to help participants interpret the data and make connections with their daily

activities. As a result, a collaboration between the participants and the researcher was required in order to bridge these knowledge boundaries and achieve a shared understanding of the data.

Using the data visualization as an elicitation tool, with me guiding the process, participants reconstructed their day-to-day activities, and discussed the meanings they attributed to these activities. Each visual elicitation interview session lasted between sixty to ninety minutes and was audio recorded. My research assistant took observational notes regarding the process. At the beginning of the session, I asked participants about their experience of participating in the diary study and using the tools. I then introduced participants to the graphical representation of their activity patterns for every day captured, which was placed on a desk facing both the researcher and participant. The use of a large printed (paper based) visualization - laid out on the tabletop - afforded a natural collaborative interaction between me and the participants. I was easily able to sit together with the participant and have a shared view of the visualization, while reviewing the data. This facilitated participant engagement with the visualization, as well as meaningful communication between me and the participants. Additionally, since most of the participants were not familiar with the use of digital devices such as personal computers and tablets, the use of paper provided a more familiar interface due to its pervasive use in everyday contexts. Moreover, given that the data visualization was presented in very fine detail, the large paper print allowed the participants to view the full scope of data, without the need for computer-based visualization interactions such as zooming, filtering, and changing scales, which could have added additional cognitive load on the participants.

I explained to each participant what the graphs represented: using examples, I verbally illustrated what each activity intensity level on the vertical axis of the graph signified. Additionally, I used different coloured markers to delineate the different activity intensity levels, giving a visual cue to interpret and distinguish between different states across the timeline on the graphs: Pink indicated non-wear or no activity, orange indicated sedentary, yellow indicated light intensity, blue indicated moderate intensity, and green indicated vigorous intensity.

After explaining the graph, I began moving through the timeline for each day with the participant, to make sense of and contextualize the data represented on the graph. Starting with the first day captured, I prompted participants to situate themselves in the day, and reflect on what they were doing on that day, using their diary entries to jog their memory.

It is often difficult for participants to express the particularities of their routine practices, so as the participants described each activity, I probed them to elaborate on the context in which the activity took place. I asked them about the place or space, who they were with, why, and why they engaged in that activity. Also, when participants described a place visited, I asked about why they visited it, details of how they travelled there, and how often they visited it in a week. Moreover, to gain a sense of participants' daily and weekly rhythms and the fixity and flexibility of their activities, I probed further on how often they performed the activity discussed in a day or week and whether the timing of the activity was fixed or flexible.

I mapped and annotated the activity discussed with the corresponding time block and activity level pattern on the graph (Figure 8). The notes and annotations made across the horizontal timeline served as an external representation that helped me to restate and reflect on the information provided by the participant, to organise and contextualize the trends in the data, and keep track of the discussion as it unfolded over time. They also acted as a shared reference that provided quick access for the participant and the research team to explore further the activities being discussed within the broader temporal context. The annotations were also compared against the visualised physical activity data in a given time block to check for possible discrepancies between the activity reported and objective measures of the activity. When conflicting information between the data sources was suspected, the researcher checked with participants about the accuracy of their reported timing, deliberated and made adjustments when necessary. Also, when an interesting time gap in the information provided about the sequence of activities annotated was observed, I highlighted the activity pattern within the given block of time. I prompted participants to reflect on what they were doing at that time. For example, I asked:

As we can see from the graph, it shows that there was very little activity (possibly sitting) between 10:30 am to 10:55 am, do you remember what you may have been doing between those times? What comes to mind when looking at the graph? What do you typically do within this time?

The process was repeated until the participants had reconstructed the entire day captured. Moving through the graphs for the following days, I began to notice patterns and repetitions and look more closely at the variations across the days of the week.

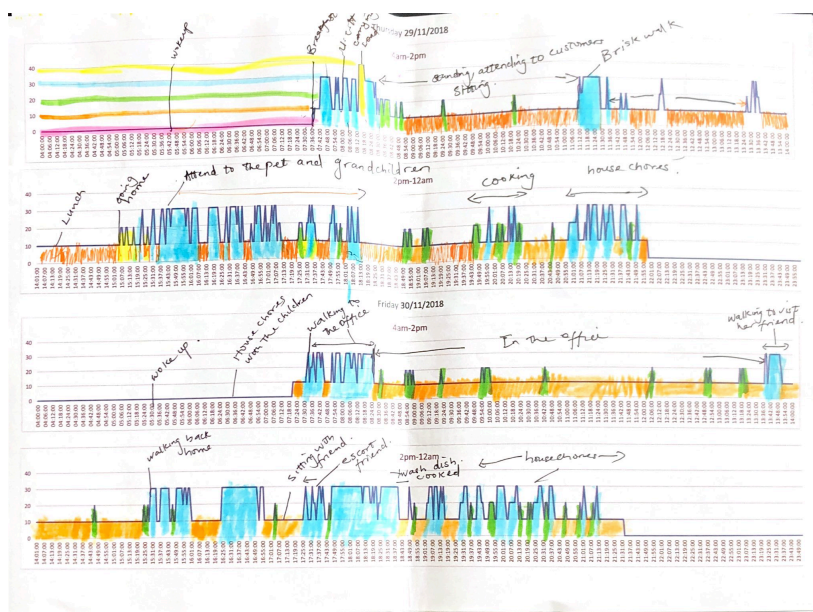


Figure 8: Annotated Activity Data Visualization

4.4.5 Informal Contextual Inquiry

In addition to the abovementioned methods, throughout the study, I conducted informal observations of the local communities I visited to obtain a contextual picture of some of the everyday experiences of the research participants. For example, given that many participants were small traders, I walked around several marketplaces to observe the trading practices and interactions of the local people. I also used public transportation several times to experience local transport systems in Ibadan. I maintained a research journal to document relevant details of my observations.

Additionally, I engaged in informal discussions with healthcare professionals (HCP), including endocrinologists, a health educator, and the chairman of the diabetes association of Nigeria (DAN) in Ibadan, to understand the diabetes care context and their perspectives on the health system's role in promoting physical activity as part of diabetes management practices. I also informally observed one of the weekly group diabetes health talks conducted by a nurse in

the waiting room during the diabetes clinic sessions on Mondays. During my conversations with the HCPs and observations of diabetes health talk at the diabetes clinic at UCH, I made detailed field notes in my research journal of any insights that might be relevant to the study.

4.4.6 Data management

All interviews were audio recorded with the permission of the research participants. I hired two expert transcribers and translators to conduct the transcriptions of the interview data. All audio recorded data were transcribed verbatim, including the ones conducted in Yoruba. The interview transcripts in Yoruba were then translated into the English language. I cross-checked each of the English transcripts against the original audio recordings to ensure the quality of the transcripts and made amendments where necessary. On the other hand, all translated transcripts were reviewed by a colleague, a native Yoruba speaker, to check for accuracy of translation and meaning. Transcribers and translators signed a confidentiality agreement form to protect the privacy and confidentiality of participants.

All data was stored in accordance with the Data Protection Act 1998. Electronic data, including interview transcripts, audio, images, and video recordings, was transferred, encrypted and stored securely in a password-protected computer and was backed up in an encrypted external hard drive. The encrypted external hard drive and copies of informed consent forms were stored in a locked cabinet at UCLIC. Data will be securely stored for five years and then destroyed.

4.5 Reflexivity and Researcher Positionality

In this section, I reflect on the implications of my positionality -throughout the research process- in relation to how I identified myself, how others identified me, and how I negotiated these identities as I navigated gaining access to research participants, establishing trust, building rapport, and gaining access to knowledge.

I am from Nigeria, born and raised in Abuja, the capital city of Nigeria, located in the Northern region of the country. Nigeria is a multi-ethnic and culturally diverse nation, where cultural norms and languages can significantly vary from one region to another. The country is divided into three geopolitical regions: the Northern, South-eastern, and Southwestern regions. Each

region is dominated by one of the major ethnic and linguistic groups in Nigeria, which include Hausa (in the North), Igbo (in the South-east), and Yoruba (in the Southwest). I have lived in Northern Nigeria for most of my life: I did my primary education in Abuja, my secondary education in Niger state, and my undergraduate studies in my parent's hometown, Adamawa state, all of which are in the North. Therefore, I am more accustomed to the Northern cultures and peoples. I am from the Fulani ethnic group, one of Africa's widely dispersed ethnic groups. In Nigeria, the Fulani predominantly reside in the north-western and north-eastern parts of the country. I speak three languages fluently: Fulfulde, which is the native language of Fulani; Hausa, the most widely spoken language in Northern Nigeria; and English, the official language of Nigeria.

After obtaining my undergraduate degree, I moved to the United States in 2013 to pursue a master's degree in HCI and design at the University of Washington. I later moved to the United Kingdom to pursue a PhD study in HCI at University College London. In August 2018, I returned to Nigeria, my home country, to conduct my PhD field study in Ibadan, the state capital of Oyo state, which is situated in Southwestern Nigeria.

4.5.1 Being a foreigner in my home country

Before my field study, I had never been to the Southwestern region of Nigeria, including Ibadan, and I did not speak or understand the Yoruba language. Therefore, before approaching the field, I was conscious of the fact that I was conducting research in a region that was linguistically and ethnically different from my home region, Northern Nigeria. While I had expected to encounter potential language and cultural challenges, I had a somewhat naïve assumption that my shared nationality with my research participants would grant me a considerable degree of 'insider status' in the field. Much to my surprise, my identity as a Nigerian became a contested issue when I found myself often being confronted with the question by local people and some of my participants, "*what country are you from?*" even before introducing myself as a research student living in the UK. Although I would always clarify that I am Nigerian, many would respond that I "*do not look Nigerian*". I became perplexed as to why I was being perceived as a foreigner by people with whom I shared the same nationality and racial identity. I could not immediately recognise what it was about my physical appearance that set me apart and deemed me a foreigner in my own country. As a

result, it became essential to critically reflect on my social position in relation to my research participants and acknowledge the blurred boundaries between my insider and outsider identities.

Upon self-reflection, I began to wonder whether my ethnic identity as a Fulani may have been a reason why I was viewed as a foreigner. The Fulani people are traditionally pastoral nomads who (according to historians) originally migrated from north Africa to settle mainly in parts of countries across the Sahel region of Africa, including Senegal, The Gambia, Guinea, Cameroon, Mauritania, Mali, Niger, Chad, Nigeria, Burkina Faso, Sudan, Eritrea, and Ethiopia. They are often said to have distinctive physical characteristics, as the Fulani appear lighter skinned, have straighter hair, a narrower nose, and thinner lips than other west African groups. Since the Fulani people reside predominantly in the northern region of Nigeria, some people living in Ibadan may not have come across many Fulani people before. Moreover, I also recalled that my being mistaken for a non-Nigerian in Ibadan was not an isolated situation. Even while living abroad (in the UK and the US), there were several instances where I was mistaken for an east African (mostly a Sudanese or an Ethiopian), even by east Africans. In these instances, my identity as a Nigerian has also been met with disbelief.

My awareness of my perceived foreigner identity, compounded by the fact that I was visiting Ibadan from abroad, further reinforced my position as a linguistic and cultural outsider. As a result, I grew self-conscious and concerned about how my research participants would perceive me. During my early days in the field, I did not feel confident in my communications with potential participants, as I did not want to act in a way that could be perceived as culturally inappropriate. To negotiate this, I invested time and effort into learning culturally acceptable ways to approach and relate with my participants. For example, I realised that one of the important cultural values of the Yoruba people was showing respect to people older than you, especially the elderly. This cultural value resonated with the values of my Fulani culture. As a way of showing respect, younger people are culturally expected to greet their elders first during contact. Given that I was in my late twenties at the time of the study, and most of my participants were significantly older than me, I made it a point always to greet them respectfully. In all my relations with participants, I ensured that I always showed respect for them and was honest with who I am and my interest in their lives.

4.5.2 Being a clinical outsider

My non-clinical background, coupled with being a research student from a different institution from UCH and the university of Ibadan, positioned me as an 'outsider' in the institution, which was my primary recruitment site. In gaining access to potential participants as an outsider, I required support from the endocrinology team at UCH to help legitimise my credibility and trustworthiness as a researcher. They served as gatekeepers who personally introduced my study to potential participants during consultations. The endocrinology team introduced me as a research student visiting from a university in the UK who was interested in gaining knowledge about ways to better support people with type-2 diabetes in incorporating physical activity as part of their management practices. Potential participants were also informed that I was working under the supervision of Dr Esan, one of the endocrinologists at the hospital. Using doctors, who were responsible for their care, as gatekeepers, on the one hand, provided an immediate sense of trustworthiness. However, on the other hand, it posed an ethical dilemma, as it could cause participants to feel compelled to participate in the study or have expectations about what they might get in exchange for doing so. As a result, I made it clear to participants that their participation was voluntary; their decision to take part or not to take part in the study would not affect the care that they were receiving, and their doctors would not be informed of their decision to accept or to decline to participate in the study.

Moreover, I was conscious of the fact that due to my research interest in people with type-2 diabetes and my association with the diabetes clinic and clinicians, I could easily be mistaken for a diabetes specialist. This made me concerned about potentially creating a power imbalance -inherent in the clinician-patient relationship- between my participants and me. To overcome this potential power imbalance, before starting the preliminary interviews, I clarified to participants that while I was working under the supervision of Dr Esan, I was not a specialist in type-2 diabetes nor a part of the clinical staff at the hospital. I presented myself as a doctoral research student from UCL with a background in computer science. I also acknowledged that the participants were experts in their diabetes and management practices. As a researcher, my role was to learn more about their experiences for me to identify challenges and opportunities for digital technology to support them in incorporating more physical activity into their daily lives. This clarification was important because I wanted

to create a non-threatening space where participants could express themselves openly and would not have to feel constrained in their responses to my inquiry. I also did not want them to think that I might be able to offer them any medical assistance. Being an outsider to the clinic made it easier for me to probe various aspects of the role of healthcare providers in providing support for diabetes management. In many cases, it also seemed to allow some participants to be more openly critical of the health system and perhaps more candid about their experiences than if I were a specialist from the clinic.

Despite my assertions that I was not a specialist, I was still mistaken for a doctor with expert knowledge about type-2 diabetes by some participants. Positioning me as a specialist in diabetes may have influenced participants' perceptions of what they should or shouldn't share with me. Some participants may have wanted to portray a particular image of who they were and how they managed their condition. During interviews or informal chats with some participants, they would ask me clarifying questions about the advice they had been given or ask for my clinical advice related to diabetes and its management. During such instances, I usually addressed their questions by politely maintaining that I was not a specialist but a research student. Therefore, I was not in the best position to give them any clinical advice or feedback. I would then encourage participants to take up these questions with their healthcare providers during their routine appointments or diabetes support group meetings. While my response could be misinterpreted as unwilling to help, I felt it was morally and ethically prudent not to offer clinical advice on issues I had limited expert knowledge about. Their questions enabled me to better understand some of their uncertainties about their condition and diabetes management.

4.5.3 Language Barriers

My inability to speak the native language of my research participants inevitably presented practical consequences. Throughout my research in Ibadan, I worked closely with two local bilingual research assistants (RAs), who (at that time) were master's students in public health at the University of Ibadan. I worked with local RAs to help bridge any language and cultural barriers that may occur between my research participants and me. Given that I could not speak Yoruba, and several people in Ibadan did not speak English, Fulfulde, or Hausa, the three languages I understood and spoke fluently, I needed the assistance of a

translator/interpreter when necessary. At the same time, since I was unfamiliar with the local context and culture, I needed local guides and 'cultural insiders' to help me articulate aspects of the Yoruba culture that I did not fully understand as a Fulani from the Northern region of Nigeria.

During recruitment, I primarily relied on my RAs to liaise communication between potential participants and me. After an initial introduction by members of the clinical team, my RAs would speak with potential participants in the waiting area to further explain who I was and what the study was about and ask if they would be willing to participate. Naturally, my RAs would often communicate with potential participants in their native language, Yoruba. My RAs quickly established rapport with potential participants, as they were generally receptive to them. Sharing the same language and ethnicity, I believe, enabled potential participants to identify with them as "one of us easily". As for me, I was seen as a guest to the community and was treated accordingly. During introductions, many potential participants would say to me: "Welcome to Ibadan" or "Welcome to Nigeria" to acknowledge my status as a guest or foreigner to the community.

While participants were generally welcoming toward me, there was a certain level of formality in how they related to me, particularly in the early phases of the study. It was apparent that they were more acquainted with my research assistants and directed most of their informal conversations or questions to them. I also observed that some participants would choose to have the interviews conducted in Yoruba, not because they couldn't communicate in English, but because they felt more comfortable relating with my RAs. Nevertheless, my engagements with my participants over time, having developed more confidence and established rapport with them as the study progressed, encouraged a more friendly relationship to be built in many cases.

Furthermore, my RAs' insider status facilitated a trusting relationship, allowing us to access many participants' homes and workplaces to conduct interviews. Additionally, our (my RAs and I) identities as young women, which participants could have considered non-threatening, may have encouraged some of them to invite us to their homes and workplaces to conduct interviews. Scholars working in many contexts have found that female researchers can gain

more access to both male and female groups, as they are often viewed as less threatening than their male counterparts. However, this trust was not always established from the beginning but developed over time as participants became more acquainted with us. For instance, some participants did not feel comfortable inviting us into their personal spaces for the interviews and opted to have the interviews done at the hospital instead. However, after going through the initial interviews, many opted to have subsequent interviews in their homes or workplaces instead.

Conducting interviews with participants in their homes and workplaces allowed me to contextualise aspects of their narratives about their everyday life. As narratives were elicited about people's routine activities in those places, illustration and corroboration were easily made through reference to spaces and objects near at hand, providing a deeper understanding of their lived experiences. It also allowed participants to feel more at ease in their surroundings and control the interview process.

While I was able to lead interviews conducted in English, I was also reliant on the support of my bilingual RAs during interviews with participants who either did not speak sufficient English or were more comfortable doing the interviews in Yoruba. During my early interviews in Yoruba, I led the interview process while one of the RAs interpreted the dialogues between the participants and me. While this interpreter-mediated interview process afforded me an active engagement with my participants, I observed that some of the nuanced details of participants' narratives were being lost in translation, with the interpreter often summarising lengthy responses in a few sentences. Additionally, I recognised that the back-and-forth interpretation was time-consuming and frequently disrupted the flow of the interviews. Since the nature of the interviews was a narrative inquiry into participants' lived experiences, they needed to be able to express themselves and tell their stories without interrupting the flow of their narratives.

To navigate these issues surrounding interpretation, I decided to explore allowing one of my RAs to lead the interviews conducted in Yoruba. At the same time, the other RA took notes and interpreted the conversations for me when necessary. This meant having to relinquish control over the interview process, which sometimes left me frustrated when some relevant

questions were omitted or missed opportunities to probe further into specific pertinent discussions. In preparation for my RAs to take the leading role in interviews conducted in Yoruba, I took my time to explain to them the research objectives and my goals and expectations for each stage of the data collection process. Additionally, my RAs and I went through the interview guide to clarify the purpose and relevance of critical topics and questions and highlight potential areas to probe further. For the initial few rounds of interviews my RAs conducted, I encouraged them to prioritise following the interview guide to ensure consistency across interviews. However, as they gained more familiarity with the interviews, I encouraged them to introduce their follow-up questions or probes when opportunities to elicit further relevant details presented themselves.

To ensure relevant details were captured during the interviews, the RAs translated and transcribed some of the interviews shortly after they were conducted for review. After translation, we sat together to reflect on how the interviews went and reviewed the translated transcripts to identify areas that worked well and issues that needed improvement. This debrief and review process helped me to identify areas where my RAs required additional guidance and support. It also helped my RAs better understand the research and what I was looking for, which helped with subsequent interviews. Ultimately, over the course of the study, we learned to work together as a team, and both my RAs continuously worked on their interviewing skills and improved considerably over time. Moreover, allowing my RAs to lead the Yoruba interviews created a more natural setting where participants' narratives could flow without interruption. I also observed that participants were mostly relaxed, comfortable, and open to discussions with the RAs during the interviews.

Notably, even some interviews conducted in English came with challenges related to language barriers. Although certain participants preferred to do the interviews in English, it became apparent during the interviews that there were times when they struggled to express themselves and articulate their experiences clearly in English. This may have impacted their ability to provide more detailed descriptions of some aspects of their lived experiences. For example, in some instances, I observed that some participants chose to keep their discussions short as they struggled to elaborate on their responses. In other cases, some participants would turn to my RAs to describe what they were trying to express in Yoruba, and my RAs

would then interpret their responses back to me in English. The research team, however, often encouraged participants to respond in Yoruba when they felt they were struggling to find the appropriate words or phrases in English and could express themselves better in their native language.

4.6 Ethical Considerations

I obtained ethical clearance from the University College London ethics committee (REC) and the Health Research Ethics Committee of the College of the Medicine University of Ibadan and the University College Hospital, Ibadan.

4.6.1 Informed Consent

Participants were informed of the study's objectives, procedures, and benefits before conducting the study. The researcher briefly summarised the study verbally and provided a longer description of the study through our information sheet. All data to be collected during the study was explained to participants. They were invited to ask any questions, and once all questions were answered, each participant provided informed consent by signing the consent form. They were also invited to consent to their data being used for academic research and publication purposes.

4.6.2 Voluntariness

Participants were informed of their freedom to refuse to partake in or withdraw from the study without any negative consequence at any point during the study. Refusal or withdrawal from the study will NOT exclude the patient from necessary treatment. They were also informed of their right to consent or withhold consent to their data being used for academic research and publication purposes. No dissemination of participants' data would happen without their explicit permission.

4.6.3 Translation of protocol to local language

The research was translated into the local language, Yoruba, to enable accessible communication with participants who are not proficient in English. Therefore, the study was conducted in the language that participants felt most comfortable speaking and was moderated with the assistance of a bilingual research assistant when necessary.

4.6.4 Privacy and Confidentiality

The following measures were taken to protect the privacy and confidentiality of participants and people who appeared in photographs or recordings: Participants had complete control over what aspects of their everyday life they recorded/not recorded and how much they would like to reveal. Participants were not obligated to record any situation that made them uncomfortable. They were advised not to take photos/ or record situations where privacy was concerned. Participants had the right to review their recordings and delete any (or all) audio recordings, photographs or videos they were not satisfied with or did not wish to share before the researcher viewed them.

Participants were also advised to be considerate and respectful of other people around them when taking photographs. They were instructed not to take pictures of or record anybody without their knowledge or people who did not want their photo taken and to be aware of what or who is in the background of any images they record. Participants were advised to obtain permission through a short consent form if they wished to include other people in their photographs or recordings. This form provided information about the study, how the pictures/video will be used, and contact information for the researcher.

Any images or recordings of others taken without their consent were not used for the research and were deleted. Also, if anyone requested their images or recording to be deleted, participants were advised to do so. Participants were advised not to record anything that could be seen as inappropriate, make people uncomfortable or embarrassed, or offend anybody.

Furthermore, participants were given the right to consent (or withhold consent) to interview and diary information (including images and/or recordings) being used for academic research and publication purposes. Each participant was assigned a unique ID number rather than their name to protect the anonymity of participants. Faces in images were blurred and masked out, and any potentially identifiable information was omitted from any reports or publications to protect the identity of the persons involved. Additionally, audio recordings from the diary study were transcribed, after which the clips were permanently deleted. Any mention of names or other recorded identifying information was removed from the transcripts.

4.6.5 Beneficence to Participants

A potential immediate benefit for those participating in the study is that it allowed them to reflect on and review their physical activities and their relationship with their health. In the longer term, the findings from the study should help inform future research and design of appropriate interventions to promote sustainable active lifestyle practices among patients with type-2 diabetes. Participants also received compensation to cover the cost of their travel and time at each stage of the data collection. This compensation was in line with general UCL and local ethics guidelines and practices.

4.6.6 Non-maleficence to Participants

There are no anticipated risks to the participants. However, if participants feel uncomfortable or distressed sharing any personal information during the interview, they have the right to skip the question, interrupt the interview for a while, or end the interview at any point without giving a reason. There will be no obligation for participants to document any situation that causes them distress and they will have the right to delete documented information without giving a reason. Any potentially identifiable details shared will be omitted from any reports or publication

Chapter 5: Narrative Analysis of Lived Experiences of People with Type-2 Diabetes

5.1 Introduction

This chapter presents a narrative analysis and narrative summary of the lived experiences of six research participants. It describes the method and process of data analysis and presents narrative summaries of six participants to highlight the nuances and idiosyncrasies of their lived experiences with type-2 diabetes.

5.2 Data Analysis

I employed a narrative analysis approach to explore and synthesise the lived experiences of people with type-2 diabetes in Ibadan and the meanings they attach to those experiences. Riessman (2008) defines narrative analysis as a group of analytic methods for interpreting texts with a storied form in common. These texts can be written, oral, or visual (Reissman, 2008).

Thematic narrative analysis, as described by Reissman (2008), is a case-centred approach that attends to the sequence of the narratives in temporal, social, and spatial contexts as narrated by the participant (Reissman, 2008). It seeks to “keep a story ‘intact’ by theorising from the case rather than from component themes across cases” (Reissman, 2008). Researchers collect descriptions of key events and experiences and configure them into a coherent story that gives meaning to the experiences (Polkinghorne, 2006). It allows the narratives to be seen from the perspective of both the participant and researcher to make sense of the individual’s experiences by telling, interpreting, and writing their story (Reissman, 2008).

The purpose of my initial data analysis was to develop six separate individual narratives that examined and captured the complexities of the lived experiences of the study participants. I considered the data generated by participants as narratives; they were telling me a story, through their words, actions, diary entries, and photographs, of the details of their day-to-day lives and what living with diabetes, was like for them. As a result, I was concerned about losing the context and the nuances of individual narratives (in their own right) through fragmenting and decontextualising the data. Hence, I employed thematic narrative analysis because it allowed me to use a person and case-centred approach and concentrate on how

participants interpret and make sense of their everyday lives and experiences of type-2 diabetes. The thematic narrative analysis allowed me to preserve the narratives and treat them analytically as a unit instead of breaking them up and analysing fragmented chunks out of context.

I found it challenging to choose specific individual cases for in-depth analysis, as all participant interviews raised important issues and were rich in data. On the one hand, I wanted to be comprehensively faithful to the data gathered and do justice to my research participants. On the other, analysing all 35 participants' data would be time-consuming, and there was a need to leave space for detailed analysis. Hence, I focused on six cases that represented the varied socio-demographic characteristics of the research population. The data analysis process was circular and iterative and followed four stages: familiarising with the data, identifying key themes, deconstructing, and organising the narrative plot and representing the data.

5.2.1 Familiarisation with the data

Participant data sources consisted of interview transcripts, diary entries, data visualisation of physical activity levels, annotations, field notes containing observations and reflections, and photographs taken by participants, lending itself to a multi-layered exploration of narratives. To cope with the large amount of data generated by my study, I decided to focus my analysis first on interview transcripts while referring to other data sources during the analysis. I read both interview transcripts (pre-interviews and post-interviews) for each participant and listened to the corresponding audio recording (English version) to reconnect with the participant and gain a sense of the participant's story.

I then re-read both interview transcripts for each participant in a back-and-forth process (at least three times). Along with reading the transcripts, I carefully reviewed each participant's data sources, including diary entries, activity levels graphs and observation notes from my research journal, to gain familiarity with the depth and width of the data.

5.2.2 Identifying key themes

I systematically worked through the transcripts of each participant's first and second interviews at a time (which I had become familiar with), highlighting texts and noting several themes down (in the margins of the transcript) that emerged within each case as I went along.

I explored what stories about their lived experiences the participant was trying to tell while paying attention to dimensions of temporality, sociality, and place within the context of the stories. In this process, I could identify the overarching themes in the narratives and outline prominent components (subplots) of the narratives that the participant perceived as necessary to their experience of living with diabetes and day-to-day lives. I then probed back and forth and noted what was significant about these themes or what was distinctive about them.

5.2.3 Deconstructing and re-organizing the narrative plot

The participants' narrative accounts were often disjointed, so they did not necessarily fit together to create a continuous narrative. So, I made a visual map (Figure 9) that explored the non-linear sequencing for each critical narrative and reorganised the narrative flow of experiences and participants' routine activities in sequence and synchrony. With the aid of the visual map, I clustered and linked relevant and related fragments of the full narrative account across space and time to create meaning and coherence while remaining faithful to the words of the participants. For example, when participants link their lived experiences with diabetes to past events, the narrative linkages in the stories may illuminate further understanding of the experiences they described within the context of their lives. In this stage, I excluded data that did not contribute to the final narrative, using a process called narrative smoothing (Polkinghorne, 2006).

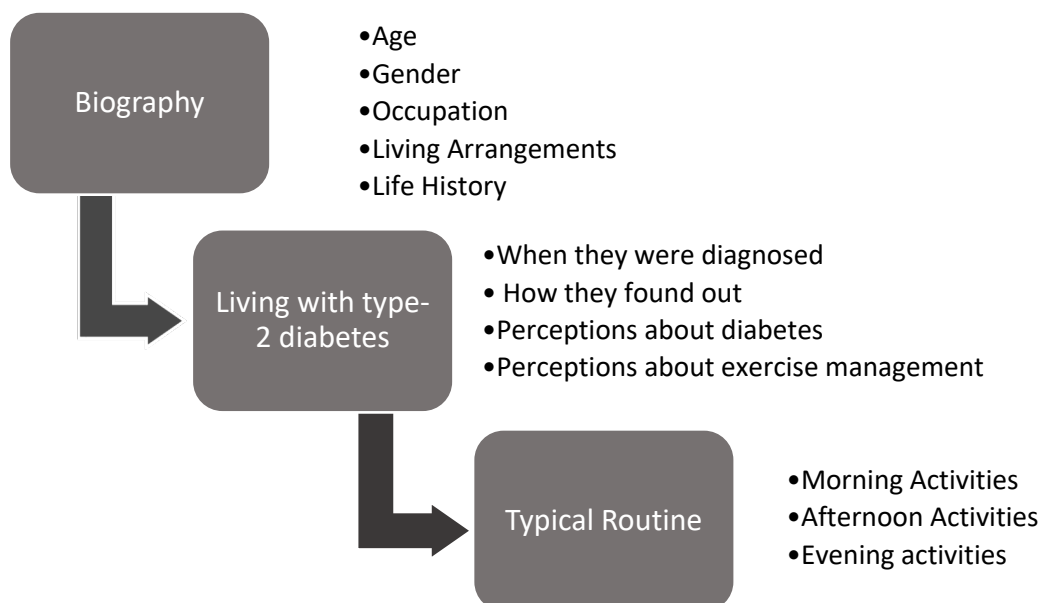


Figure 9: Visual Map - Participant's Narrative Flow of Experiences

5.2.4 Representing the narrative data

In the presentation of my data analysis, I wrote a descriptive account of each case as a narrative whole. As I was writing, I returned again and again to the transcripts, for added illumination and new insights. I re-wrote several drafts during the development of the narrative summary until I was satisfied that all key narratives were retained, and extraneous information was removed. In the final narrative, I provided a thick description of how the participant experiences everyday life when living with type-2 diabetes in Ibadan.

5.3 Narrative Summaries

This section provides a narrative summary of Six participant's lived experiences. It provides a reconstructed narrative of their biographies and daily life experiences.

5.3.1 P02 Narrative Summary

Sex: Male

Age: 81

Work status: Retired

No of household members: Lives alone

Mobile phone: Basic Mobile phone

5.3.1.1 *Biography*

P02 is a retired accountant living in Ibadan for the past 63 years. He worked as a primary school teacher for 13 years, after which he moved on to work as an accountant until his retirement 23 years ago. He lives alone in a 3-bedroom bungalow in a spacious gated compound, with a small garden (where he grows his vegetables) and a fishpond in his backyard. His neighbourhood is a gated community with individual bungalows, and he is acquainted with some of his neighbours. He has been living alone since his wife died 25 years ago, and all his three sons got married; two live with their families out of state, and one lives with his family in Ibadan. He doesn't receive a government pension, so his children support him financially to care for his needs and health. Every Sunday, his son and grandchildren visit him, and he always enjoys being in their company. He stated that his grandchildren enjoy helping him with cooking, doing the dishes, tidying up and cleaning the house when they visit.

A domestic help also comes once a week (on Tuesdays) to help with cleaning the house, washing his clothes and doing the groceries.

P02 was diagnosed with type-2 diabetes about ten years ago when he went to see his doctor because he was losing weight and urinating frequently. He believes he inherited diabetes, as two of his brothers had diabetes too. He was also diagnosed with hypertension, which is controlled with medication.

After being diagnosed with diabetes, P02 was put on oral medication and subsequently placed on insulin, which he takes once a day in the evening before bedtime. He was also referred to a dietician who offered him advice on diet and exercise. He was advised to eat moderate portions of carbohydrate and protein-rich food and many vegetables. He was also advised to take a walk or get up and move around the house after eating to help his body break down excess glucose from his meals.

Additionally, P02 joined the diabetes association of Nigeria (DAN) support group at the hospital to learn more about diabetes and its management. He occasionally attends the monthly group sessions, where a team of health professionals (endocrinologists, dieticians, pharmacists and health educators) educates patients on diabetes management and how to prevent and care for further complications. The meetings also provide the opportunity to ask questions and share experiences with others about living with diabetes, and coping strategies, which he finds reassuring to know he is not alone in this journey and gives him hope that he too can persevere. Nonetheless, he is grateful to God that he is alive. He believes the “grace of God” has kept him alive because many of his friends he lived, worked and ate with have passed away.

Managing diabetes has been a learning process for P02, especially in understanding the effects of different food on his blood sugar levels. He mentioned that he now monitors his blood sugar levels less frequently than he used to when he was diagnosed because he has gotten to a point where he knows which foods work for him. He mainly checks it when he feels sick or a pinch of discomfort. Regarding physical exercise, he tries to move around his house or compound after eating and walks around his neighbourhood at least three times a

week. However, P02 struggles to be as active as he wants due to his health and old age. He believes that he had lived an active lifestyle for most of his life, especially during his youth. While living with his parents, he helped his mother hawk food on the streets after school as an adolescent. He carried a tray with food on his head, walking around the village all afternoon and evening. At the weekends, he helped his father on the farm all day to put food on the table for the family. After secondary school, when he left home for teachers training college, he engaged in sports activities, including football and tennis, every day for leisure until he developed a knee injury and couldn't play anymore. When he started work after college, he used to walk about 4 km to and from work every weekday for six years until he could afford to buy a car.

However, when P02 left teaching for an accounting job, his activity levels started to decline because he worked at a desk for long hours (about 12 hours) every weekday. Shortly after his retirement, his health began to deteriorate, impacting his mobility. Besides having diabetes, he suffers from eye problems and other health complications that affect his lifestyle. He developed knee and back pain about seven years ago, which interferes with his ability to carry out some physical tasks. He can no longer stand, bend or sit for long periods without pain, and as a result, he now relies on others to do chores, including hand washing his clothes, sweeping and cleaning his house and sometimes cooking his food. He also needs to walk very carefully and slowly around his home to avoid falling over, particularly when going up and down the steps in his kitchen. However, he walks with the aid of a cane when leaving his house. When going out to town (using public transport), he avoids using buses because he feels they are not accessible for people with mobility impairments, and he is concerned that he may fall if he tries to get on one. He now only prefers taking an auto-rickshaw because he finds it easier to get in and out safely.

5.3.1.2 Typical Routine

P02's daily routine is more or less the same: He spends most of his time at home, in his bedroom, lying on his bed, resting, listening to his radio, and sleeping. He doesn't go out to town much except for days that he has an appointment or meeting at the hospital in Ibadan. He also sometimes travels to Lagos for his routine eye appointments. He mentioned that he spends most of his time at home because he doesn't have much to do since his retirement.

When his wife was alive and his children were younger, he drove them to their hometown to visit relatives every two weeks. He doesn't go to his hometown anymore because most of his close relatives have passed away. Likewise, he used to visit friends at the weekend and attend social functions, but he no longer visits because most of his close friends have also passed away.

P02 typically wakes up between 6:00 am to 7:30 am to check his glucose levels and take his medication before breakfast. He takes medication for his diabetes, hypertension and eye condition. Then he sits on his bed for five to ten minutes to prepare himself to stand up gently (so that he doesn't experience much pain in his back). Right after, he walks to the kitchen to boil some water on the stove to take his bath. He then gently carries the kettle of water to the bathroom to have a bath. After that, he gets dressed and returns to the kitchen to prepare a quick breakfast, which may include cereal, oatmeal, tea and bread. He likes to eat other traditional breakfasts but only makes quick dishes because his back and leg pain makes it difficult for him to stand for a long time. He says that if he stands for too long, for example, 30 minutes at a time, his legs begin to hurt and quiver.

He sits in the dining room for about one hour, having breakfast, taking his medication, and listening to the news on the radio. After finishing his breakfast, between 9 am – 10 am, he walks to his backyard to feed his fish and water his vegetables, which takes about five to ten minutes daily. He may also briefly walk around his compound for another five minutes to exercise his body. He takes pleasure in feeding his fish and watering his vegetables and believes that if he doesn't move about after eating, the food might not digest properly.

After his walk, he returns to his bedroom to lie down, resting and listening to his radio. During this time, he may get up a couple of times to go to the bathroom and then go back to bed. He may also fall asleep while listening to the radio. He stays in bed until about 3:00 pm, before he gets up to go to the kitchen to prepare his lunch. He mainly cooks rice with green leafy vegetables for lunch, which usually takes about 25 minutes to prepare. While prepping and cooking, he alternates between standing in the kitchen and sitting in the dining room to avoid experiencing pain in his knees or back. On days when he feels like eating other traditional dishes, he finds challenging to prepare, he asks a relative who lives in his neighbourhood to

help him cook. He wishes he could store cooked food in his freezer and just have them warmed when he needs to eat but he cannot do so because of the unstable power supply in his neighbourhood. He stated that he misses when his wife was alive and didn't have to worry about food or depending on other people to assist him with things.

P02 sits in the dining room to eat lunch, after which he walks around his neighbourhood for about 30 minutes. During his walks, he stops to greet and briefly chat with neighbours on his way. When he gets home after his walk, he lies down to rest in bed for some hours before getting up to prepare his dinner between 7:30 pm to 8:00 pm. For dinner, he usually eats corn meal pudding with green leafy vegetables from his lunch, which takes him about 15 minutes to prepare. After dinner, he goes to the kitchen to boil water and take his bath. After his bath, he takes his insulin injection between 9:00 pm to 9:30 pm. He then goes back to bed until he falls asleep.

5.3.2 P06 Narrative Summary

Gender: Male

Age: 47

Work status: Unemployed

No of household members: Lives with parents

Mobile phone: Basic Mobile phone

5.3.2.1 *Biography*

P06 is a 47-year-old man diagnosed with type-2 diabetes about seven years ago. When he started experiencing symptoms including fever, headache and weakness, he initially thought he had malaria, so he went to buy anti-malaria tablets from the pharmacy. However, after taking the medication, his symptoms persisted and worsened, so he decided to go to the hospital. At the hospital, he was admitted and later diagnosed with type-2 diabetes.

When P06 was diagnosed, he admitted that he didn't take his condition seriously and didn't follow through with any medical advice (after he was discharged) for many years until he started experiencing complications, including deteriorating eyesight, muscle weakness and severe weight loss. He had never heard about diabetes before and didn't know how serious

it could be. His non-adherence to treatment was mainly because of financial constraints: He felt he could not afford the high cost of managing diabetes and at the same time meet his financial responsibilities towards his wife and his family. So, he didn't go back to the hospital for follow-up care, didn't take his prescribed medications, and didn't adjust his diet, hoping it would eventually go away on its own.

P06 is married with two young children who are in primary school. He used to sell used car parts in Lagos for a living. However, his condition worsened over the years, and he could not work or support his family financially. His wife, a hairdresser in Lagos, took up caring for the home and their children. About a year ago, his parents and siblings grew very concerned and asked him to move back home to Ibadan so that they could better support him in getting the treatment and care that he needs to get better. So, he decided to move to Ibadan to live with his parents while his wife and children stayed in Lagos.

Since then, P06 has been following up with treatment at the outpatient clinic in Ibadan. His siblings have since taken complete responsibility for his care, including paying for hospital bills, buying his medications and glucose strips, and providing him with some money to purchase his food. They also visit with their families to check on him every weekend. One of his nephews accompanies him to all his clinic appointments at the hospital. His mother cooks his meals and regularly checks if he has taken his medication. His wife and children visit him in Ibadan during holidays and festive periods. He feels very grateful for his family, and their support motivates him to take care of himself for them and his children.

P06 now takes his medications regularly and attends his routine appointments in the hospital. His eyesight has improved, but he still hasn't gotten back his strength. He monitors his blood glucose levels once weekly and keeps a record of his readings in a notebook to show to his doctor during his follow-up appointments for feedback. In terms of diet, he was encouraged by the dietician to adopt a diet rich in vegetables and fish to help control his glucose levels. However, he considers the cost of fish and some of the recommended vegetables, such as eggplants, cucumber, and carrots, to be expensive for his family, so often, he is unable to follow some of the recommended diets. He mostly consumes a more traditional diet that combines carbohydrates (in recommended portions) such as rice, yam, and cornmeal,

together with beans and green leafy vegetables, which are less expensive options. He gives his mother some money to go to the market to buy the food they need based on what they can afford.

His doctor also advised P06 to engage in physical exercise. However, he was not informed about the specific type of physical exercise that would be adequate for him and how often he should exercise, and he didn't ask for an explanation either. He walks around his neighbourhood about three times a week as a form of exercise, even though his health limits his mobility. Because of his muscle weakness and fatigue, he states that his walking pace has slowed significantly, and it takes him longer to get anywhere. He is also no longer able to lift heavy items and usually needs assistance lifting a bucket of water. P06 lives on the top floor of a two-family house, with a shared bathroom located outside of the house. So, he needs to use the stairs every time he needs to use the bathroom or go outside the house, which is also a struggle for him. He says he goes up and down the stairs, at least ten times a day, which he feels, should count as exercise, even though she climbs the stairs slowly and carefully. While he had never considered engaging in physical activity for his health in the past, he played football for leisure for most of his life until he became too weak to continue. He also stated he used to walk several kilometres between going to and from his shop and running errands but now feels tired after walking a short distance.

5.3.2.2 Typical Routine

Since moving back to Ibadan, P06's routine has been more or less the same daily. He is not working and spends most of his time at home with his parents. He also spends some time every day in the mosque praying and meditating. He only goes out to town when he has an appointment at the clinic.

P06 typically wakes up every morning between 4:00 am and 4:30 am for his morning prayers. As soon as he wakes up, he goes downstairs to the bathroom to perform ablution. After ablution, he goes back upstairs to his room to achieve his prayers before the morning obligatory prayer at 5:30 am. During his prayers, he sits on the prayer mat and takes the time to pray to God to restore his health and strength so that he can return to his wife and children. At 5:30 am, he gets up to perform his morning prayers, after which he goes back to sleep for an hour or two.

P06 then usually wakes up around 8:00 am to listen to the news on the radio on his bed while he waits for breakfast to be ready. He eats his breakfast any time between 8:30 am to 9:30 am. When his mother is done preparing breakfast, she calls on him to go to the kitchen to get his food. He then goes to the living room to eat and take his medication while he listens to his radio. After breakfast, he stays in the living room (in his parents' company) listening to all the morning radio programs until 11:00 am. He may get up to the bathroom at some point between these times. As his household has no television, he finds his radio as his primary source of entertainment. After he is done listening to the radio at 11:00 am, on some days, he takes a nap for a couple of hours if he's sleepy, while on other days, he may decide to go out to take a walk around his neighbourhood for about 30 minutes up to an hour. During his walk, when he gets tired, he finds a place to sit and rest for a while before walking back home.

P06 usually eats his lunch between 12:30 pm and 1:00 pm every day. Immediately after lunch, he rests before going to the mosque for his afternoon prayers at 2:00 pm. His walking pace takes him about 15 minutes to walk to the mosque. After prayers, he mostly sits to meditate in the mosque until the next prayer time at 4:00 pm. After prayers, he sits or sleeps in the mosque for another hour before returning home at around 5:00 pm. On some days, he stops over at a neighbour's place to have a chat before the next prayer time at 6:30 pm; other days, he goes back home to rest or sleep instead.

At 6:30 pm, P06 prays with his parents at home, and then they sit together to eat dinner and get some fresh air on their veranda. After dinner, they sit and chat while waiting for the last prayer call for the day at around 8:00 pm. They then get up to pray, after which they go inside to get ready for bed. He lies in bed for some time listening to the news on his radio before falling asleep between 8:30 pm and 9:30 pm.



Figure 10: Image portraying where P06 performs his morning prayers



Figure 11: Image portraying where P06 takes his daily walks



Figure 12: Image portraying the staircase that leads to P06's bathroom outside



Figure 13: Image portraying the staircase that leads to P06's house



Figure 14: Image portraying the radio P02 frequently listens to

5.3.3 P08 Narrative Summary

Gender: Female

Age: 35

Work status: Nurse

No of household members: Lives with husband and son

Mobile phone: Smartphone

5.3.3.1 Biography

P08 has been working as a nurse in Ibadan for the past 15 years. She lives with her husband and 7-year-old son in a two-bedroom bungalow. She was first diagnosed with diabetes four years ago, during her second pregnancy (which she eventually lost). Her doctor initially thought it was gestational diabetes, but even after losing her pregnancy, her blood sugar levels never returned to normal, so she was later diagnosed with type-2 diabetes. Finding out

about her condition wasn't a shock to her because of her family history of diabetes: Her mother died from diabetes complications.

She feels she knows quite a bit about diabetes and its management but still has much to learn. Through her experience living with it, doctors' advice, and experimenting, she knows what works and what doesn't work for her. She also uses her phone to go on the Internet to check information about the side effect of some of her prescribed medication and some complications of type-2 diabetes and tries taking precautions because she wants to be healthy and live long for her son. She informs her doctor about any symptoms or side effects she observes. She also has a colleague with diabetes with whom she shares her experiences, and they both support and learn from each other. She has government health insurance, which covers the cost of her treatment and medication, while she buys her glucose strips out of her pocket.

P08 was also referred to the dietician at the clinic, who advised her to limit her intake of sugary foods, including carbonated beverages, cakes, pastries and sweets; to consume moderate amounts of carbohydrates; and increase her intake of vegetables and protein. She was also advised to eat breakfast between 7:30 am, and 8:00 am lunch between 1:30 pm and 2:00 pm, and dinner between 6:30 pm and 7:30 pm. Before her diagnosis, she admits she used to skip breakfast but doesn't do that anymore. She tries to stick to the recommended timing, but sometimes, especially on afternoon shifts, she eats dinner later than recommended. She also initially struggled with reducing her food portion size because she always felt weak and hungry. She tests her blood glucose levels before and at least two hours after every meal. By checking her glucose levels regularly, she has learned to know how much to eat and how her body responds to different types of foods. This helps her to experiment and adjust her diet accordingly.

P08 stated that she is aware that physical exercise plays a role in helping the body use insulin more efficiently. Although she currently doesn't actively do any form of physical exercise outside her routine activities, she feels that juggling the demands of her work and her responsibilities at home is an exercise in itself. She expressed her desire to sometimes take a brisk walk around her compound after the day's work but is most often too tired to do so.

Before her diagnosis, P08 had never felt the need to do any physical exercise because she felt she was healthy.

5.3.3.2 Typical Routine

P08's weekday routine varies slightly depending on her work shifts at the hospital: She is usually assigned either morning or afternoon shifts. When she is on morning shifts, she starts work at 8:00 am and closes around 4:00 pm. However, she begins work at noon and closes around 8:00 pm on the afternoon shift.

P08 typically wakes up between 5:00 am to 5:30 am and starts her day by checking her blood glucose levels. After that, she and her husband sit to read the bible and pray for about 20 minutes, after which she wakes her son up to get ready for school. She then goes to the kitchen to cook breakfast for her family. She also washes the dishes from the night before, cleans the kitchen counters, and sweeps and mops the kitchen floor while the food is cooking. After she's done cooking, she gets her son ready for school and serves him his breakfast to eat. If she's on the morning shift, she then goes to the bathroom to have her bath and then gets dressed for work. After getting dressed, she goes to the kitchen to pack her breakfast to eat when she gets to work. She stated that because she is usually preoccupied with her morning chores and getting her son ready for school, she doesn't have the time to eat at home before she leaves work. When it's 7:00 am, she leaves for work, while her husband leaves with her son to drop him off at school before he goes to work. P08 drives to work, which takes her about 30 – 45 minutes, depending on traffic. When she gets to the clinic, she sits to eat breakfast before starting the day's work.

However, if P08 is on an afternoon shift, she gets time to eat breakfast at home with her family. After her husband and son leave home at 7:00 am, she tidies up the house and sweeps and mops all the rooms, for about 30 minutes. After finishing her chores, she lies down in bed to rest or sleep for at least a couple of hours before getting up to get have her bath and get ready for work. She then leaves home for work at 11:00 am.

At work, she could either be assigned to the emergency unit or the outpatient clinic. On days she is assigned to the outpatient clinic, she sits at the desk and attends to patients during

appointments. Her duties at the desk entail checking patients' vital signs before they meet with doctors, answering questions the patients may have, booking subsequent appointments for the patient, and directing patients to the consulting room to see the doctor. This involves her sitting at the desk for most of her shift and only getting up when she needs to use the bathroom or go for her one-hour lunch break at 1:00 pm.

On the other hand, on days she is assigned to the accident and emergency unit, she is mostly on her feet, moving around for most of her shift, attending to patients in the emergency room. Her duties at the emergency unit entail: providing initial assessments and care, assisting doctors during treatment and procedures, coordinating further investigations, and transporting patients to the ward if admitted. P08 mentions that whenever she checks her glucose levels on days, she's working in the emergency room, she notices that her glucose levels are always within normal range, even when she doesn't take her medications. She suspects that her activities at the emergency room helped lower her glucose levels on those days.

During her lunch break, P08 walks with some of her colleagues for about 8 minutes to the hospital to buy and eat lunch. After lunch, they walk back to the clinic to continue their work. If she is on morning shifts, she finishes her work for the day and drives back home at 4:00 p.m. When she gets home, she sits in the living room to rest for about an hour before preparing dinner for her family at around 6:00 p.m. After making dinner and cleaning the kitchen, she sits in the living room to eat dinner with her family and then helps her son with his homework. She puts her son to bed at 8:00 pm, tidying up the house and sweeping the floors (if necessary) for about 30 minutes. She then joins her husband in the living room to chat and watch the evening news before bed. She usually goes to sleep between 9:00 pm to 10:00 pm. However, if she is on afternoon shifts, she usually gets home from about 8:30 pm to 9:00 pm. When she gets home, she eats dinner (cooked by her husband) and sits in the living room to chat and watch the evening news before going to bed by 10:00 pm.

On Saturdays, P08 usually stays at home all day with her family. After a busy week, she feels she deserves some rest. She usually wakes up between 6:00 am to 7:00 am. As usual, she checks her glucose level and prays with her family before starting her day. She then goes to

the kitchen to prepare breakfast for her family. She also washes the dishes from the night before, cleans the kitchen counters, and sweeps and mops the kitchen floor while the food is cooking. After she's done cooking, she serves her family breakfast, and they eat together. After eating, she takes her medications and may lie down in the living room to watch TV or sit to read her books for the rest of the morning. She spends the rest of the morning in the living room while occasionally getting up to go to the bathroom or kitchen. When it's 1:00 pm, she gets up to prepare lunch. After eating lunch, she returns to the living room to rest some more. While resting, she may watch TV, chat with her husband, play with her son, and take a nap before dinnertime. At 6:00 pm, she gets up to make dinner in the kitchen and cleans up after. After dinner, between 7:30 pm to 8:00 pm, she puts the laundry in the washing machine, and tidies up the house, after which she goes to have her bath. She then puts her son to bed and joins her husband in the living room to watch the evening news before bed.

On Sundays, she wakes up at 5:30 am and does her usual morning routine. After eating breakfast with her family, they leave for church at 7:30 am. Her husband drives them to church, which takes about 30 minutes there. In church, they sit, stand, sing and dance through the prayer service, which ends at 11:00 pm. On their way back from church, P08 and her family stop by the market to buy food items they need. They spend about an hour walking from one stall to another while her husband carries the shopping bags. After shopping, they visit her husband's parents' house. Two of her husband's siblings also visit the parents with their families, and they all have lunch there. They spend the rest of the day chatting with family, playing with the kids and helping with chores around the house. She always enjoys being around family and likes that her son gets to play with his grandparents and cousins. They leave for home in the evening, between 5:30 pm to 6:00 pm. When she gets home, she sorts out the food items from the market and prepares dinner. She eats dinner with her family and then helps her son with his homework. After putting him to bed at 8:00 pm, she irons her clothes and those of her son and husband. After that, she may watch the news or go to bed if she feels tired and sleepy.

5.3.4 P10 Narrative Summary

Gender: Female

Age: 50

Work status: Unemployed

No of household members: Lives with husband and adolescent daughter

Mobile phone: Basic Mobile phone

5.3.4.1 Biography

P10 is a 50-year-old petty trader diagnosed with diabetes three years ago. She didn't know she had diabetes (as it showed no signs or symptoms) until she developed a sore on her left foot, which became infected. Several months after nursing and treating the wound with antibiotics, it kept getting worse and wouldn't heal. So, when the wound became very painful, and she couldn't walk properly, her husband took her to the hospital for treatment. Following a series of tests, she was diagnosed with type-2 diabetes and told that her leg urgently had to be amputated below the knee.

After the procedure, P10 was devastated and had difficulties reconciling with her new reality. She was also very distressed about having diabetes, which had caused her to lose her leg. She had never heard about diabetes before and didn't understand how and why she had it. She was also worried she was going to lose another leg. So, she was referred to the health educators at the hospital for counselling. They explained what type-2 diabetes was all about and reassured her that she could live a healthy and long life out of it if she were compliant with taking her medications, eating properly, monitoring her blood glucose, and proper foot care. She was also advised to exercise but did not specify what type of exercise she should engage in. She was also advised not to sit for too long at a time because it might prevent her body from utilising the blood sugar properly. With the additional support of her family (husband and two children) and her faith in God, she was able to come to terms with the loss and her condition.

Since her diagnosis, P10 has consistently taken her medication and attended her routine follow-up appointments. She monitors her blood glucose levels once weekly to save the cost of purchasing the strips regularly. She records her blood sugar readings in a notebook and

shows them to her doctor during her routine appointments for feedback. She checks her other foot to detect any blisters or sores as soon as possible and always covers her feet with cotton socks.

P10 hasn't made significant changes to her diet since her diagnosis, as she was informed that she could still eat any foods but in moderation. While she was encouraged to include more vegetables to supplement her diet, she finds most of the recommended vegetables expensive, so she only buys what she can afford. However, she eats traditional foods that include green leafy vegetables because they are more accessible and affordable.

P10 stated that losing her leg has restricted her mobility and ability to perform some physical tasks. She has had to make adjustments in her daily life. She used to work as a hairdresser but had to quit her job since it required her to stand on her feet for an extended period. She now sells cold soft drinks and bottled water in her home to earn some money to take care of her health, even though the income she makes from it is not enough to cover all of the costs of her management. Her husband and two older daughters offer their financial support when she needs it. She also now depends on her youngest daughter to do household chores, including cooking, cleaning, fetching water from the well, and doing the dishes. Her husband now assists with going to the market to buy food and items for the household and restock her shop items.

She uses a walker around the house and a prosthetic leg when she needs to go out to town. She stopped wearing her prosthetic leg at home after she developed a wound from prolonged wear. She doesn't like going out anymore because of the pain and discomfort she experiences from wearing her prosthetic leg when she walks long distances and wears it for a long time. For instance, she used to go to the market. She wishes her prosthetic leg was more comfortable and less painful so that she could do her daily tasks without much restriction. She also encounters difficulties getting on and off public transport such as taxis, buses and auto-rickshaws as she can only bend her prosthetic leg to a certain degree. She finds it more convenient to get on a motorcycle taxi with her prosthetic leg, but it is more expensive than other public transport options. She no longer goes to the market

5.3.4.2 *Typical Routine*

P10 lives with her husband and 17-year-old daughter in a two-bedroom block of flats. There are four neighbours within the block with whom she is well acquainted. Her other two daughter lives out of state with their family. She spends most of her time at home, watching television, selling goods and chatting with her family and neighbours. She mostly doesn't leave her house except on weekends when she goes to church and has an appointment at the hospital.

On weekdays, P10 typically wakes up between 5:30 am, and 6:00 am. When she wakes up, before she gets up from bed, she stretches her arms and legs about 50 times for about 2 to 3 minutes as a form of exercise. She then goes to the living room to pray with her family for about half an hour. After prayers, she goes to the bathroom to have her bath while her daughter cooks breakfast for the family. In the bathroom, she sits on a stool while she bathes with a bucket of water so she does not have any difficulty bathing herself. After her bath, she dresses up and goes to the living room to eat breakfast with her family and have her medication.

After breakfast, at 7:30 am, P10's husband leaves for work, and her daughter leaves for school while she sits in the living room to watch TV (if there's electricity) and attend to customers. She stated that she has, on average, about 8 to 12 customers in a day, but that can easily double during the weekends. Whenever a customer comes to buy an item, she may stand up to get it for them or direct them to the refrigerator to get it themselves if she feels tired.

She also gets up a few times to go to the bathroom and goes back to sit in the living room. While in the living room, she may fall asleep for a couple of hours. In the afternoon, between 1:00 pm to 2:30 pm, when she starts to feel hungry, she goes to the kitchen to prepare cornmeal pudding (a traditional food) for lunch. She usually makes cornmeal pudding because it takes a short time (less than 10 minutes) to make and doesn't require much assistance since her daughter isn't home to assist. She prepares lunch using a portable gas stove while sitting on a stool in the kitchen.

After having her lunch in the living room, on some days, P10 remains there watching TV, reading her bible, and attending to customers until her family return home. On other days, especially when there is no electricity, she goes outside to sit on their shared veranda, chat with her neighbours, and pass her time. Her neighbours are aware of her condition, and even though they don't understand it, she feels comfortable in their company and sharing information about her health. If she gets a customer outside, she goes inside to get them what they need, and sometimes her neighbours help her. She also gets up a couple of times to go to the bathroom. Her daughter returns home from school at 5:00 pm and goes to the kitchen to prepare their dinner. She sits outside until her husband returns from work between 6:00 pm to 6:30 pm then returns inside to eat dinner and spend some time with her family in the living room before going to bed between 9:00 pm to 10:00 pm.

On Saturdays, P10 wakes up between 6:00 am, and 6:30 am and goes through her usual morning routine until after breakfast. After eating breakfast, her husband leaves for work, and her daughter sits in the living room to help her attend to customers while she goes outside to the backyard to hand wash her clothes and those of her husband and daughter, which takes her about an hour to finish. She insists on doing laundry because it makes her feel helpful around the house and helps reduce the burden of house chores on her daughter since she can wash while sitting on a stool. However, her daughter helps her fetch and carry the buckets of water she needs from the well before she starts washing, as well as spreading the clothes in the backyard to dry after she is done washing and rinsing.

After laundry, she goes to the bathroom to have her bath, after which she goes to her room to dress up and rest in bed afterwards. While lying in bed, she may read her bible, listen to gospel songs, and eventually fall asleep for a couple of hours. When her daughter is done preparing lunch in the afternoon between 1:00 pm to 2:00 pm, she joins her daughter in the living room to eat lunch and watch TV (if there's an electricity supply) for some time before going outside to get some fresh air and chat with her neighbours.

In the evening, at about 5:30 pm, P10 goes to church for choir practice for one hour. She has been in the church choir for 28 years and looks forward to rehearsal nights every week. She loves to sing and sees singing in the choir as a form of worshipping God. P10 walks for about

three minutes to the street, where she can catch a motorcycle taxi to church. She may stand for several minutes before she gets one, and it takes her about 10 minutes to get to church. She sits for one hour in the church to practice for Sunday church service with the group. At 7:00 pm, she takes a bike back home. When she gets home, she sits in the living room to eat dinner, watch TV or chat with her family before bed between 9:00 pm and 10:00 pm.

On Sundays, P10 goes through her usual morning routine until after breakfast, leaving her home to church with her family at 7:30 am. Her husband drives them to church, which takes up to about 15 minutes. She prefers to sit in the front of the car because it provides enough room for her prosthetic leg. While in church, she sings in the gospel choir and then joins her family for the rest of the church service. Throughout the church service, they sit to listen to sermons and stand to pray, sing praises and dance. When P02 feels tired or uncomfortable on her feet, she sits back down.

After church at 1:00 pm, P10 goes back home with her family. At home, she sits or lies on the couch in the living room while she waits for her daughter to cook lunch for the family. They sit in the living room to eat lunch and watch TV (if there's an electricity supply). After lunch, she spends the rest of the day in the living room or the bedroom, resting while her daughter helps her attend to customers. In the evenings, between 4:00 pm to 5:00 pm, she usually goes outside to get some air on the veranda and chat with her neighbours for some time until dinnertime. She then goes back inside the house to eat dinner with her family between 7:00 and 8:00 pm. The family may watch TV or chat during and after dinner before going to bed between 9:00 pm and 10:00 pm.

5.3.5 P11 Narrative Summary

Sex: Male

Age: 40

Work status: Teacher

Education level: Master's degree

No household members: Lives with his wife

Mobile phone: Smartphone

P11 is a 40-year-old teacher at a private secondary school. He lives with his wife in a two-storey house enclosed in a gated compound. In 2014, he found out that his blood sugar level was high when his wife -out of curiosity-asked him to test his blood sugar level using a relative's glucose monitor because he was losing weight and urinating frequently. However, he was reluctant to go to the hospital to seek medical assistance because he didn't want to be placed on drugs for the rest of his life.

He later came across a book about traditional herbal medications, where he read about how 'bitter leaves' could be used to treat pre-diabetes. Since then, for four years, he has been taking the herbal remedy as a self-care practice for controlling his glucose levels. However, he did not change or control his dietary habits: He drank alcohol and carbonated drinks and ate a lot of starchy, fatty and sugary food. He thought that if he cultivated the habit of taking the bitter leaves, it would prevent him from having diabetes. He also believed he was doing well until he began to lose weight drastically, and his family insisted he sees a doctor.

About a year ago, he took his family's advice and decided to see a doctor. At the hospital, he was tested and diagnosed with type-2 diabetes. He was then placed on medication and referred to the clinic's dietician for counselling. The dietician provided him with a breakdown of the kinds of food he should eat, the timing of his food, and the quantity of food he should consume: He should have his breakfast between 6 am to 7 am, his lunch between 12 noon and 2 pm, and then dinner between 6 pm and 7 am. Regarding the quantity of his food, he should aim to eat no more than the size of his fist and include plenty of vegetables in his diet. He was also advised to do some exercise after eating to help digestion and break down his blood glucose adequately.

He has since been working hard to adjust his lifestyle to follow the recommendations. He now controls his diet and makes a conscious effort to be more physically active. Before his diagnosis, he didn't know much about exercising to keep himself healthy, but now, he is more informed and conscious of the fact that he has to be physically fit and makes an effort to do so. He also checks his blood sugar levels twice daily, before breakfast and two hours after breakfast.

When he found out he had diabetes, he felt disappointed: He thought he was too young to get it, limited by dietary restrictions, and probably be on drugs for the rest of his life. Although he acknowledged that he grew up never paying attention to his diet or health, eating a lot of fatty and sugary food, and drinking carbonated drinks, he didn't think that his lifestyle would cause any problems at his age. Nonetheless, his family has been supportive of him; his parents and siblings provide him with advice and moral support, and his wife cooks his meals for him and eats what he eats. He also uses his mobile phone to check information about diet and management. However, he doesn't want people outside his family to know about his condition because he fears being stigmatised. He feels that although diabetes isn't a death sentence, people will perceive it differently, so he tries to keep it from his colleagues, friends and distant relatives.

5.3.5.1 Typical routine

On weekdays, P11 typically wakes up at 5:30 am. His wake-up time is fixed because he sets the alarm for 5:30. The moment he wakes up, he says a prayer for 5 minutes, and then he picks up his phone to respond to messages, browse the Internet or go through things on his phone for about 20 minutes. He then gets up from bed to check his blood sugar and goes downstairs to the kitchen to make his breakfast. He typically takes light meals such as wheat bread, tea, and oats for breakfast. It takes him about 5 to 10 minutes to prepare his breakfast. He then sits in the living room for about 10 to 15 minutes, has breakfast, and takes his medications while watching the news on TV. After breakfast, he goes back upstairs to the bathroom to have his bath and dresses up for work.

At 7:20 am, he leaves home and walks for 5 minutes to the school where he teaches civic education and government studies. Between 7:30 am to 8:00 am, he stands for the school assembly and moves around to coordinate the students. After assembly, at 8:45 am, and 9:45 am, he teaches a class for one hour. While in class, he stands and moves around the class while teaching. He likes to engage the students and have eye contact to ensure that they are paying attention. At 10:45 am, he moves to another class for another one-hour teaching session. After teaching, he goes back to sit in the office to do some administrative work and prepare his lesson notes and assignments. At 1 pm, his wife brings his lunch. After lunch at 1:45 pm, on Tuesdays and Thursdays, he teaches another class for 1 hour, after which he goes

back to sit in his office until 4 pm. He sometimes walks about the school premises, going up and down the stairs, and checking in on students for about 5 to 10 minutes when he gets tired of sitting down.

At 4:00 pm, he walks back home. He lies down on the bed to rest before dinner when he gets home. Between 6 pm and 7 pm, he sits in the living room with his wife to eat dinner and watch TV (if there is electricity) or listen to the radio. After dinner, he does some press-up exercises for 10 minutes while watching TV or listening to the radio. At 9 pm, he goes upstairs to the bedroom to get ready for bed.

On Saturdays, he wakes up at 5 am to go for his bible study fellowship at 7 am, where he meets with others to teach children moral studies and how they can be helpful in society. He does his typical morning routine at home, and by 6:40 am, he leaves the house and walks down the street for about 4 minutes to take a taxi to his bible study. Between 7 am and 10 am, he sits down with a group of students for the bible study. After his bible study, the rest of his activities and schedule are flexible. He goes back home, sleeps for a couple of hours, and relaxes afterwards. Between 1 pm – 2 pm, he has his lunch, and after eating, he moves around the house, climbing the stairs to get the food down before he sits to relax. For the rest of the day, he sits in his living room to read the newspaper, work on his laptop, or watch football on TV (if there's electricity). At about 7 pm, he has his dinner, and after eating, he goes out to jog; he jogs around his compound for about 40 minutes. He feels motivated to exercise because he was told that fitness is also for his management and would love to jog more often. However, he finds it challenging to create time for it during the week. He would also love to jog or run around his neighbourhood instead but is concerned about how people would perceive him when they see him jogging or running. It isn't common practice to see people jogging in his neighbourhood, so if they see him, people will think there is something wrong with him and start asking questions, and he doesn't want them to know much about him. After Jogging, he goes back upstairs to have a bath, then comes back downstairs to the living room to sit and chat with his wife or watch a movie (if there's electricity) before going to bed.

On Sundays, he typically wakes up between 7:45 am to 8:00 am. He prays, has his breakfast, and medication, and then takes his bath, and get ready, before heading out to church with his wife, between 8:45 to 9:15. They usually walk briefly for about 4 minutes, take a taxi for about 20 minutes, and then drop off to take a tricycle before getting to their church by about 10 am. The activities in church involve moving between sitting, standing to pray, singing praises and dancing for about an hour and a half.

After church, he goes with his wife to the market to buy food items for the week. He shops for food every week because the electricity supply in his neighbourhood is unstable, so he can't store food in the refrigerator for a long time. On their way, they walk for about 25 to 35 minutes before boarding a bus to the market. He describes the market as a huge open-air market, so they walk around from stall to stall for about an hour or two, buying groceries and carrying them in bags. On their way home, they take a bus, and then drop off to take a taxi back home. He gets home between 2:00 pm and 2:30 pm. He will have his lunch after his wife is done cooking, after which he walks around the house for some time. In the evening, around 4 pm, he (and his wife) goes to visit his parents and grandmother. Every Sunday, he looks forward to visiting them because he doesn't have time to see them during the week. Both his parents and grandmother live within the neighbourhood, so they walk for about 15 minutes to their homes. While he is with them, they sit, chat, and have dinner together before going home. Right after dinner, about 7:30 pm, he walks back home. At home, he sits in the living room with his wife, watching TV or listening before bed at 9:00 pm.

5.3.6 P32 Narrative Summary

Sex: Female

Age: 55

Work status: Petty trader

No of household members: Lives with Husband, Son, Daughter-in-law, and Granddaughter

Mobile phone: Basic Mobile phone

P32 is a 55-year-old petty trader who found out she had diabetes six years ago when she fell very ill and was admitted to the hospital. She was shocked when she found out she had

diabetes: She didn't know why she had the condition and thought it was only restricted to "rich people". She didn't know much about the situation, as no one in her family had diabetes, and she did not even know anyone with diabetes. After her diagnosis, she was initially prescribed insulin injections to control her glucose levels. She feared that she would have to use insulin for the rest of her life and felt it would cost her family much money to manage her health. Fortunately, after a few months, when her glucose levels stabilised, her doctor replaced her insulin with oral medication, which was easier to come to terms with and cheaper than insulin.

P32 was referred to health educators for counselling and education after she was discharged from the hospital after her diagnosis. The health educators advised that she should cut down on high sugar and fatty foods and eat food in small portions. Before her diagnosis, she used to take a lot of cold soft drinks, especially on a hot days, but she had to stop taking them altogether, since she found out it was detrimental to her health. However, she admitted that she doesn't get satisfied with eating small portions of food, so she has learned to adjust her food portion size to eat to her satisfaction while keeping her blood sugar levels in control. She hasn't experienced any significant problems from increasing her food portion size. She believes that she had prayed to God to control her blood sugar, and he has answered her prayers.

P32 was instructed to check her blood sugar four times daily: before breakfast, two hours after breakfast, two hours after lunch, and two hours after dinner. However, she currently only checks her blood sugar level once a day, in the morning after breakfast, because the glucose strips are expensive and will only last her a couple of weeks if she checks it frequently. However, she checks her blood sugar levels when she feels uneasy, and based on the result, she decides what measures to take to manage her sugar levels. For example, it helps her to know what medication to use or food to eat or not to eat.

P32 was also advised to include exercise in her daily routine as it helps the food digest easily. However, she was not informed about how much exercise she should do in a day. Although she didn't engage in any planned activity and didn't know the benefits of exercise to her health before diagnosis, she considers herself physically active throughout her life. She

attributes being active as being hardworking, keeping busy and productive, and she sees herself as all of those. When she was 15 years old, she dropped out of secondary school because she wasn't doing well, and her parents supported her in starting her own small business. She used to hawk on the streets of Lagos, selling a variety of fruits all day until she got married and moved to Ibadan at 19 years. After she got married, she didn't have any help looking after her house and family, so she decided to stay home and keep busy with house chores, including cooking, washing the dishes, hand washing clothes, cleaning the house, fetching water, gardening, taking care of her children and anything else that is needed to be done around the house. When her children were grown up and could help her take care of the house, her husband supported her (financially) in opening a stall in the market. She sold staple food in the market for 14 years until about six years ago (after her diagnosis), when her children decided to open a shop for her in front of her house instead because they felt that going to sell at the market every day was too stressful for her health. Nonetheless, P32 stated that her activity level hasn't significantly changed since her diagnosis, as she can still do things that she used to do without limitations. She still does her business and likes to keep busy, even though she feels tired more easily now.

P32 currently lives with her husband, son, daughter-in-law, and one-year-old granddaughter in a three-bedroom bungalow. She owns a small shop in front of her house that sells various convenience items, including cereal, canned products, carbonated drinks, and toiletries. She is also a food vendor who provides daily lunch to about 66 primary school children at a public school in Ibadan. In her backyard, she has a garden where she breeds her rabbits and grows cassava, vegetables and fruits. Two of her children live with their families out of state. Her husband and all her children support her in managing her health. They pay her hospital bills and buy her medications and glucose strips. Her daughter-in-law helps her with some chores while she sells at the shop or when she isn't feeling too well. Her husband also helps her out in the evening shop, so she can get some rest.

5.3.6.1 Typical routine

On weekdays, P32 wakes up at 4:00 am to prepare lunch for the public school she provides catering service. When she wakes up, she sits to pray on her bed for about five minutes before getting up to go to the kitchen to start cooking. The cooking process usually takes one to two

hours, depending on the food she cooks. While the food is cooking, she goes to sweep the floors of the living room and bedroom, which takes her about 10 minutes. She uses a short, traditional African broom (without a stick) to sweep, so she mostly bending and squatting mostly bends and squats while sweeping. After that, she mostly moves between sitting in the living room and going to the kitchen to check on the food. In the process, she also goes to the backyard to feed her rabbits, clean their cage and water her plants. When she is done cooking, she puts the food in two large food warmers and washes the pots and utensils she used to cook and tidies up the kitchen. She then goes to the bathroom to have her bath. After bathing and dressing up, she goes to the living room to eat breakfast with her husband before he leaves for work at 8:00 am. She checks her blood sugar levels any time between waking up and right before breakfast and takes her medication after eating breakfast.

After breakfast, she sits to rest in the living room until 9:00 am when she leaves the house to take the food to school. She doesn't own a car or drive, so she uses public transportation when she goes out to town. It takes her about an hour, using three different means of transportation to get to the school. When she leaves her home, she walks down the street for about six to eight minutes to catch a motorcycle taxi, while carrying the two food warmers. She rides a motorcycle taxi for about 10 minutes, before being dropped off where she needs to board a taxi. Sometimes she stands to wait for a taxi to arrive, while other times she finds the taxi waiting. She sits in the taxi for about 10 to 15 minutes (depending on the traffic) before being dropped off at the bus stop. She stands to wait for the bus to the school. She finally gets dropped off at a bus stop near the school, where she walks for about 10 minutes to the school kitchen, where she serves lunch.

She usually arrives at the school between 10:00 am to 10:30 pm. Once she gets to the school kitchen, she gets the students' plates and starts serving them. The students come out for lunch at 11:00 am, and she gives each of them their plate of food. She washes her food warmers and gets on her way back home by 11:30 am. She walks to the bus stop to catch a bus to the street where she can take a taxi. Sometimes she stops by the market if there is anything she needs to buy before going home. When she gets home between 12:30 pm to 1:00 pm, she usually feels exhausted from the journey, so she lies down in the living room to get some rest for about an hour. She finds her morning routine quite strenuous because she

sweats from all the activities of cooking, cleaning, walking, and carrying a heavy load. After resting, she eats her lunch, which is also from the food she prepared for the school children. She doesn't need to prepare lunch because she is usually the only one at home in the afternoon.

At 3:00 pm, P32 goes to her shop to sell her goods. When she opens her shop, she takes the table outside, arranges some items on the table, sweeps the floors, and gets it all set up before opening for business. She then sits on an armchair in the shop and waits for customers. Every time a customer comes in to buy something, she gets up to get them what they need and then returns to sit on her chair. She may go inside the house a few times to use the bathroom. Her shop is usually busy, with customers coming in every few minutes. Her customers are primarily people in her neighbourhood, some of whom she is acquainted with. Some people stop by to chat with her on their walk home from work or town.

In the evening, between 5:00 pm and 6:00 pm, after P32's husband returns from work, he sits in the shop and attends to customers while she goes inside the house to get some rest and prepare dinner. Her daughter-in-law assists her in the kitchen when cooking dinner. While cooking, she also starts prepping for the school lunch meal she has to cook the following day, for example, bringing out all the ingredients and cutting meats and vegetables. She finds cooking dinner a bit of exercise because she uses much energy when making the food they eat for dinner. They mainly eat a traditional meal called amala, made from yam or cassava flour, that requires them to continually stir the flour in boiling water until it becomes a thick paste. When she feels too tired or sick to make dinner, her daughter-in-law helps with the cooking.

P32 closes her shop between 7:00 and 8:00 pm and goes back inside the house to eat dinner with her family. However, even after completing her shop, when a customer comes to buy an item, she opens it and attends to them. She sits with her family in the backyard to eat and chat for some time before going to bed between 9:00 pm and 9:30 pm. She also plays a bit with her granddaughter during this time and then bathes her right before bed. After she's done bathing and dressing her granddaughter, she goes to her room to sleep.

On Saturday, she usually wakes up between 5:00 am to 6:00 am. When she wakes up, she does her morning prayers and goes to the bathroom to have her bath. She then goes to the kitchen to prepare a quick meal, which takes about 10 minutes, before heading out to market to restock her goods and buy food items she needs for the house and catering business. The market opens at 7:00 am, so she prefers to go to the market early morning so that she can come back home in time to open her shop at 10:00 am. Her son drives her to the market and accompanies her to help her carry some shopping bags. They usually spend up to two hours in the market, walking around and buying different items. They get a porter in the market to carry their bulky items in his wheelbarrow while they shop. When she is done shopping, her son drives her back home. When she gets home, she sorts out her purchased items and organises her shop with the help of her son.

P32 opens her shop for business at 10:00 am and spends the rest of the day in the shop. Her daughter-in-law cooks food for the family and takes care of other house chores while she is at the shop. At 1:00 pm, she closes the shop, goes inside the house to eat lunch, and stretches her legs around the house. She re-opens her shop at 2:00 pm and continues to sell her items until 7:00 pm when she finally closes for the day. Her husband usually sits with her in the shop for some to keep her company and help out when he is at home. During slow hours, she lays a cloth on the floor of her shop and lies on it to rest. After closing her shop, she returns to the house to freshen up and then sits to eat dinner and chat with her family in the backyard as usual. She plays with her granddaughter for some time before going to the bathroom to bathe her. Afterwards, she goes to her room to sleep between 9:00 and 9:30 pm.

On Sundays, P32 wakes up between 5:00 am to 6:00 am to go to church with her family. When she wakes up, she says her morning prayers and goes to the bathroom to have her bath. After that, she dresses up and goes to the living room to eat breakfast (prepared by her daughter-in-law) with her family. They then leave the house at 7:00 am and walk to church, which is about 12 minutes walk from the house. The church service begins at 7:30 am and ends at noon. During the church service, there are parts when they sit to listen to sermons, kneel to pray, and stand to sing praises and dance. She mentioned that she loves to sing and dance in the church: when she dances, she gives her whole heart to it and is filled with joy. After church service at noon, she walks back home with her family.

P32 doesn't open her shop on Sundays to get some rest, spend time with her family and do some yard work in her garden. At home, she sits in the living room (with her husband and son) to watch over her granddaughter while her daughter-in-law cooks lunch for the family. Sometimes after church, they have relatives over, and they sit to eat lunch together and chat afterwards. In the evening, at about 4:00 pm, she goes to her garden to do some weeding, planting, or harvesting. Growing her vegetables helps her to save money (instead of buying from the market). Also, when she feels exhausted from working in the garden, she feels a sense of accomplishment. After gardening, she goes inside the house to have her bath and lies in her room to rest afterwards. She stays in bed until about 6:30 pm when she gets up to cook dinner and starts prepping the food (for the school children) for Monday. After cooking, she sits with her family in the backyard to eat and chat for some time before going to bed between 9:00 pm and 9:30 pm. She also plays a bit with her granddaughter during this time and then bathes her right before bed. After she's done bathing and dressing her granddaughter, she goes to her room to sleep.

5.4 Conclusion

This chapter provided a narrative summary of a selection of six participants from the sample. The narrative analysis helped us to gain a rich and in-depth understanding of individual lived experiences of type-2 diabetes and physical activity. It also helped us to identify the idiosyncrasies of their unique experiences. In the next chapter, I examine activity patterns across all participants' sample.

Chapter 6: Cluster Analysis of Daily Activity Patterns of People with Type-2 diabetes

6.1 Introduction

This chapter presents a qualitative cluster analysis of participants' everyday activities to categorise groups of participants based on their patterns of activities. It describes the data analysis process and presents the findings.

6.2 Data Analysis

After conducting a narrative analysis of six participants' lived experiences (described in chapter five) to highlight the intricacies and idiosyncrasies of their lived experiences. I wanted to find out participants' similarities and differences in activity patterns. Therefore, the initial aim of this data analysis was to conduct a thematic analysis of people's daily activities. I conducted a deductive thematic analysis based on predefined activity codes from the time geographic activity categorisation scheme (Ellegard & Nordell, 1997). The time geographic activity categorisation scheme includes about 600 different activities with five levels of details and is categorised into seven broad themes called 'activity spheres' (Ellegard & Nordell, 1997). The seven activity spheres include: care for oneself, care for others, household care, procuring and preparing food, recreation and reflection, movements and transportation, and gainful employment.

Following the six steps thematic analysis process, I started the analysis by familiarising myself with the data. I focused on the data gathered from the activity diary study and the visual elicitation interviews for this analysis. I read through each participant's activity diary, activity data visualisation and follow-up interview transcript and noted the participant's activities during a typical week. Having completed this process for each participant, I began to code the data in NVivo by assigning codes to people's activities. I ended up with ninety – seven codes for activities that emerged across the thirty-five participants' data and omitted duplicates. I further grouped the codes into predefined categories and subsequently grouped the categories into the seven predefined activity spheres. During this process, I started to observe different patterns of similarities and differences in activities among different groups of participants. This observation informed my decision further conduct a cluster analysis to help identify groups of participants with similar patterns activities.

6.2.1 Cluster Analysis

I conducted an SPSS two-step cluster analysis to identify participant groups based on their activity patterns (during a typical week). Cluster analysis is a multivariate statistical method for classifying groups of similar observations based on the values of a set of variables (Kettenring, 2006). The variables for this cluster analysis were categorical (activity codes) - assigned dichotomous values (1 for yes and 0 for no) - to indicate participation and non-participation of activities. I chose the two-step cluster analysis because it supports the clustering of categorical variables using the log-likelihood distance measure (Tkaczynski, 2017). Additionally, the algorithm determines the optimum number of clusters and allows you to set the number of clusters into which the data should be sorted.

To prepare and organise the coded data for the cluster analysis, I created an excel spreadsheet that grouped the activity codes that emerged from the previous thematic analysis described in the last section under their respective activity spheres. For each activity code, I created a matrix that indicated whether or not each of the thirty-five participants engaged in the given activity. If a participant engaged in a given activity, the cell representing the relationship was filled in with a “yes”, otherwise, it was filled in with a “no”. The data from the matrix was then used to conduct a cluster analysis of the thirty-five participants.

The two-step cluster analysis initially automatically identified two cluster groups as the optimum number of clusters: **Cluster one** consisted of 17 participants, and **cluster two** consisted of 18 participants. Participants in **cluster one** were predominantly males (13 males and 4 females), whereas participants in **cluster two** were predominantly females (17 females and 1 male). I further analysed the data by exploring different numbers of clusters (from 3 to 7).

In the three-cluster analysis, **cluster two** remained the same as the two-cluster analysis, while the initial cluster one was separated into **clusters one and three**. **Cluster one** consisted of 5 participants (3 females and 2 males), while **cluster three** consisted of 13 participants (12 males and 1 female).

In the four-cluster analysis, **clusters one and three** remained the same from the three-cluster analysis, while the initial **cluster two** broke down into **clusters two and four**. **Cluster two** consisted of 10 participants (9 females and 1 male), while **cluster four** comprised 8 participants (8 females).

In the five-cluster analysis, **clusters one and three** remained the same as in the previous cluster analysis. However, participants in **clusters two and four** broke down to form three clusters. 6 out of 10 participants from **cluster two** remained clustered in one cluster (also named **cluster two**). However, three participants from the previous cluster two, and 4 of the prior **cluster four**, clustered together to form a new cluster (**cluster four**). Lastly, the remaining 5 participants, one from the previous **cluster two** and four from the previous cluster four, merged to form **cluster five**. **Cluster two** consisted of 6 participants (6 females), **cluster four** consisted of 7 participants (6 females and 1 male), and **cluster five** consisted of 5 participants (5 females).

In the six-cluster analysis, **clusters one, two, four and five** remained the same from the five-cluster analysis, while **cluster three** broke down further into two clusters (**cluster three** and **cluster six**). **Cluster three** consisted of 6 participants (6 males), and **cluster six** consisted of 6 participants (5 males and 1 female).

In the seven-cluster analysis, **clusters one, two, three, five and six** remained the same from the six-cluster analysis, while **cluster four** separated into clusters **four** and **seven**. **Cluster four** consisted of 4 participants (4 females) and **cluster seven** consisted of 3 participants (2 females and 1 male).

Clusters	Participants	No of participants	No of females	No males
1	P10, P11, P13, P14, P19	5	3	2
2	P5, P12, P18, P29, P30, P32	6	6	0
3	P2, P6, P21, P22, P25, P31	6	0	6
4	P1, P4, P27, P33, P3, P26, P34	7	4	3

5	P7, P8, P9, P15, P35	5	5	0
6	P16, P17, P20, P23, P24, P28	6	1	5

Table 3: Cluster classification

In sum, **cluster one** remained stable from the three-cluster analysis through the seven-cluster analysis. **Cluster two** and **cluster five** remained stable from the five-cluster analysis through the seven-cluster analysis. **Cluster three** and **cluster six** remained stable from the six-cluster analysis. Moreover, participants in **clusters one, two, three and six** remained clustered together in the same cluster at every stage of the analyses (two cluster analysis through the seven-cluster analysis). However, while participants from **cluster four** (P1, P4, P27, P33) and participants from **cluster seven** (P3, P26, P34) also remained clustered together, both clusters initially came together from two separate clusters (**clusters two and four**) from the four-cluster analysis, to form **cluster four** in the five-cluster analysis. They then separated to form different clusters in the seven-cluster analysis.

Additionally, one participant (P35) from **cluster five** was previously in a cluster separate from the other participants in the cluster in the four-cluster analysis. In the five-cluster analysis, P35, a member of cluster two, clustered together with P7, P8, P9, and P15 to form **cluster five** in the seven-cluster analysis. The following (Figure 15) shows how the 35 participants were clustered at each level of analysis.

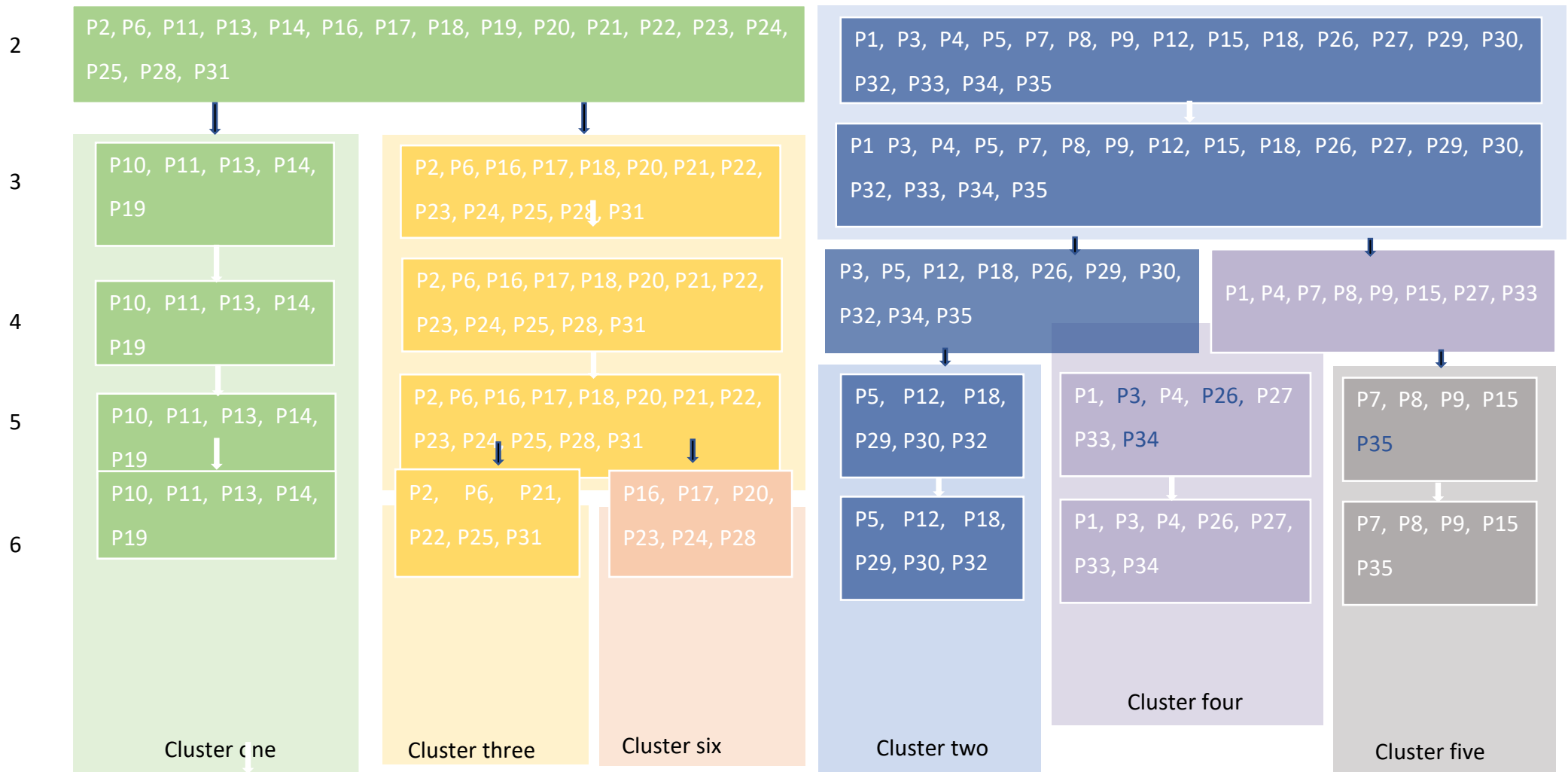


Figure 15: Cluster Analysis Grouping

6.3 Findings

6.3.1 Cluster one (P10, P11, P13, P14, P19)

Cluster one consists of five participants (two males and three females) between the ages of 34 and 50. Two Participants in this cluster live with their spouses and child(ren), two participants live with their spouses, and one participant lives with her children. They have varied occupations including a secondary school teacher, a primary school teacher, a lecturer, a nurse, and a small business owner. Two participants in this cluster live in a block of flats, while the other three participants live in houses in gated compounds.

ID	Age	Gender	Occupation	Living arrangement
P10	50	Female	A small business owner	With spouse and daughter
P11	47	Male	Secondary school teacher	With spouse
P13	34	Male	University Lecturer	With spouse
P14	44	Female	Nurse	With spouse and children
P19	42	Female	Primary school teacher	With children

Table 4: Cluster One Demographic information

6.3.1.1 Care for oneself

Participants in this cluster reported in their diary entries waking up between 5:00 am and 7:00 am and going to sleep between 8:30 pm to 9:30 pm every day. All participants in this cluster reported performing self-care activities, including bathing, dressing, using the bathroom, and eating without assistance. However, one participant in this cluster (P10) had her lower left limb amputated, therefore uses a prosthetic leg and a walker to move around. In the visual elicitation interviews, P10 explained:

I use my walker to move around the house. I only use the prosthetic leg when I am going out. It is more challenging to do things with the walker that is I prefer to sit in one place. I used to put on my prosthetic in the house, but when it started injuring my leg, considering the fact that I am diabetic, it won't heal on time, the doctor said I should not use it at home. That was why I followed the instruction of not using it when I am at home.

All participants in this cluster reported taking medication for their diabetes daily, while three participants reported taking insulin injections and drugs daily. Three participants (P13, P14 and P19) reported in their diary entries checking their blood glucose levels every day. In the visual elicitation interviews, these participants explained:

I check daily, before breakfast, two hours after breakfast and sometimes after lunch and dinner, but I always check in the morning. - P13

Initially, I checked once in a blue moon but now, let me say for the past six months, I have been on insulin, so I check more frequently, and I am yet to stabilize, so I check very frequently; I do it 6 times a day at times. - P14

I check every day. Previously, I checked four times a day, before a meal in the morning, when I wake up, after breakfast, lunch, and dinner. In my last appointment, the doctor asked me to now check after breakfast, lunch and after dinner three times a week, but I should check my fasting blood sugar before breakfast every day. - P19

One participant (P10) reported in her diary checking her blood glucose levels once in a week. In the visual elicitation interview P10 stated:

At the onset of diabetes, I was asked to check it regularly but now I have reduced the frequency to once a week.

When asked why she reduced her frequency of checking her glucose levels she explained:

It is costly. if I check every day, I will exhaust it within two months. That's why I reduced the frequency, and I will also have to purchase some drugs, which are expensive also, that is why I changed.

One participant (P11) reported checking his blood glucose levels three days a week. During the follow-up interviews, P11 elaborated:

I do check my sugar levels 3 or 4 days a week. I have enough for me to use. I check before breakfast, then two hours after breakfast, in the morning.

Three participants in this cluster reported engaging in physical activity for their diabetes management. Two participants (P11 and P13) recorded in their diary report jogging around their gated compounds on Saturday mornings. For both participants, their activity data recorded a time block of continuous bouts of moderate to vigorous

intensity activity, lasting up to 20 minutes. This was consistent with the times they recorded jogging in their diary reports. In the follow-up interviews, when asked why they chose to jog around their compound, these participants disclosed that they felt more comfortable jogging in an enclosed space rather than on the streets within their neighbourhood. P13 elaborated that:

[jogging around the neighbourhood] will be strange... no other person does that. So, I will be the only one jogging, and they [people] will be like what's wrong with this young man (laughs), is he okay?

Similarly, P11 responded:

People will be staring at me if I jog outside. They would like to know what is going on with me, and why is he jogging? That's why I do it [jog] in my house, there is a fence here, there is a gate. People will not be seeing what I'm doing inside.

P11 and P13 also stated in their diary report doing push-up exercises daily. For P13, the activity data showed a pattern of activity of moderate to vigorous intensity lasting between two to five minutes on each reported day. These time blocks were consistent with the time P13 reported doing these push-up exercises. P11 stated in the visual elicitation interviews that he did his push-up exercises every day after dinner:

I do a little push-up after dinner just to make the food go down. Just a little, maybe for two to three minutes.

However, P13 stated that he didn't have a specific time frame for his push up exercises:

I don't have a specific time for doing the push ups. whenever I feel like, I will just do it. Sometimes in the morning before I go to work, sometimes in the evening. But I do it every day when I am at home.

P13 also reported taking walks around his neighbourhood during the weekend in his diary. In the follow up interview P13 stated:

I take a stroll around my neighbourhood. On weekends: Saturdays and Sundays too, I take a stroll in the evening before I eat my dinner, usually for around 30 minutes. I would like to do it every day, but I only have time during the weekend.

P10 reported doing stretches for a few minutes every morning after she wakes up:

I do exercise when I wake up. I do exercise on my bed by folding and stretching my arms and legs for about 50 times before I get up from the bed.

When asked why she does the stretches, P10 stated:

That's what we were told to do by the public health nurse at the waiting area. The doctors talked to me about exercise, but they didn't specifically tell me the type of exercise to engage in, but I was told not to sit too long on a particular spot.

Some participants reported taking naps on some days in their diary reports. For P10, her accelerometer data recorded continuous periods of no activity lasting between two and three hours on three days reported. When probed during the visual elicitation interviews, P10 confirmed that those were the times she was taking a nap. She further explained:

I am usually alone in the house in the morning and afternoon. So, when I am lying down in the parlour watching tv or waiting for customers, I sometimes fall asleep because there is nothing else for me to do. [...] On Saturday my daughter, she attends to the customers, so I lie down in bed to read my bible, I also fall asleep in bed. – P10

Although P14 did not record taking a nap in her diary report, her accelerometer data recorded a time block of no activity for up to three hours on one of days reported (Saturday) and a time block of no activity for one hour on the following reported day (Sunday). When probed during the follow-up interview, she confirmed that she had taken a nap between those times. When asked whether these naps were routine, P14 further explained:

I use Saturday to rest. Except I have an outing to go to, I don't leave the house on Saturday. That is the time I relax; the children will be around. I am lying down in my room mostly. Sometimes I sleep, sometimes, I might not even sleep, I may just lie down on the bed. [...] On Sundays I don't do a lot after I come back home, I rest. Sunday is a busy day; we spend the morning in church and then the stress of the market after. I get very tired by the time I get back home, I will just sit down and rest, I can sleep too if I am too tired.

6.3.1.2 Care for others

Four participants in this cluster did not report engaging in caring activities. However, one participant reported in her diary entries bathing, picking out clothes, and getting her six-year-old child ready for school. She also stated in the visual elicitation interview that she dropped her children and picked them up from school on some days:

If I am on the morning shift, I drop my children at their school first before I head to work. When I leave the hospital, I drive down again to pick up the children, then we go home.

6.3.1.3 Household chores

Members of this cluster mostly did not engage in household activities. When probed during the visual elicitation interviews, the three female participants in this cluster (P10, P14, and P19) explained that they had older children living with them who helped them with housework. For instance, P19 explained:

My children are already grown up. They can do many things, that is why I don't do much. They are there to help me: cooking, sweeping, washing, everything, they are the ones doing it. I am a teacher, so I close by 3pm, and then I return home I don't do much at home, because my children must have done majority of the house chores.

Only one participant (P10) reported handwashing her clothes and those of their family members once a week. In the visual elicitation interviews, P10 explained:

I only wash my clothes; I also wash my husband and my daughter's clothes. I don't have any issues with washing with my hands because I can do it sitting down on a stool. My daughter helps me with everything, and she goes to school too; I don't want to stress her more. I don't like that I can't do many things in the house because of my leg, so washing makes me feel like I am being useful in the house.

The two male participants expressed that they did not engage in any household activities because their wives took care of the household. For instance, P13 explained:

My wife takes care of the house. I don't mind helping her, but she doesn't allow me.

6.3.1.4 Procuring and preparing food

6.3.1.4.1 Procuring food

Three members of this cluster (P13, P14, and P19) reported going to the market once a week to purchase household items. While P11 did not report going to the market in his diary report, his activity data recorded continuous transitions between light and moderate intensity activity between 11:30 am to 2:00 pm on one of the days (Sunday) reported in his accelerometer data. When probed during the visual elicitation interview, P11 explained that he went to the market between those times on that day:

We finish church at 11:00, after church at around past 11 we went to bodija market, so we were walking... You know in the market, bodija market it is a big market, you want to buy this you want to buy that, we were there for up to two hours, it is a very big market. We were there, you know, walking from this store carrying things here and there.

When asked how often he went to the market in a week, P11 stated: *I usually go to the market with my wife on Sundays after church. We go every Sunday.*

However, P10 explained in the interviews that she stopped going to the market since her amputation:

My husband assists me with buying food for the house and the soft drinks I sell. I used to go to the market every week before, but since I lost my leg, I haven't gone because there are restrictions to where I can go. You know the market there is too much walking from one shop to another. If I walk for a long time with my prosthetic, I start to feel some discomfort and I don't want to injure my leg from too much walking. That is why I stopped going.

6.3.1.4.2 Preparing meals

Participants in this cluster did not report cooking meals in their diary entries. When probed during the follow-up interview, the three female participants in the cluster (P10, P14, and P19) revealed that their older children mostly cooked for the family:

I don't do cooking; I am not the major person that cooks, the children do that, I can only go in and out to supervise them. P19

I cook occasionally, but because of my work I don't really have time and when I am not working, I just want to rest. By the time I get back home, because I live in Akobo, we stay long in traffic, I will be so tired, the children will do the cooking, serve me, I will sit down there until I am ready to sleep or have my bath. P14

P10 explained in the follow up that she sometimes prepared her lunch in the afternoon when her daughter was in school:

It is my daughter that does the cooking in the morning, I can just assist her by telling her to do this and that. In the afternoon, because I am the only one at home, I sometimes prepare [corn pudding] and eat for lunch. I sit down to cook it and it doesn't take much time to cook it. When my daughter comes back from school, she will prepare our dinner.

The two male participants (P11 and P13) revealed their wife cooked their meals. For example, P11 explained:

My wife before she goes to her own work, she wakes up and cooks my food. My wife will cook for me, and I will bring the food here [to work]. I will come with the food and when it is time, I eat. When she comes back home, she'll cook again. P11

6.3.1.5 Work

Four participants in this cluster leave their homes to go to work, while one participant in this cluster ran her small business from home. As noted above, one participant works as a nurse at the hospital, one participant is a secondary school teacher, one participant is a primary school teacher, and one participant is a university lecturer.

P11 works as a teacher in a secondary school near his home. He describes his teaching activities as follows:

When I come to school, some days I have 3 classes, some days I have 2. But I'm always teaching every day. We have 40 mins per class.

P11's accelerometer data reported frequent bouts of light intensity to moderate intensity activity with occasional periods of sedentary activity during the times he

reported being at work. When probed during the visual elicitation interview, P11 explained:

When I have 3 classes, that is 120 minutes of standing and I will be talking too. We discuss about a topic, entertain the questions... I work administratively here too, sometimes, I run errand for school. I go to the bank. Maybe we have some other things, I will go there. Then, within the school, I see that teachers are in the classroom, students are being taught, they are not moving around aimlessly, they are not doing what they are not supposed to do. I'm always moving, I'm always moving around. Checking on the students, checking what they are up to.

P19 also works as teacher in a primary school. She describes her teaching activities as follows:

I teach in a primary school. When I get to school, I attend the assembly which starts by 8:00 am. After the assembly, I start teaching at 8:30 till 11:30 and we go on 30 minutes break. After which I continue teaching till the closing time at 3:00 pm. I teach primary one, I am the only teacher in my class, so I teach six sessions in a day.

When asked to describe in what position she delivers her teaching P19 explained:

I stand to teach and then I sit down for some time when I give them class work. I then stand up to walk around the class to check their work.

P14 works as a nurse in the hospital. She describes her work activity as follows:

I usually work morning and afternoon shift at the outpatient clinic. I mostly sit on this desk and attend to patients. I take patients vitals and sort out which doctor they need to see. [...] Because of my work on the desk, there is every tendency of sitting for a long time. There are days I can sit for like 2/3 hours that I will need to consciously stand up to move about.

P13 works as a lecturer at a university. He reported teaching every weekday in his diary report. He describes his teaching activities as follows:

I go to work at 8:00 o'clock and I go home at 5:00 o'clock. I currently teach two to three classes in a day. Undergraduate classes. Each class is about 45 minutes long.

When asked to describe in what position he delivers his teaching P13 explained:

I stand up while teaching. I move around, I pace from one end to the other so that I will have eye contact with the students. When I am not teaching, I sit in my office and work on my system.

P10 is a small business owner who sells soft drinks in her living room. She describes her selling activities as follows:

I sit in this parlour to sell. I can be lying down and watching tv when there is electricity. If there is anyone who wants to buy something, I will stand up sometimes to give them or I will tell them to go and get what they want from the freezer. I get 4 to 5 customers at most per day. Sometimes when my daughter is around, she attends to them.

6.3.1.6 Recreation and Reflection

All participants in this cluster are Christians and reported in their diaries starting and ending their day with prayers with their family members. They also reported visiting their place of worship between once to twice a week, particularly on Sundays. In the visual elicitation interview P14 describes her activities in church as follows:

We go to church at 8:00 o'clock in the morning and we finish at 12:00 o'clock. [...] We sit for a while when listening to the sermons, and then we are asked to stand up to sing some songs of praise and we dance too. We then sit again for a while and we may stand up again to pray or sing. We just repeat this for a while and then finally stand up to say the closing prayers.

Three participants reported in their diary entries visiting relatives during the weekends. Two participants (P11 and P13) reported visiting their parents, while one participant (P19) reported visiting her sister. In the visual elicitation interview: P11 describes his visits to his parents as follows:

Every Saturday, in the afternoon, maybe between 1:00 and 2:00 o'clock, we go to check on my parents [...] I will sit together with them. We sit down, we watch TV together, we talk together, share jokes, and I have my dinner there. I also help with anything my mother needs around the house. She sends me 'help me get this, help me get that'. I help her to get one or two things.

All participants in this cluster reported spending their evenings in their living rooms with their family members. For instance, in the follow up interview, P13 stated:

I have my dinner between 6:00 and 7:00 o'clock. I eat dinner with my wife, we watch tv or watch a movie and then we go to bed latest at 9:00 pm. Sometimes I do my press up exercise while watching tv or when I am done with what I'm watching, and my wife, you know tv sometimes she may want to watch a particular channel and I may not like that channel, so I will use that time to do exercise instead of sitting and watching, I prefer to do exercise at that time, and I will know that time is not wasted.

For P19, her activity data recorded continuous periods of sedentary activity ranging between 5:00pm and 9:30 pm on five of the reported days in her accelerometer data.

When probed during the visual elicitation interviews, P19 explained:

In the evenings I don't do much. When I get back home at around 4:00 o'clock, I will just sit down in the parlour with my children. I will eat, and I will be talking with them. We also watch Yoruba movies if there is electricity. When it is 8:30 we say our prayer and then we go to sleep.

One participant (P10) reported in her diary sitting outside to chat with her neighbour in the veranda of her home on most of the reported days. In the visual elicitation interviews she stated:

Sometimes when I am tired of sitting inside or when there is no electricity, I go outside to chat with my neighbours. I meet them at our veranda at the front, and I sit and talk with them. [...] I sit outside until my husband is back from work at around 6:00 or 6:30 pm, then I go back inside.

6.3.1.7 Transportation

Places participants in this cluster visited include their place of work, their relatives' homes, their place of worship and the market. Participants in this cluster used varied forms of transportation for their commutes. Two participants (P13 and P14) reported in their diaries driving to work, one participant (P19) reported using public transport to work, while one participant (P11) reported walking to work every morning. When asked during the visual elicitation interviews how long it took them to drive to work, P14 stated: *I drive for about one and a half hours to go to the hospital. The road is*

very, very bad very bad and there is a lot of traffic. On the other hand, P13 stated: My trip to work only takes between 7 to 10 minutes. I live close to the university.

When probed how long it took him to walk to work, P11 stated that lived close to the school he worked and only took him about 5 minutes:

My place is not far from [the school], about 4,5 buildings, so I trek. it takes me about 5 minutes.

P19 described her journey to work as follows:

I walk for like five minutes to the junction near my house and I board a taxi. The journey in the taxi shouldn't be more than 15 minutes. It is not very far but the taxi will stop to pick other customers. The taxi then drops me at the junction near my school. I only walk for like two minutes and I am inside the school.

Two participants (P14 and P13) reported in their diaries driving to the market, while two participants (P11 and P19) stated that they take public transport to the market.

P11 describes his journey to and from the market as follows:

We take a bike from the church to bodija market. This may take us about 5 minutes. On our way back home, we take a taxi, a bus and a tricycle home. From the market to our house is far. We take a cab from the market and then we get dropped off at UI (university of Ibadan) bus stop, and then we take a bus to Ojo bus stop (participant's neighbourhood), from Ojo bus stop we take a tricycle home.

When asked how long the journey was from the market to his home, P11 stated:

It depends on how early you get transport. Sometimes we don't get a bus on time, so we have to wait. But we should be at home within one hour thirty minutes.

Two participants reported walking to their relatives' homes. In the follow up interviews, when asked how long it took her to her sister's place P19 stated: *It takes me about 45 minutes to walk from my house to my sister's house in Mokola.* When probed why she walks to her sister's house, P19 explained:

There are times when I ought to take a taxi, but I choose to walk. Sometimes, when I go to town, I prefer to walk instead of taking a taxi just to perform the exercise. I have to trek for me to do some activity, I want that to be part of my activities, that's why I walk to her place.

P11, on the other hand, stated: *My parents' house is not so far from my house. It is between 10 to 15 minutes' walk from my house. That is why we just walk to their house.*

Three participants reported taking the public transport to church, while two participants reported driving to church. P10 describes her journey to church as follows:

I take the bike whenever going to church for my choir lessons. I will walk for like three minutes to the main road where I can get a bike. Most times I have to stand and wait for a bike to pass but I prefer to take a bike because when I board a taxi, I need to sit in the front because of my [prosthetic] leg. When the front sit occupied, I would not enter, I can't ask the person sitting there to stand up since it's not my car. So, it is easier for me to take a bike and it takes me maybe 10 minutes to arrive at the church. But on Sundays my husband takes us [to church] with his car. In his car I can sit in front.

6.3.2 Cluster two (P5, P12, P18, P29, P30, P32)

Cluster two comprises six female participants between the ages of 42 and 65. This cluster group includes three small business owners, a police officer, a cleaner and a retired teacher. All six participants live with their family members, including spouses, children, and/or grandchildren. For most participants in this cluster, their daily life mainly involves managing housework, work/trading and family responsibilities, as well as spending time with members of their household. Participants in this cluster lived in gated compounds.

ID	Age	Gender	Occupation	Living arrangement
P5	43	Female	Cleaner	With spouse and children
P12	65	Female	Retired teacher	With spouse
P18	55	Female	Small business owner	With spouse, adult child and grandchild
P29	64	Female	Small business owner	With spouse and grand children
P30	58	Female	Police officer	With adult children
P32	63	Female	Small business owner	With spouse

Table 5: Cluster Two Demographic Information

6.3.2.1 Care for oneself

Data from the visual elicitation interviews shows that participants in this cluster usually wake up between 4:00 am and 6:00 am. All these participants perform self-care activities including bathing, dressing, using the bathroom, moving around, and eating without assistance. During the visual elicitation interviews, only one participant reported checking her blood glucose levels on a daily basis. Other participants reported monitoring their glucose levels a few times a week to a few times a month. Five participants reported napping during the day, at home, while in their shops, or at work. At night, participants in this cluster go to sleep at varying times between 8:00 pm and 10:00 pm. Additionally, only a few participants in this cluster reported participating in planned (structured) physical exercise as part of their diabetes management practices. These participants mainly take walks around their compounds a few times a week. For instance, P12 stated:

I walk around my compound like three times a week, going back and forth, up and down for about 30 minutes. This exercise is really helping, any time I walk, and I check my blood sugar it goes down as much as 70. - P12

6.3.2.2 Household chores

For members of this cluster, a central part of their morning involves performing housework activities. During the visual elicitation interviews, most of them explained that doing housework kept them busy on their feet and moving around the house as they juggled between cleaning the kitchen, sweeping the floors of the house, picking up and putting things in order, and cleaning the bathrooms. Participants in this cluster reported in their diary entries engaging in the washing of their clothes and those of their family members. Some participants reported doing laundry only once in the diary study week, while others reported doing laundry up to three times per week. During the visual elicitation interviews, participants clarified that their laundry practices typically include washing and rinsing of clothes with their hands. It also involved fetching water in buckets from community boreholes or wells and carrying the buckets home. For example, P30 stated:

I wash my clothes three times a week. I go to fetch water from the borehole down the streets to wash the clothes. [...] I usually fetch four buckets of water

to wash. I go with my children, and they help me carry some of the buckets of water. - P30

Additionally, most participants in this cluster reported – in their diary entries - engaging in gardening activities a couple of times in the diary study week (especially in the weekend). During the visual elicitation interviews, participants in this cluster explained that their gardening activities included planting, watering, weeding, and harvesting. These participants stated that they mostly grew vegetables in their backyards for domestic consumption. They also mentioned using manual tools such as hoes, watering cans, rakes and shovels as they worked in the garden. For example, P12 stated:

I regularly work in my garden where I grow different kinds of vegetables. I consider it exercise because I always sweat and feel tired after working in the garden. I use this hoe to clear the weeds and plant new vegetables. I also use the rake to sweep out dirt. – P12

6.3.2.3 *Caring for others*

In addition to performing household chores, four out of six participants in cluster two reported having young children or grandchildren in the households they care for. During the visual elicitation interviews, these participants described feeding and bathing the children and getting them ready for school in the morning. They also played with them during their free time in the evening. Three participants in this cluster also reported engaging in the daily management of their farm animals by feeding them and cleaning their pens. For instance, P05 and P29 stated:

My mornings are very hectic because I have to get my children ready for school. I bathe and dress them and prepare their breakfast. I will also have to sweep the house and wash dishes from the previous night. - P05

Before I go to my shop in the morning, I will always go to the backyard to feed the chickens and clean their pens. When I come back from the shop, I will feed them again. I do this every day. – P29

6.3.2.4 *Procuring and preparing food*

All members of this group reported going to the market a few times a week, especially at the weekends, to purchase food and household items for their homes. Three

members of this cluster who are traders also reported going to the market to stock up on items for their shops. Participants explained during the visual elicitation interviews that they typically spent between one hour to three hours in the market, walking around the market stalls and buying items from multiple stalls. Three participants also stated that they are accompanied by family members who help them carry shopping bags. For example, P32 stated:

On Saturdays are my market days. I will need to go to the market on Saturday to restock the shop and buy food for the house. I spend like three hours there because I have to walk around the market to buy different things from different shops. – P32

All participants in this cluster expressed that they are responsible for cooking meals for the family. Participants reported typically cooking twice a day, in the morning and evening. For most of the participants, the food cooked in the morning served as both breakfast and lunch, to enable them to rest or participate in other non-household activities such as work or trade during the day. In addition to meal preparation, this group also reported doing the dishes. Participants explained that this activity is usually done in the kitchen, preparing meals and cleaning up. 3 out of the 6 participants in this cluster reported seeking the assistance of their older daughters or daughter-in-law living with them while cooking dinner. These participants explained that they were usually tired after a long day of work and would require an extra hand in the kitchen. For instance, P30 stated:

My daughter helps me a lot in the kitchen. I like to cook for the house, but I need her to help me with preparing the food especially in the evening when I come back from work, and I am already low on energy. She will clean the dishes and help me cut some vegetables. - P30

6.3.2.5 Work

Besides doing the household chores and taking care of their children (or grandchildren), five out of the six participants also go to work or place of business. Half of the participants in this cluster are small business owners: One of them reported going to sell her goods at her shop in town, while the other two reported selling their items in a small shop in front of their homes. During the visual elicitation interviews P32 described her activities in the shop as follows:

once I open my shop in the morning, I begin with sweeping the floors, cleaning, and dusting surfaces, and restocking and organising the items in the shop. I then sit in the shop and wait for customers to arrive. I usually stand up to get the customers what they want once they arrive, and then go back to sit on my chairs when I finish attending to customers. [...] During less busy hours, I lie down on the floor to rest. – P32

P05 works as a cleaner and described her work as follows:

I spend my time at work doing cleaning work like sweeping and mopping the floors and cleaning the bathrooms, in the morning and afternoon. [...] During my free time, I lie on a bench to rest or nap for a few hours. I then get up to do my last cleaning activities before closing for the day. – P05

P30 who works in a police station reported:

My work requires me to sit at the desk throughout the day. Even though I am a police officer I do desk-duty, taking care of admin. I take naps on my desk whenever I am free. – P30

6.3.2.6 Recreation and reflection

Participants in this cluster reported in their diary entries starting their day with worship. In the visual elicitation interviews, participants in this cluster explained that they were Christians. Their morning prayers entailed reading a portion of the bible and praying with their household members. They also reported attending religious services at the church, with family members every Sunday. Participants described that their religious activities at the church typically involve sitting down to pray and listen to sermons and standing up to sing praises and dance. For example, P32 stated:

Our church service lasts about two hours. [...] During service we listen to sermons by our pastor and then in between we stand up to sing praises to God. In church, we connect with God spiritually through our singing and dancing. I feel like I am communicating with him. I can't explain it in words, but you just feel his divine presence. I feel like he is listening to my heart, and this brings me joy and contentment. – P32

During their free time in the evening, participants in this cluster reported mostly spending time at home with their family members. Particularly at dinner time, participants stated that they often sit together to eat and chat with their family members until bedtime. During this time, some participants explained that they may

also watch TV with their family if they had electricity supply. Five participants in this cluster explained during the visual elicitation interviews that they rarely visited their relatives or friends but usually spoke to them on the phone. However, 1 participant mentioned visiting her daughter in the city once every week. 2 participants, who had shops in their homes, also reported that they were often visited by their neighbours who come to keep them company in their shops while they sold their goods. For instance, P18 stated:

When I am in the shop my friends who are also my neighbours come to visit me. We sit down and chat. Sometimes they also assist with attending to customers. - P18

6.3.2.7 Transportation

Places members of cluster two reported routinely visiting include their place of work or trade, the market, and their place of worship. Members of this cluster described that they primarily relied on public transportation to travel to these places. They also explained that their public transportation journey was usually multi-modal, involving a combination of more than one of the following vehicles: taxi car, bus, auto-rickshaw, and motorbike. They also explained that short walks were involved when transiting between modes of public transport. For instance, P29 stated:

I use public transport everywhere I go because I don't have a car. I will trek from my house to the junction to get a bike that will take me to the bus stop. Sometimes after I get off the bus, I will have to take keke (auto-rikshaw) before getting to my destination. - P29

6.3.3 Cluster Three (P2, P6, P21, P22, P25, P31)

Cluster three consists of six male participants between the ages of 47 and 81. Five of the participants in this cluster are 65 years and over and retired, while 1 participant is unemployed. 3 participants in this cluster live with their spouses only, one participant lives with his spouse, son, daughter-in-law and grandchildren, one participant lives with his parents, and one participant lives alone. Three members of this group earn less than 18,000 naira a month (less than minimum wage), while the other three earn between 18,000 naira – 30,000 naira a month.

ID	Age	Gender	Occupation	Living arrangement
P2	81	Male	Retired	Alone
P6	47	Male	Unemployed	With parents
P21	67	Male	Retired	With spouse
P22	78	Male	Retired	With spouse, adult child and grandchild
P25	73	Male	Retired	With spouse
P31	83	Male	Retired	With spouse

Table 6: Cluster Three Demographic Information

6.3.3.1 Caring for oneself

Five participants in this cluster, who are Muslims, documented in their diaries that they wake up between 4:00 am and 5:30 am to perform their daily morning prayers. After completing their prayers, they reported going back to sleep to wake up between 7:00 am to 8:30 am. This was consistent with the accelerometer data which reported time blocks of inactivity between approximately 6:00 am to 8:30 am for these participants. For each participant, periods of inactivity lasting between 25 minutes and 4 hours, were also observed at multiple blocks of time in a day. When probed during the visual elicitation interviews, participants explained that they spent most of their time in the day resting in their homes, and the blocks of inactivity represented the times they were either sitting down, lying down or taking a nap during the day. For example, P06 stated:

When I finish eating [lunch] in the afternoon, I will lie down and rest till 2:00pm. I will then go to mosque for the 2:00pm prayer [...] When we finish praying, I sit in the mosque to do my personal prayers and meditation till the next prayer at 4 o'clock [...], after we finish praying by 4 o'clock, most times, I sit again or sleep in the mosque till 5 o'clock. But sometimes, I can come home if I have something to do at home.

Similarly, P02 and P21 stated:

Most of the day I am alone, lying down in my bedroom. [...] Even after some 30-minute walk, I go and lie down and rest. In most cases, I will sleep, because I don't have any other thing to do. - P02.

After I finish eating [breakfast], I just sit down with my radio or I go to lie down on the bed, until prayer time. – P21.

At night, participants in this cluster reported, in their diary entries, going to bed between 9:00 pm and 11:00 pm. This was also consistent with the activity data which reported periods of inactivity between those times.

All participants in cluster three reported in their diaries that they performed self-care activities such as bathing, dressing, using the bathroom, moving around, and eating meals. All participants also reported taking oral medications every day, while two participants reported also taking insulin once or twice a day. Three participants in this cluster stated that they monitored their glucose levels at least three times a week, and two participants reported monitoring their glucose levels once every week. However, one participant who did not report monitoring checking his blood sugar in his diary entries explained in the visual elicitation interview that he only checks his sugar levels when he feels uneasy: *I don't check my sugar levels frequently. If I feel sick and inconvenient, I will check - P02.*

In the visual elicitation interviews, most participants explained that they could not afford to check their glucose levels every day because glucose strips were expensive for them. For instance, P22 stated:

I check [my sugar levels] at alternate days, two days interval, if I check it today, today is Friday, I will do it on Sunday because of the cost. It can't be done every day because of the cost. Because of the strip, the strip is about 4500 naira and if I want to do it in a day that means I will use a bottle in a month, that's expensive. – P22.

Furthermore, half of the participants in this cluster reported in their diaries taking walks around their neighbourhood a few times a week for exercise purposes. According to these participants, these walks typically last between about thirty minutes to one hour. The activity data for these participants reported periods of light intensity activity during the times participants reported taking these walks. The accelerometer data also reported periods of sedentary time between the periods of light intensity activity. When probed during the visual elicitation interviews, these

participants stated they would sometimes stop to chat with their neighbours for a few minutes or sit down to rest when they feel tired. For instance, P06 and P02 stated:

On my way, I stop to greet and talk with my neighbours that are outside before walking on. – P02

Because of my health, I can't walk for a long period of time. So, whenever I feel tired, I rest my body on a car for a while, or I sit for some time then I continue walking. When it is 12:30 [pm], I go back home. - P06.

6.3.3.2 Caring for others

Members of cluster three did not report engaging in any activity related to caring for other people. However, two participants in this cluster captured in their photo diaries, farm animals that they cared for. They also reported in their paper diaries and visual elicitation interviews that they engaged in feeding them every day. For instance, P02 noted:

I have a fishpond here. I go and give them food every morning. I take pleasure in it [feeding them]. I go there, put it [the food] there, looking at them for 10-20 minutes. P02.

6.3.3.3 Household chores

None of the participants in this cluster reported participating in any household chores. 5 of the participants who live with their families explained in the visual elicitation interviews that other family members such as their wife, daughter-in-law or mother were responsible for household activities. For instance, P22 stated: *my daughter-in-law and my wife take care of those matters [household chores], it is the women's work.* Similarly, P31 mentioned: *I don't do any of such work. my wife does not allow me to get involved [with housework] at all.*

The other participant - who lives alone - revealed in the visual elicitation interviews that he had a housekeeper who came in once every week to assist him with cleaning the house and doing his laundry. He further explained that he got a housekeeper because he couldn't manage all the housework by himself due to limitations caused by his back pain:

For years since my wife died, I used to do all the work in the house all by myself. But then the back pain started, and it reached a point where it became difficult for me to do it [...] My son hired a maid to help me. She comes every Tuesdays to clean the house. She washes my clothes too. -P02.

6.3.3.4 *Procuring and preparing food*

The visual elicitation interviews revealed that 5 participants in this cluster also relied on other family members such as their wife, daughter-in-law, or mother to purchase and prepare meals for them. For example, P06, P21 and P22 stated:

My siblings give me money to buy my food. I give my mother the money to go the market and buy food items. My mother cooks my food. We eat the same food, but she cooks based on what I was recommended to eat. - P06 .

My wife cooks for me and checks if I have taken my medicine every day... she asks me and cooks whatever I like. -P21.

My daughter-in-law does most of the cooking for the family, and she also does all the shopping. - P22.

The other participant - who lives alone - reported - in his diary entries - preparing food for himself. However, he mentioned in the visual elicitation interview that he does not go to the market himself to purchase food items. He stated that his son and housekeeper assisted him with buying the food items he needs:

My son helps in purchasing the food I eat. Sometimes he sends the money or brings the food items when he comes visiting. I send the maid to the market to get me anything I need. - P02.

6.3.3.5 *Reflection and recreation*

For all participants in this cluster, their diary entries showed that their leisure time is mostly spent at home. In the visual elicitation interviews, 5 participants reported that they often spent time at home in the company of their family members. For instance, P31 and P22 stated:

I am often at home together with my wife. I eat breakfast with [my wife], she sits with me, and I talk with her. When she is doing housework, I read the

newspapers and listen to the radio. We also eat lunch and dinner together, and after dinner, I usually just sit and watch the news on television with her until it is time for bed. – P31.

I am usually here [in the living room] with my family, with my wife mostly, I will be sitting or lying down with my radio and I will be talking with them. - P22.

Most participants in this cluster reported in their diary reports listening to the radio on a daily basis. In the visual elicitation interviews, they revealed that they listen to the radio for several hours at multiple times of the day, while doing other activities such as eating, resting, and/or spending time with family members. For instance, P21 described his daily radio listening as follows:

I listen to the news radio in the morning from 7 o'clock, to 9 o'clock, and at 8 o'clock I will be having my breakfast, and the news will still go on and I will be sitting on the chair. When the news is over, I just walk in there [the bedroom] and lie down, and then I can listen to music or other programs on the radio, take a nap and listen to the radio again before I stand up to take my bath and go to the mosque at 1 o'clock. Then after 8:00 pm, after returning from the mosque, when I finish eating dinner, I sit in the sitting room and I turn on the radio to listen to the news and different programs with my family until 10:00 o'clock at night, then I go to sleep. -P21

Additionally, three participants described the radio as a companion that keeps them entertained throughout the day. For example, P02 stated:

The radio is my friend, it keeps me company. I listen to it all the time, in the morning, during the day, and in the evening [...] They cast jokes [on the radio] and I will be laughing. I mostly fall asleep while listening to the radio, and then I wake up and continue listening.

Four participants stated in their diary entries and in the visual elicitation interviews that they were often visited by relatives, especially during the weekends:

My son and his wife and kids usually come on Sundays after church. Every week they come. My grandchildren would love to see me. They take joy, they take greater joy... Immediately they get here, they sweep. they will clean all these places for me, the kitchen, everything. I am talking of my grandchildren. – P02.

My siblings, nephews and nieces come around to check on me during the weekend. We play and eat together when they are here. But my wife and children are not in Ibadan, they are in Lagos. So, they only come to see me during holidays and festive periods. – P06.

Five participants who are Muslims reported walking to the mosque in their neighbourhood several times (up to five times) a day to pray in congregation:

I attend the mosque every day for the five daily prayers. The mosque is the next building to my house, so it is very convenient for me. – P22

I pray at the mosque near my house, I don't pray at home because it is more beneficial to pray together with people. I also like to listen to sermons at the mosque after prayers. – P25.

Three participants reported in their diary entries visiting their neighbours' houses several times in a week. During the visual elicitation interviews, these participants elaborated that they normally stopped by their neighbours' places after their prayers at the mosque, particularly in the late afternoon/evening. While at their neighbours' places, participants indicated they usually sit to chat with the neighbours for up to a couple of hours before going back home or to the mosque for their night prayers. For example, P25 and P31 stated:

After asr [late afternoon prayer] I go to see my neighbours down the road, I will sit outside with my people [neighbours] there, I will be playing with them until towards 6:30 pm, then I will be coming home to pray. – P25

I like to talk with my neighbour, we exchange jokes. So, in the evening time after 4, from the mosques I will just go there, relax. Maybe I will take tea there, take biscuits or anything. I will be at his place till around 7:00 o'clock, then I go back to the mosque. – P31

6.3.3.6 Work

None of the participants in this cluster reported going to work, given that they were retired or unemployed.

6.3.3.7 Transportation

Based on their diary reports and visual elicitation interviews, the places most participants in cluster three frequently visited included the mosque, and their neighbours' houses, which are all located within their neighbourhoods. The most common means of transportation amongst members of this cluster is walking. According to participants, the mosques they visit are typically between one to fifteen minutes' walk from their homes. Some participants stated that the mosque is located next to their house or within five minutes' walk from their home, while others stated that the mosque were a bit further from their homes and took them between eight to fifteen minutes to walk there.

6.3.4 Cluster four (P7, P8, P9, P15, P35)

Cluster four consists of five female participants between the ages of 35 – 69 years. This cluster group includes two primary school teachers, a nurse, a small business owner and a housewife. Most participants live with their family members: two participants live with their spouse and child, two participants live with their spouse, whereas one participant lives alone. Three participants in this cluster live in a house enclosed in a gated compound, while two participant lives in a block of flats.

ID	Age	Gender	Occupation	Living arrangement
P7	69	Females	Small business owner	With spouse
P8	35	Females	Nurse	With spouse and child
P9	56	Females	Teacher	Alone
P15	48	Females	Teacher	With spouse and child
P35	58	Female	unemployed	With spouse and parent

Table 7: Cluster Four Demographic Information

6.3.4.1 Care for oneself

Participants in cluster three reported waking up at varied times between 5:00 am and 6:30 am every morning and going to bed between 8:30 pm to 11:00 pm. All participants in this cluster reported in their diary entries engaging in daily self-care activities such as bathing, dressing up, moving around, eating and taking oral medications for their diabetes, without any assistance. Participants in this cluster

checked their blood glucose levels at varied frequencies. P35 reported checking her sugar levels two times a week, P09 reported checking once a week, P08 reported checking three times a week, and P07 and P15 reported checking once every morning.

6.3.4.2 Exercise

Two participants in this cluster reported engaging in exercise as part of their diabetes management practices. P15 reported taking walks around her neighbourhood in the weekend. During the visual elicitation interview, P15 elaborated that during her weekend walks, she stops to chat with her friend and sometimes, the friend accompanies her for these walks:

I have a friend who sells things in front of our house, so I stop, and we chat. Sometimes she too goes with me for the walk. She would say, 'you are doing your exercise again, I want to go with you'. So, she will accompany me. She has children in the shop who sell for her. So we go, we talk, we go around the neighbourhood, and then we come back together.

When asked how she felt about taking walks with her friend, P15 stated: *When we move together, we cover a longer distance. When I am alone, I turn back after a short while.* Although P09 did not report taking walks in her diary, her activity data reported continuous bouts of light to moderate intensity between approximately 7:00 am to 8:00 am on three of the days reported. When probed during the visual elicitation interviews, P09 explained that the time blocks for these activities were consistent with her walks to the school in the mornings. She further elaborated that she sometimes chooses to walk to the school instead of taking the car, because she wants to get some exercise done:

My neighbour is also a teacher here, so we sometimes come to work together in her car. But sometimes when I want to exercise, I tell her to go, and I will walk. My house is not too far from the here (the school), it is just like thirty minutes walking. – P09

6.3.4.3 Household chores

Members of this cluster reported being involved in household chores every day including doing the dishes, sweeping the house, mopping the floors, cleaning the

bathrooms and putting things in order. The accelerometer data for most participants in this cluster reported frequent bouts of light intensity to moderate intensity activity levels in the mornings between 5:30 am to 8:00 am [insert image]. During the follow-up interviews, most participants confirmed that parts of their mornings are usually dedicated to performing these chores:

When I wake up in the morning, I sweep the house, I sweep my sitting room up to the corridor, the kitchen, my bedroom. I take my bath, then I clean the bathroom - P09

When I wake up, I clean my house and I cook food for the family. When I am cleaning, I wash the plates from the previous night, I tidy kitchen. I also sweep both inside and outside the house and I mop too. I try to arrange, put things in place because I don't like my house getting disorganised. – P08

However, one participant stated that she preferred doing her chores in the evening after work:

After dinner is when I clean the house. I wash the plates, sweep and mop the floors, clean the furniture and the bathrooms, and do the ironing. When I wake up in the morning, I love to see my house neat. I don't like to wake and see my house dirty; my husband will even say, go and sleep now, you will do it tomorrow morning, but I don't like it. I just like to wake up in the morning to prepare food, take my bath, and then go to work. - P15

Four participants in this cluster also reported doing laundry once every week. Most of these participants revealed in the follow-up interviews that they hand wash their clothes rather than using the washing machine:

I wash clothes by hands. I have a washing machine, but I don't like it. I prefer washing by myself with my hands, the machine will not wash it well, I prefer washing it myself. – P07

I don't have a washing machine. I wash with my own hands. Anytime I wash, I sweat, so I consider it an exercise for me. – P15

One participant, who did not report doing laundry stated in the interviews that she had a laundry man who took care of her laundry:

I don't wash myself; I have someone who comes every week to do it for me. My husband pays him. – P35

During the follow up interviews, some participants expressed how they felt about engaging in these chores:

I find the housework to be very hectic because I don't have a maid and I have to do everything on my own. It's me alone doing everything from morning till evening, all day long. At times you have to be tired. – P07.

I just have to do it, there is nobody to do it for me. I also do it in order to please myself. Because if I don't do it, I won't feel too comfortable in that house. And I count it as exercise. - P08.

6.3.4.4 Caring for others

Only two participants in this cluster reported in their diary entries taking care of their young children (P08 and P15). P08 reported in her diary report and visual elicitation interview regularly engages in caring activities including waking her son up in the morning, getting him ready for school, and help with his homework:

My son, he is seven. So, I wake him up in the morning and get him ready for school. I serve him his breakfast and I pack his lunch. At 7:20 am he goes to school. My husband drops him at his school and brings him back home [...] In the evening, I help with his homework and make sure he goes to bed by 8:00 pm. - P08

Similarly, P15 stated in the visual elicitation interviews that she takes her 11 year old son to school in the morning before going to work and picks him up in the afternoon after work. She also mentioned sometimes helping with his homework:

My son is 11 year old now so he can do things for himself, but I drive him to school every morning before I head to work and then I pick him up later after school then we go back home. [...] I also help him do his homework in the evening. But it is not all the time, only when he needs my assistance. – P15

6.3.4.5 Procuring and preparing food

6.3.4.5.1 Procuring food

All members of this cluster reported in their diaries going to the market once every week to shop for groceries for their households. On the days participants in this cluster reported going to the market, their activity data reported long periods of light to moderate intensity activity (with short bouts of sedentary activity in between), lasting up to three hours. Participants confirmed in the visual elicitation interviews that they typically spent between one hour to three hours in the market, walking around the market stalls and buying items from multiple stalls. For instance, P07 describes her activities at the market as follows:

I go to the market on a weekly basis. [...] I spend about two to three hours most times. I walk round the market. I walk round the whole market, moving from one shop to another until I get everything I need. Although, I sit down for a bit in some shops while bargaining on some items. [...] I pay one of these wheelbarrow guys [porters] to help me carry my goods. – P07.

6.3.4.5.2 Preparing food

All Participants in this cluster reported cooking meals every day. During the follow up interview some participants stated as follows:

I cook three times: breakfast, lunch, dinner. I wake up in the morning at 5:00 am, I say my fajr prayer (Muslim morning prayer) and then I go to the kitchen to cook breakfast for me and my husband. Then in the afternoon, at around 1 o'clock, I cook again for lunch. Then again, at around 6 o'clock, I start making preparations for dinner. – P35

I cook at least two times. My husband and I will eat in the morning then in the afternoon. But sometimes at night, if we don't feel like eating, we just take a cup of tea and go to bed. – P07

I mostly prepare breakfast and dinner for my family. I don't usually cook in the afternoon (since I go to work), unless on Saturdays when I am home. Sometimes if I'm getting home late from work, I don't cook dinner. My husband would have done that for me. I will just get home and eat. -P08

6.3.4.6 Work

Three participants in this cluster reported leaving their homes every weekday to go work, while one participant reported running her small business from home. Two participants in this cluster, who are primary school teachers reported in their diaries conducting teaching activities such as, standing in front of the class to deliver a lesson, writing on the board, sitting on their desk, and walking around the class to monitor students' work. For both participants, their activity data recorded patterns of long periods of sedentary activity lasting between one hour and two hours, at multiple time blocks, during their reported working hours. When probed during the visual elicitation interviews, P09 explained:

If you look at my timetable, I don't teach all the subjects. When it is not my subject to teach, I have to sit down. Any time another teacher comes from another class to teach them another subject, I sit down to mark or prepare their homework. Sometimes I just rest, especially you know, when I have been standing for a long time teaching, so I sit down. Whenever another teacher is teaching, I don't interfere. – P09

P07 who owns a small convenience shop in front of her house describes her activities at the shop as follows:

I don't stay in the shop all day. The shop is in front of my house. I open the shop by 7 o'clock for school children who need something to eat or things for school. I sit in the shop and attend to them for one hour and latest by 8:15, I close it. I get inside the house to cook, eat and then lie down to rest. Then, I have a small radio, I always listen to radio when I am resting in the sitting room or bedroom. My radio is always by my side. After eating lunch, I re-open at 2:30 pm. I attend to customers and sometimes my husband sits with me in the shop to assist me. In the evening at 5:30 pm, I close the shop and go inside the house.

6.3.4.7 Recreation and reflection

6.3.4.7.1 Religious activities

Participants in this cluster reported starting their day with worship. Three participants, who are Muslims, reported waking up between 5:00 am to 5:30 am to perform their morning prayers, before starting other activities for the day. For example, in the visual elicitation interviews, P35 stated: *I wake at around 5:00 o'clock and I go to the toilet*

perform ablution. I then go back to my room to perform Subhi (morning) prayers.

When asked how long it took her to perform the morning prayers, P35 stated:

It only takes me about five minutes, but after the prayer, I sit on the mat for some time, like another thirty minutes to read my Qur'an (muslim holy book) before I go to the kitchen to prepare breakfast.

The three participants also reported performing four other daily prayers between 1:00 pm to 8:00 pm every day. Two participants who are Christians (P08 and P15) also reported waking up in the morning to pray with their spouses and children. For example, during the visual elicitation interview, P15 stated: *My first activity after waking up is saying my prayers. I pray together with my husband and son, and we sing praises to God.* When asked how long it took her to pray P15 explained: *it lasts about 10 to 15 minutes. Because on some days we read the bible too.*

The three Muslim participants reported attending religious services at the mosque on Fridays, whereas the two Christian participants reported going to church every Sunday with their family members. For example , P08 and P09 stated:

Sunday, typically, we go to church, anything from 7:00, 7:30. We leave home for church, we attend morning service. So, by 11:00, 11:30, we are back home.
– P08

On Friday we close by 1pm and I go to the mosque from school for Juma'at (Friday) prayer. Juma'at starts at 2 o'clock and we finish around 2:30 to 3:00 o'clock. - P09

6.3.4.7.2 Listening to the Radio

Two participants (P35 and P07) reported listening to the radio while resting in during their free time:

I have a small radio. I always listen to radio when I am resting in the sitting room or bedroom. I listen to the news or any program I am interested in. My radio is always by my side. - P07

I sometimes watch TV when I am not doing any work in the house but not always. I usually listen to the radio. This is my radio. I listen to different programs and I like listening to the music too. – P35

6.3.4.7.3 Socializing

Participants in this cluster reported spending time with their family members and/or neighbours, visiting relatives and or receiving guests at home, during their free time.

6.3.4.7.4 Spending time with family and neighbours at home.

P08 and described spending time with their family before bedtime as follows:

After dinner, I just sit down, relax, watch television, the night news. So, my boy will be playing, and my husband and I will just be chatting and watching tv. - P08.

During the visual elicitation interviews, two participants (P09 and P07) described spending time with their neighbours' children in the evenings:

My neighbours' children as soon as I get home from work, they come running to welcome me. I get biscuits for them, and I just play with them. When they are fighting among themselves, I settle it. They keep me busy. You know I'm a teacher, I sometimes help with their homework. – P09

In my compound, we have other tenants, they have kids, most of the time, you know when the children come from school, they will come to stay with me. I play with them, I will ask them what they were taught in the school, they will recite most of their poems for me. They keep me company. Then there is a lady yet to have children so must most of the time in the evening, she will come to chat with me. – P07

Additionally, P09 reported being visited by a friend who is also her neighbour. She describes their interaction as follows:

My neighbour friend visits me a lot. We talk and laugh together. You know, I live by myself and it's not good for someone to be alone. That is why I like being in the midst of people. My neighbour keeps me company and I enjoy it.

6.3.4.7.5 Visiting relatives and neighbours

All participants in this cluster reported in their diary entries visiting their family members. Three participants reported visiting their daughters living in Ibadan. During the visual elicitation interviews P09 and P35 stated:

I go to see my first daughter frequently. She is married and her house is around here, even though it is closer to my house. She recently gave birth, so I go to help her with the baby. At times, after work, I will go from here and stay there until around 7 - 8. When I don't visit for a few days, she calls to say 'mummy

we are missing you, the baby is missing you, please come. So, I go every chance I get. - P09

This is when I was at my daughter's house. I visit her like once in a week or once in two weeks. She lives far and I have to take a two taxis and bus to her place, so I can't go there regularly. - P35

When probed what she did at her daughter's home and how long she spent there, P35 noted:

I just sit down with her, and we talk. Sometimes I cook. Sometimes we go out to the market together. We eat together and I play with my grandchildren. [...] I usually go in the afternoon time like 1 o'clock and I go home at around 6 o'clock.

One participant, P15 reported in her diary entries visiting her sister's home, and her son at the university during the weekend. When probed during the visual elicitation interviews, P15 explained:

I usually visit my family during the weekend. You know, I don't always have time during the weekdays, because of my work. On Saturdays I go to my sister's or friends' house, and mostly on Sundays, after church, we go to see my son at his university. I take food to him, spend a few hours with him, and then go back home. P15

One participant in this cluster (P35) captured an image that included some shops on a street as part of her diary entries. When probed to explain the context of the picture during the visual elicitation interviews, P35 stated:

That place where the woman is sitting down, that is my neighbour's shop. That is where I go at night after I eat dinner. She closes around 10 pm. So, I'll go and sit and talk with her for one or two hours before going home to sleep.

When asked why she frequently visited her neighbour's shop, P35 explained:

There isn't anything for me to do at home, and I am at home throughout the day, and I get bored. I feel it is better for me to go outside and socialize.

6.3.4.8 Transportation

According to their diary reports, places members of cluster two routinely visit include their place of work, the market, their place of worship, and their relatives' homes. Three participants in this cluster reported traveling by car to go to the market, their

place of worship, and visit relatives, while two participants reported using public transportation to visit these places.

Two of the three participants in this cluster who leave their homes to go to work reported traveling to work by car. P08 reported driving to and from work every weekday. In the visual elicitation interview, she added: *It takes around 30 minutes to 40 minutes' drive if there is no traffic. If there is traffic it takes up to an hour to get to the hospital.* Another participant, P15 stated: *We leave the house at 6:30 am and we arrive at my son's school between 7:00 am to 7:15 am. I arrive at my school by 7:30 am.* However, the other one participant (P09) reported traveling to work by car on some days and walking on other days.

6.3.5 Cluster five (P01, P03, P04, P26, P27, P33, P34)

Cluster five consists of seven participants (six females and one male) between the ages of 45 and 83 years. Four participants in this cluster are small business owners, two participants are unemployed, and one participant is retired. Three participants live with their spouse and children, two live with their spouse, one lives with a maid, and one participant lives alone.

ID	Age	Gender	Occupation	Living arrangement
P01	67	Female	Small business owner	With maid
P03	47	Female	Unemployed	With spouse and young and older children
P04	45	Female	Small business owner	With spouse and older children
P26	83	Male	Retiree	With spouse
P27	53	Female	Small business owner	With spouse and older children
P33	64	Female	Small business owner	With spouse
P34	70	Female	unemployed	Alone

Table 8: Cluster Five Demographic Information

6.3.5.1 Care for oneself

Participants in this cluster reported in their diary entries waking up between 5:00 am and 6:00 am. All participants reported engaging in self-care activities including bathing, dressing, using the bathroom, moving around, eating meals and taking medications for their diabetes. Two participants reported checking their blood glucose levels twice every day: before and two hours after breakfast. Three participants reported checking once every week, and two participants reported checking three times every week. None of the participants in this cluster reported in their diaries engaging in exercise as part of their diabetes management.

6.3.5.2 Household chores

Four (P03, P27, P33, P34) participants in this cluster reported in their diaries reported engaging in household chores every morning, such as sweeping and mopping the floors, cleaning and arranging the home, and doing dishes every morning. For example, P03 and P27 stated:

I sweep and clean inside the house in the morning after the children have gone to school. I also clean outside the house too because the goats dirty the compound with their faeces. – P03

I do a lot of work in the morning before I go to the shop. I sweep my sitting room and wash the bathroom, and then I will start cooking, and washing plates in kitchen. - P27

Five participants (P03, P33, P34, P27, P26) reported in their diary entries regularly doing laundry (hand washing). In the visual elicitation interviews, P26 who is the only male participant in the cluster stated:

I wash my clothes by myself. I don't give my clothes to my wife or anybody. Nobody can wash for me, otherwise won't be satisfied. [...] I wash every few days because I can't wash many clothes at a time. I don't have strength like I used to before. So, I wash little clothes every few days.

However, during the visual elicitation interviews, two participants (P01 and P04) stated that they delegated the household chores to other household members, including their older children, or house maid. For instance, P01 explained:

I don't cook, wash or clean the house. I have a maid. she lives with me. she tidies up, washes, does the laundry, those sorts of things. I cannot do these things anymore. It's not good for my body, I don't have the energy, I get tired easily.

Additionally, one participant in this cluster reported in their diaries fetching water for their household, multiple times in a week. During the visual elicitation interviews, P03 stated:

I fetch water from the well near my house every few days after I have used up the one in the drum at my house. I usually need to go to the well two times in a day to fill up the drum. I use buckets to fetch the water, I go with my two children to help me so we can carry many buckets at a time.

Although P27 did not report fetching water in her diary report, her activity data recorded continuous bouts of moderate and vigorous intensity activity lasting between 10 minutes to 20 minutes on all of the days reported. When probed during the visual elicitation interviews, P27 stated that the time blocks most likely corresponded with times she fetched water from the well in her compound. She further explained:

I live upstairs on the second floor. I go downstairs to draw the water from the well and I carry it upstairs. I fetch four to five buckets in a day, but I carry one bucket at a time.

Similarly, P34 did not report in her diary fetching water from the well. However, when probed during the visual elicitation interview what she did while she waited for her food to finish cooking on one of the reported days, P34 stated that she went to fetch water from the well near her home. She explained:

I went to draw water from the well to wash my clothes because I had used up the water from yesterday and had not replaced it. I drew one bucket and my neighbour offered to help me draw another two buckets. He also helped me to carry the two buckets inside the house.

When asked how often fetched water from the well. P34 stated:

I think fetch every day or every two days it depends. I use the water to clean the chicken pens, to take my bath, cook food and then when I need to wash my clothes. It depends when the water finishes.

One participant, P26 recorded in his diary entry gardening on one of the days of the weeks reported. P26's activity data reported bouts of vigorous intensity activity level in the time block that corresponded with his gardening diary entry. When probed what activities he does in the garden, during the visual elicitation interviews, P26 explained:

I grow plantain and vegetables. So, I sometimes go to water the plants and harvest. For example, on that day (referring to diary entry) I was cutting down ripe plantain with my son and clearing the weeds.

6.3.5.3 Caring for others

Only one participant (P03) in this cluster reported in their diaries engaging in activities that involved caring for other people such as her young children. However, four participants in this cluster reported in their diaries, caring for their farm animals in their homes. For instance, P34 explained in the visual elicitation interviews:

I have a chicken poultry so in when I'm done eating my breakfast, I will go out to the backyard; sweep their pen, wash their bowl, put in their food, and water and return them back to the pen. I will also go and feed the chickens at night. - P34

6.3.5.4 Procuring and preparing food

6.3.5.4.1 Procuring food

All participants in this cluster reported (in their diaries) going to the market between once to two times every week. Three participants stated during the interviews that they go to the market to purchase food and items for their household, whereas four participants (who are traders) stated that they go to the market to purchase food/items for their household and their shop. For participants in this cluster, frequent periods of light to moderate intensity activity, lasting between one to four hours, were observed on some of the days (particularly weekends) reported by the accelerometer. These periods of light to moderate activity were usually followed by periods of sedentary activity lasting between one hour to two hours. When asked during the follow up interviews, participants confirmed that these periods were consistent with the days that they went to the market for that week. They further explained that they spend between two to four hours walking around the market. For instance, P33 describes her activities in the market as follows:

Too much walking when I go to buy goods in the market. I will spend up to three hours moving around looking for tomato here, looking for soap, looking for biscuits and sweets, looking for everything everywhere. One will have to walk in that market, I get home and then we offload the goods from the car. After walking, when I get back, I sweat a lot, I will lie down and rest. If I feel like sleeping, I sleep. -P33

Similarly, P26 expressed:

I go to the market once or twice a week. I go and buy what to use to prepare food at the house. I may spend up to two hours going about, going to different places to buy things. And after that, I carry the things and I will take transport back home [...] I get very tired when I get home, so I mostly just rest for some time. – P26

Additionally, most participants stated in the follow up interviews that they hire porters at the market to carry their goods while they shopped as well as help them put the items in their car. For example, P01 mentioned:

I usually hire someone to help with the load. I go to the market by myself, and I buy cartons of goods, so I need help carrying them around, because I can't do it myself. -P01

6.3.5.4.2 Preparing food

Most members of this cluster reported cooking meals at least twice every day:

I prepare breakfast and lunch every day. I prepare breakfast for my husband and my children between 5:30 to 6:30 in the morning. They leave the house around 7:00 o'clock. I prepare lunch for myself, and my children prepare dinner when they come back from school. - P03.

I cook every day, breakfast, lunch and dinner. I cook for myself, and my wife cooks her own food. Because of my health, I avoid certain foods and salt, and she prefers the food that I can't eat. So, I cook my own food because I don't want to stress her with cooking two different food every time. - P26

P01, who did not report cooking meals in her diary explained in the follow up interview her reason for not cooking as follows:

My house help [maid] does the cooking for us. I tell her what to prepare and she does it. I used to cook by myself, but I don't cook at all anymore, since she started living with me. -P01

6.3.5.5 Work

Four participants in this cluster are traders who reported selling everyday convenience items. Three participants stated in the follow up interviews that they rent a corner shop in town for their business, while one participant stated she owns a small shop in front of her house. All traders reported going to their shops every day except for Sundays. They reported opening their shops in the morning between 7:00 am and 10:00 am and closing in the evening between 6:00pm and 8:00 pm. Two of the traders in this cluster (P01 and P04) described their activities in their shops as mostly sitting on a chair while waiting for customers and standing up to attend to customers when they arrive. P01 describes her activities in her shop as follows:

After eating my breakfast and bathing at 8 o'clock in the morning, I go straight to the shop outside the house and wait to sell my goods. I sit down on this chair mostly, unless they [customers] want to buy something, I will stand up and give them what they want. At times, I don't stand up, if the items are close by, I just stretch my hand or ask them to help me get it. When it is 6 o'clock I pack up and close the shop. – P01

I sit and wait for customers to come and buy my things. But I have to stand up when they come to buy something. They stand outside here; they don't enter the shop. They tell me what they want, and I get it for them. So, I have to stand up and attend to them. – P04

On days that P01 reported going to her shop, between 8:00 am and 6:00 pm, the accelerometer data recorded a pattern of intermittent periods of sedentary activity and light intensity activity. Periods of sedentary activity lasting between 5 minutes to 1 hour 30 minutes at a time, and periods of light intensity activity lasting between 1 minute to 4 minutes at a time were observed. In the follow up interviews, P01 explained:

At times people come every few minutes, and at times it can take up to one hour before someone comes. It depends. Sometimes it gets very busy and I have to be standing up every few minutes. But sometimes I can sit for up to one hour on this chair without standing. Sometimes I even lie down on the chair and sleep when it is not busy.

Similarly, on most days that P04 reported going to her shop, between 9:00 am to 4:00 pm, the accelerometer data recorded intermittent (between five to fifteen minutes) intervals of sedentary activity with frequent brief periods of (1 minute to 3 minutes)

of light intensity activity in between. When asked during the follow up interviews, P04 explained:

My shop is always busy. People come every 5 to 10 minutes. So, I stand up and then sit down every time they come. I don't normally sit for too long without standing up.

However, longer periods of continuous sedentary activity (between 40 minutes to 1hour 30 minutes) and less frequent brief bouts of light intensity activity in between was observed between 4:00 pm and 6:00 pm. In the follow up interviews, P04 explained:

In the evening time, after school at around 4 o'clock, two of my children come to help me. They take over the shop, attending to customers so I can get to rest and sometimes sleep before we close. Those times, I am just sitting down or lying down. But I can briefly stand up to do something or go to the toilet.

For the two other traders in this cluster (P27 and P33), continuous periods of sedentary activity lasting between 50 minutes to 2 hours at a time, with a few brief bouts of light intensity activity (between 1 to 2 minutes) in between, was observed in the accelerometer data during the times they reported being at their shops. In the follow up interviews, these two participants explained that they have people who assisted the with attending to customers, and described their work in their shop as mainly sitting down to supervise the activities of the shop:

I go to the shop with my daughter. My daughter helps me at the shop. She attends to the customers, and I keep records of our sales. Throughout the day, I am sitting most times. -P27

I have two people working for me, so I just supervise. I usually sit in the shop while the salesgirls [shop assistants] will be working. Sometimes I go out to see other friends at the other stores near my shop, sometimes I even sit outside, outside the shop to relax. – P33

6.3.6 Cluster Six (P28, P23, P20, P24, P16, P17)

Cluster six consists of six participants (5 male and 1 female) between the ages of 53 – 75 years. Four participants in this cluster live with their spouse only, one participant

lives with her adult children, one participant lives with his spouse, daughter-in-law and grandchild. Five participants in this cluster are self-employed, and one participant is retired.

ID	Age	Gender	Occupation	Living arrangement
P16	53	Male	Self-employed Artisan	With Spouse
P17	68	Male	Self-employed	With spouse
P20	61	Male	Self-employed Engineer	With spouse
P23	75	Male	Self-employed Lawyer	With spouse
P24	62	Male	Retired	With spouse, daughter-in-law, and grand child
P28	73	Female	Retired Trader	With adult children

Table 9: Cluster Six Demographic Information

6.3.6.1 Care for oneself

Participants in this cluster reported in their diary entries waking up between 5:00 am to 7:30 am and going to sleep between 9:00 pm to 11:00 pm every day. All participants reported in their diary entries performing self-care activities such as bathing, dressing, using the bathroom, moving around, taking medications, checking blood sugar levels and eating meals.

Two participants (P28 and P24) reported in their diary entries taking rests and naps on most days of the week. P28's accelerometer data reported multiple continuous periods of sedentary activity with brief periods of light intensity to moderate intensity activity in between on all of the 7 days reported. P28's accelerometer data also reported no activity between 10:00 am and 01:30 pm on three of the reported days. When probed during the visual elicitation interviews, P28 confirmed that these periods of inactivity were the times that she was taking a nap. She also explained that she spent most of her time in the day lying down and resting in bed:

When I wake up, I just lie down in bed, I will be listening to my radio until around 9:00 o'clock, before I stand up to go and eat my breakfast. When I finish eating, I go to lie down in bed again. Sometimes, especially when my daughter helping

me in the shop, I go back to sleep after breakfast and wake up in the afternoon. When I wake up, I will just rest in bed until 4:00 clock when I need to take my bath.

Similarly, P24 reported in his diary taking naps between 10:00 am to 12 noon during two out of the seven days of the diary study week. This was consistent with P24's accelerometer data, which recorded no activity between approximately 10:20 am to 12:00 pm on two of the reported days. During the visual elicitation interview, P24 elaborated:

I take siestas almost every day. Sometimes in the morning after I come back from my exercise or in the afternoon after working at the poultry shed. I feel a bit tired after some activities, that is why I go and sleep to rest.

Two participants in this cluster did not document taking naps in their diary entries. However, their activity data reported periods of inactivity between thirty minutes to two hours on some days. When probed during the visual elicitation interviews, these participants recounted that the time blocks of inactivity were consistent with the times that they took naps that week. For instance, P23 explained:

I slept for some time on that day after I came back to the office from the court. Any day I go to court I am usually terribly tired when I come back. I lie down there on that couch and sleep for a while before getting up to continue my work activities.

Five participants in this cluster reported participating in leisure time physical activity as part of their diabetes management. Two participants reported in their diary entries taking walks around their neighbourhood on three days of the dairy study, while one participant reported taking daily walks around his compound. However, one participant (P24) reported taking walks both around his compound and his neighbourhood. P24 reported in his diary entries taking these walks two times every day. In the follow up interviews P24 described his walking activities as follows:

I like to take my walks after my food to help breakdown the food better. I go out by 9:30 in the morning to walk down the road and that would go on for 30 minutes. In the evening too after my dinner I walk round this compound like 5 to 10 times. I don't walk on the road at night because the road is dark. That is why I prefer to walk round my compound.

One participant (P20) reported jogging around his neighbourhood on three days in his diary entries. Additionally, P20's activity data reported up to thirty continuous minutes of moderate to vigorous intensity activity level on the three days he reported jogging in his diary. During the visual elicitation interview, P20 confirmed that the time blocks were consistent with the timing of his jogging. P20 describes his exercise routine as follows:

I exercise two to three times a week. I go out for exercise in the weekend and may be one day in the week if I have time. My workout is about 2km of jogging and walking, three quarter jogging, and one quarter walking. When I start getting out of breath from jogging, I walk.

6.3.6.2 Caring for others

Participants in this cluster did not report engaging in activities that involved caring for other people. However, one participant (P24) reported caring for his poultry which he rears. In the visual elicitation interviews, P24 described his caring activities as follows:

I go to check my poultry. I go on a daily basis. I feed them and I also give them water to drink. I also clean their shed every other day.

P24's accelerometer data recorded up to 40 minutes time blocks of continuous moderate to vigorous activity on three of the reported days, which were consistent with time blocks he reported cleaning his poultry shed in his diary. When probed during the visual elicitation Interviews, P24 further elaborated:

I usually sweep and then I scrub their shed to remove all the dirt and their waste. Sometimes I might be cleaning for less than 30 minutes, sometimes more than 30 minutes. Sometimes by the time I am finished I may be sweating from all the scrubbing. P24

6.3.6.3 Household chores

Three participants in this cluster reported in their diary entries doing a few household chores. P28 reported sweeping every day in her diary entries. In the visual elicitation interviews, she explained that she only swept her own room while her children took

care of the other household activities: *I sweep my room. They [my children] are the ones that sweep the house. I only sweep my room. P28*

P16 reported doing his own laundry in one of the days in his diary entries. In the visual elicitation interviews, P16 stated:

I wash my own clothes on Saturdays. I am not one of those people that their wives wash their clothes for them. I don't leave [my wife] to do all the work alone. So, I wash my clothes and I iron them. P16

Other participants explained in the follow up interviews that other family members did the laundry for them. For example, P28 explained:

I don't wash my clothes, it's my daughter that helps me to wash it. I used to wash my clothes and everything. It was when I was getting old that [my children] said I'm getting old. I don't do that again. P28

P16 also reported assisting his wife with some household chores. In the visual elicitation interview he stated:

When my wife is in the kitchen, I will help her do certain things. At times, when she is washing plates, I will take it, wash it with her.

P16 also reported assisting his wife to fetch water (for their household) from the well in their compound every day. In the visual elicitation interview, he explained:

I help my wife to fetch water from the well. We have a well at home in the compound. I draw water with a small white plastic paint bucket and fill up two big buckets. I will carry one on one hand the second on the other hand and take it inside the house. I do this every morning. P16

When asked why he helps his wife with chores at home, he stated:

Firstly, I am helping myself as I am helping her because it is exercise. Secondly, I don't want her to overwork herself, so I help her.

P20 reported washing his own car every morning. In the follow up interviews, he stated:

I wash my car every day, every morning. I can't stand seeing my car dirty, especially now that dust is all over.

6.3.6.4 *Preparing and procuring food*

6.3.6.4.1 Procuring food

None of the participants in this cluster recorded in their diary entries purchasing food for themselves or their household members. All the male participants in this cluster stated in the follow up interviews that their wife was responsible for going to the market and procuring food for them. For instance, P24 stated that:

My wife goes to the market to the get food and things for the house. I give her the money, and she buys what we need.

The female participant in this cluster (P28) stated that her daughter who lives with her was responsible for purchasing food for their household:

I don't go to the market. It is my daughter that goes and buys everything. Even the things for the shop she buys them and brings them to the shop.

6.3.6.4.2 Preparing food

Similarly, none of the participants in this cluster recorded in their diaries preparing food themselves or their household members. The visual elicitation interviews revealed that participants relied on other family members such as their wife or daughter to prepare meals at home. However, P28 mentioned that she occasionally cooked when her daughter is not at home:

I don't usually cook. My daughter, she is the one that cooks for us. But occasionally when she is not at home, when she goes out somewhere, I cook myself. Even when she was not living with us, I used to cook by myself, every day I cooked. But since she's here, she's the one helping me.

6.3.6.5 *Work*

Five participants in this cluster are self-employed. One participant (P23) is private practice lawyer who owns his own office. P23 reported going to work every day except on Sunday. In the follow up interview P23 describes his work activities as follows:

I leave the house at 7:30 am and I drive straight to my office. I have court duties from 9:00 in the morning to 12 noon from Monday to Thursday but most of the time I come and dress up in the office before leaving for court because I have all my outfits here, the wigs, all the things I put on. By 1:00 pm I come back to

the office to do some paperwork and attend to clients. I remain at the office until 6:00 pm, then I go home. [...] on Friday and Saturday, I come straight to the office and work until 6:00 p.m.

On the days that P23 reported going to court, between 9:00 am to 12:30 pm the activity data recorded intermittent intervals (between twenty minutes to thirty minutes) of sedentary activity with brief periods (one to four minutes) of light intensity activity in between. When probed during the visual elicitation interviews, P23 revealed:

I am mostly sitting down in court, listening to the opposing counsel, listening to the Judges. But I have to stand up while I am addressing the court in that period, that's between 9:00 to about 12 o'clock. While addressing the court, I stand up (and sometimes move a bit) for just about 5-10 minutes then I sit again.

However, between 1:30 pm to 6:00 pm, P23's activity data reported longer periods of continuous sedentary activity lasting between 1 hour to 2 hours at a time, with a few brief bouts of light intensity activity (between 1 to 2 minutes) in between. In the follow up interviews, P23 further explained:

I am sitting down throughout in the office. I have to attend to people, that's when I am in the office. I will have to sit down to attend to clients.

The four other participants stated that they had other people working for them, so they go to work mostly to supervise. Two of these participants (P17 and P20) own shops for car repairs. P17 reported going to his workshop three times in the week in his diary report. When asked in the follow up interviews how often he went to work in a week, P17 said: *It is not definite, some days I go to the office and some days, I don't.*

P17 describes his activities at his workplace as follows:

I just go around the compound, for about 10 mins to check what is happening. I check a vehicle, speak to my workers and then go back to the office. Then I will sit in the office for about an hour or two hours and go home. Because I have people working for me, I don't work.

P20 reported in his diary going to work every weekday. In the visual elicitation interviews, he describes his work activities as follows:

I just go to supervise the repair jobs in the workshop. I move from one repair job to another to inspect and make sure they are following my instructions. When I finish inspecting, I go to my office to check some paperwork and then I go back home.

P16 owns a print and graphics shop. He reported going to work every weekday in his diary entries. In the follow up interviews, P16 explained:

I have four staff members and they do most of the work. As soon as I get to work, I go upstairs to my office, and they come to report if there is any issue. Sometimes I go downstairs to see the work they are doing. I sometimes check on my apprentice and assist him to resolve any issues he is having.

P28 who is a small business owner, has a small convenience shop in front of her house. In the visual elicitation interviews, P28 describes her selling activities as follows:

I don't sit in my shop to sell. My daughter and my son, they help me sell in the shop. But if they are not at home and there is nobody to help me, if someone comes and they want to buy something, I will go out of the house, I will sell it to them and come back. I don't sit down, I just come back straight to my room.

6.3.6.6 Recreation and reflection

Members of this cluster reported going to their place of worship regularly. Two participants who are Muslims reported going to the mosque multiple times in a day for their daily prayers while four participants who are Christians reported going to church with their family members once every week. P28 describes her activity in the church as follows:

I go to church every Sunday. We start our Sunday service at 8:00 o'clock and we finish around 11:00 o'clock. We sit to listen to sermon and when it is time for praise worship, we stand, sing and dance. We stand up and pray too.

P23 describes his activities at the mosque as follows:

I do my five daily prayers in the mosque every day. Even when I am at work, I go to the mosque nearby to pray. When I am praying, I am standing up, bending and sitting down. Prayers are usually done in 10 to 15 minutes. [...] Sometimes I sit to listen to the sermons after prayers. After work I go to the mosque at 7:00 pm to pray maghrib, after maghrib, I usually sit in the mosque until Isha prayers. I go home after 8:00 pm.

Five participants in this cluster also reported praying at home as soon as they woke up in the morning and before bed. Three of these participants stated that they prayed with their family members while two participants stated that they prayed by themselves:

I pray with my wife. We do our morning devotion (worship) after we wake up. We will read the bible, we will sing and then pray. We do the same at night. – P17

When I wake up in the morning, first and foremost, I'll do my morning prayer. As soon as I wake up, I sit on the bed to say a short prayer for about three to five minutes before I leave the bed to do my ablution and then go to the mosque. Before I go to bed, I will spend at least 5 minutes saying prayers. – P23

Four participants in this cluster reported in their diary entries visiting their friends and/or neighbours multiple times in the week during their free time. In the visual elicitation interview P24, who is retired, explained:

I go to see my friends almost on a daily basis. I can spend up to three hours or more with them. You know whenever you meet your friends, you will spend some time with them. Because if I come back home there is nothing I will come and do [...] We just sit down, and we introduce different topics, so much news, on politics, on social matters and some other things like that.

Participants in this cluster also reported sitting together with their family members in the evening to eat dinner, chat and listen to the news until bedtime. The activity data for participants in this cluster reported mostly sedentary time blocks in the evenings, ranging between about 6:00 pm to 11:00 pm. During the visual elicitation interviews, some of the participants stated:

I sit in the sitting room between 7 and 8 to eat dinner. I eat dinner with family. Because they all must have come back from work. We discuss and watch tv. - P24

When I get back home from isha (night) prayer, I am mostly sitting down and eating with my wife. I listen to news between 8:30 -10:00 pm. I turn off the

television by 10. National news is at 9:00-10:00 pm. Local news is between 8:30-9:00 pm. – P23

I sit down outside in the veranda with my people (children) to get fresh air. When I am sitting outside, I listen to the news on the radio, and I discuss with my children. When I start to feel sleepy, I go inside my room. – P28

6.3.6.7 Transportation

Places members of this cluster regularly visited include their place of work, place of worship and friends/neighbours' place. Participants in this cluster reported using varied means of transportation for their travel to these places. Two participants reported using private cars to go to work. When asked how long it took them to drive to work P20 stated: *My workshop is not far from my house. It only takes like 5 minutes,* while P23 stated: *It takes me about twenty to thirty minutes to drive to my office. It is not very far, but there is a lot of traffic on the road, that is why it takes this long.*

One participant (P17) reported taking the public transport to go to work. When asked during the follow up interviews how long it took him to travel to work, P17 explained:

It depends on how quickly I get transport. Sometimes it takes me less than one hour, sometimes it takes me up to one hour. From my house, I walk to the main road for about three to five minutes, from the main road I take a bike to a bus stop. I wait to board my bus and the bus drops me at another bus stop near my workshop.

One participant (P16) reported in their diary entries walking to work. In the visual elicitation interview P16 stated:

I walk to work every time. It only takes me like 10 minutes. I leave home at 8:00, and I arrive around 10 past 8. It is not too far from my place.

Four participants in this cluster reported in their diaries walking to their place of worship. Two of these participants (P20 and P23) reported that they walked to the mosque on a daily basis, whereas the other two participants reported walking to church once a week. Both P23 and P20 mentioned in the visual elicitation interviews that the mosques they visited were only a couple of minutes away from their homes:

The mosque is close by. It is just down the road. I will be there in about two minutes. - P23.

It takes me like two minutes to walk there (to the mosque). It is four houses from my house. – P20

In the follow up interviews, when asked how long it took them to go to church, P16 explained: *My church is a bit far from my house so takes me 35 to 40 minutes to get there*, while P28 stated: *[My church] is not far. It doesn't take me more than 10 minutes to reach the church. Let's say between 8 minutes to 10 minutes.*

Most participants in this cluster reported walking to their friends' or neighbours' place. Only one participant (P24) reported driving to meet with a group of his friends on a regular basis. In the follow up interviews, when asked how long it took him to travel to his friends' place, P24 explained:

I see my friends at Eyeeye. We meet at one of our friends' houses there. From my house to Eyeeye it normally takes me between 20 to 30 minutes to drive there. The road is bad, so one has to drive a bit slowly.

Chapter 7: Life history of ‘doing physical activity’ and ‘being active’

7.1 Introduction

In this chapter, I explored participants’ narratives about physical activity embedded into their everyday practices over the life course to understand how key life transitions, and turning points interact with their experiences of ‘doing physical activity’ and ‘being physically active’. In what follows, I describe the data analysis process, present the findings, and summarise the key findings.

7.2 Data Analysis

I employed the thematic analysis method proposed by Braun and Clarke (2006) to analyse the preliminary interview data, incorporating an interplay between deductive and inductive approaches. A deductive approach involves a thematic data analysis guided by existing theoretical concepts or research questions Field (Braun & Clarke, 2019), while an inductive approach involves identifying and defining themes from the data itself (Braun & Clarke, 2019). The data analysis included a deductive approach because the research questions that guided the preliminary interviews were broadly framed within key concepts from LCP and SPT. However, while the thematic analysis was guided, it was not limited to theory-driven coding; but it also allowed for inductive, data-driven coding.

I began the data analysis by closely reading and re-reading printed copies of each narrative interview transcript to familiarise myself with each participant’s narratives. During this process, I highlighted notable quotes from participants and made initial annotations and notes of emergent ideas that appeared relevant for subsequent analysis steps. At this stage, I was looking for a general sense of the recurrent patterns around participants’ physical activity trajectories. For each participant, I created a timeline by hand and outlined significant *transitions* and *turning points* along their *life trajectories* where participants felt these had impacted their activity patterns. I colour-coded the timeline (Figure 16) to delineate experiences related to different life stages: childhood and adolescence, early adulthood, mid-adulthood and later adulthood.

After familiarising myself with the data, I began initially coding the data across the thirty-five participants' narrative interview data. I used NVivo to help organise the transcripts and assist with the systematic coding and categorisation of the data. Guided by the LCP's concepts of transitions, turning points and trajectories, I conducted a focused coding of the data to identify narratives and generate codes related to these concepts. Once all the interview transcripts were coded, I reviewed the codes generated to identify common categories of *transitions* and *turning points*. After forming initial categories, I explored patterns across categories and organised them into themes related to the different stages of people's *life trajectories*. I then reviewed each theme to ensure it was reflective of its associated sub-themes and narratives. Finally, I defined the descriptive labels of the themes and sub-themes and began writing up the analysis presented in the following section.

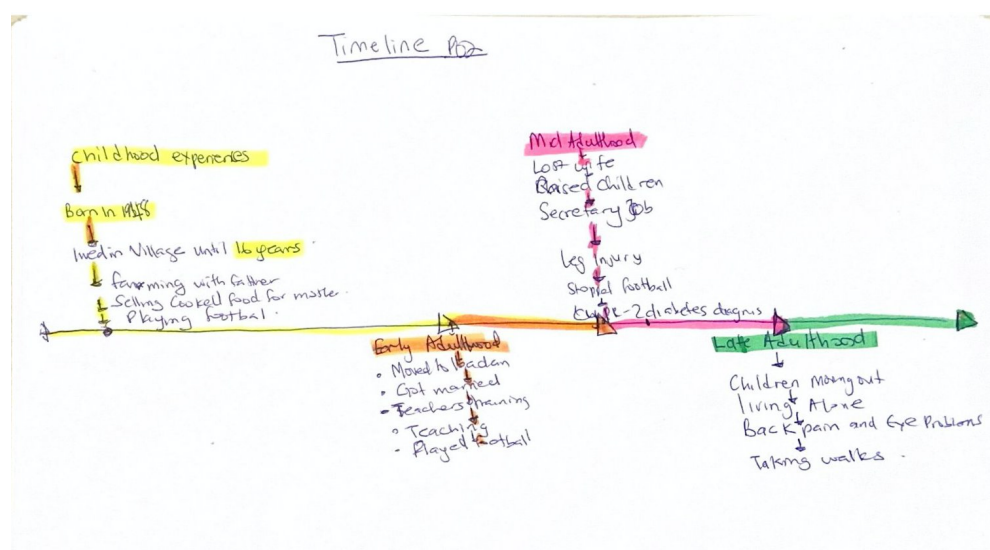


Figure 16: Colour-coded Timeline for P02's Lifecourse

7.3 Findings

During the narrative interviews, I asked participants to describe how physical activity has been (or has not been) a part of their lives from childhood until after their diagnosis. In their narratives, participants represented and interpreted the meanings of physical activity differently. However, they mainly positioned physical activity in the broad context of their lives, including a range of daily activities. I discuss these

meanings in relation to transitions and turning points that influenced their physical activity practices over different life stages. Transitions and turning points implicated in people's physical activity trajectories include leaving the parental home, transitions to marriage and parenthood, transitions to retirement, ageing and developing health conditions.

7.3.1 Growing up in the village

In participants' reflections of their physical activities across their life course, they frequently associated 'being physically active' with the notions of working hard, keeping busy and not being 'lazy', which reflected traditional family values. Several participants referenced how the family values of working hard and not being lazy were important cultural beliefs passed down to them by their parents (from childhood), which had a profound impact in shaping most periods of their lives. They used terms such as 'very active', 'hard working', 'agile' to explain their parents' activeness:

Yorubas, we believe in working hard. My mother always says that, if you are lazy that person cannot prosper, so you must be active, you must work, you should be agile. You cannot be lazy with my mother. My mother and father were very active. They go to farm, they work, and if they are going far places, they will have to walk. If they want water, they will fetch it, if they want to cook, they will have to fetch firewood. Anything they wanted to do, there is physical activity. So, as their child, you cannot just sit down doing nothing. Even if you want to be lazy, they will not allow you. They will make you work; they will send you to the farm. P29

My parents raised us to be hardworking. Yoruba culture does not allow laziness, so in my family, it's important for someone to be active. Because as the saying goes: an idle hand is the devil's workshop. One is not supposed to sit down and not be involved in anything. The mind will be turned towards evil. That is why it was important for us to be active right from childhood. No matter the work my parents did at home, I helped them. P06

When talking about physical activity in early life, most participants shared stories about how they grew up in villages before moving to Ibadan. Many of these participants reminisced about growing up on the farm, describing their activities as helping their fathers with farm work and their mothers with trade and chores around the house. For instance, P21 and P25 recounted their farming activities as follows:

I grew up on the farm, my father had a farm, and we used to plant rice, maize cassava, cocoa, kola nut, banana, and orange. When I was young, when I go to the farm, that was when I was most active. Saturdays and Sundays were farm days. When we go in the morning, we would weed the grass, fetch water from the stream, plant, and harvest. We planted maize, cocoa, coco yam, coffee, and palm. When the sun gets hot by 12, we will go under the shed to rest. We go back to the farm by 4. P21

During my childhood days, my father had a big farm, a large cocoa plantation, kola nut plantation too. When I return from school in the afternoon, I will go and meet my father on the farm. Before I return from school, my father would have allocated my work for me, he gives me portions to work on and will ensure that I finish them before he and I go home. Maybe at 7 pm, we will return home from the farm. P25

When asked why they considered farming a physical activity participants responded:

I was doing [farm work] because I was helping my father to sustain our livelihood with anything that we could get from the farm. I wasn't consciously exercising. I didn't even know that I was exercising parse, but then for somebody who goes to the farm, and you worked vigorously, you get very tired. P22

Farming is a physical activity because you are working all day clearing the land, cultivating, and harvesting, and you sweat a lot. It is a very physical activity. P16

Additionally, P01, P12 and P23 recounted how they walked long distances hawking food or goods for their mothers and then coming home to help them with household chores:

My mother was a trader. When I was in primary school. I used to help her to sell dry rice and fish. I will trek 7 miles in the village, 7 miles with load on my head. And after getting home again, I will help her with work at home. P01

My mother was selling clothes. My sisters and I sold the clothes for her. We went to the school in the morning, we returned in the afternoon, and we prepare lunch. Immediately we took our food, we will walk around, we will be hawking around the village selling clothes from the afternoon till evening. Then in the evening, we will walk to a market, a very big one. We go there to sell, and then we will return home at 8 o'clock in the evening and when we got back, we will prepare our food, so were very active then. P12

My mother used to sell food. So, I knew when I was 8 years old, I used to carry food about, selling food about. That was after school. I will trek for about four

to five hours selling. And then I would go to out at night with my father between 9'oclock and 10'oclock to hunt. You know a hunter will go out in the night. P23

7.3.2 Leaving Parental Home

However, most participants noted that they had left their parental homes in the villages and moved to the city of Ibadan - mostly during their early adulthood - for reasons including higher education, to earn a living, or after getting married, which brought about a shift in some of their childhood practices of physical activity. For instance, many participants stated that they had discontinued farming altogether because they had left their parent's homes and moved on to other life pursuits and that living in the city did not support owning farmlands like in the villages. P02 expressed:

Since I left the village, I haven't been able to do farm work as we did before. When I moved to Ibadan I started working as a teacher, so those were the old village days. In the city, you can't even own farmland because they have built houses everywhere. P02

However, some participants stated that they had adapted their farming traditions even after moving to the city by growing their crops on a smaller scale in their backyards. For instance, P30 stated.

I still grow food in my backyard to this day. Of course, it is not as big as our farms in the village. But I grow vegetables like tomatoes, okra, and cassava. I regularly work in my garden planting, cutting grass, hoeing, and harvesting. P30

7.3.3 Playing sports in school

While narrating specific moments in their life where they felt they were particularly physically active, many participants recounted taking part in different sports activities during their school days, as part of their extra-curricular activities. Several of the participants often viewed engaging in these activities merely as a form of competition and socialization with their friends and schoolmates, which they had enjoyed. In their narratives, they fondly reminisced about the fun and excitement of playing sports during their youth. For example, P09, P07, P20 and stated:

When I was in secondary school, I used to run for the school. There were competitions I used to represent the school. Ah, those days, I ran very well. I still have my certificates. I really enjoyed it. P09

I used to play volleyball when I was in teachers' training college. I love sports. You just have to have one thing or the other done in school, you have to do one sport or the other. But for me, I loved playing volleyball the most. P07

In my youthful days, we played football and table tennis with my friends in school. We played football after school in our neighbourhood. P02

7.3.4 Leaving school

While enjoyable, many participants stated that they had discontinued participating in any sports activities on leaving secondary school or college. This was true of female participants in particular. Some women explained that they had gotten married soon after leaving school and thus prioritized other responsibilities such as housework and childcare, which left little time for sports or other recreational activities in this period of their lives. For example, P34 explained:

I didn't play any sports again after I left school. After you get married and start having children your priorities change. There is a restriction to what you can do. You are a woman now, so you have to focus on your family. You don't have time for that anymore. You cannot be seen outside playing. P34

In contrast, several male participants stated that they had continued playing football beyond school, despite some life transitions such as getting a job and getting married/raising children. P26 stated:

I played football even after getting married. I played with a local club in my neighbourhood. Mostly in the evening when I finish work, I will go there to play. P26

However, these men disclosed that they had eventually dropped playing football as they grew older, because they felt it was no longer considered appropriate to play outdoors. They viewed themselves as too old to be playing sports, particularly those who had retired, who felt life after work was a time for them to rest. Some also raised a concern about how their local community had stereotypes associated with age and

playing sports. These participants explained that sports were culturally perceived as activities for children and younger adults and thus participation by middle-aged or older adults was deemed unusual. For instance, P21 and P20 explained:

There is a limit to the sports that one can do with my age. I live in a semi-urban area, and people there they start wondering when they see you engaging in sports, what is this man looking for, what does he want? When they see you, they start wondering, you are not a young man, if you are a young man, they will say he is a child, he is just playing. And for me to say I am playing, playing for what? It is only common in elite environment, not in our environment. P21

If I play football now, some people may think that “what is this one doing now? it is what his children are supposed to be doing not him”. But for the people that have understanding, they will know that it’s a normal thing. But unfortunately, people, where I live, do not have that understanding. P20

7.3.5 Getting married and raising children

Nevertheless, the notion of physical activity as ‘working hard’ was also reflected in their narratives around the obligations of fulfilling family responsibilities, after leaving their parental homes. Most male participants stated that after getting married they worked hard to establish themselves financially to take of their family. For example, P25 stated:

I got married immediately after I finished school and, I didn’t have a job then. But when you are married, as a man, it is your responsibility to take care of your family. They have to eat so you have to be active, you can’t be lazy. There is no shortcut to making money. You have to work hard to provide for your family. My father would say you have, whatever you are doing use your energy. I learnt from my mother that I needed to make money by selling something. So, I learnt to trade. I used to travel to different parts of country to sell cocoa and kola nuts.

Female participants in this study emphasized the transition from their parental home to their marital home and becoming a parent as a significant moment in their life, that instigated changes in their roles and responsibilities towards family. These women often framed “being active” - at those moments in time - in relation to their positioning within the customary norms around women’s roles as wives and mothers within the home. For example, being primarily responsible for housework and childcare, these women felt that they had spent most of their time ‘working hard’ by

taking care of their children and homes, even though none of them participated in structured physical activity outside their daily routines. Participants identified their homes as the key spaces in which they were particularly active. They explained that most of the housework such as cleaning the house, fetching water from the well and washing of clothes required a considerable amount of physical energy because they mostly did them by hand and relied little on any form of technology. In addition to these household responsibilities, almost all of these women stated that they were employed full-time or had their small-scale businesses to help support their family. For instance, P01 narrated:

You know when I got married and started having children, I didn't have any house-help, I did the work all alone until my children grew up. You know in our culture, the woman is supposed to take care of the home and family, it is our duty and I take pride in it. I have a daughter and four boys. I did all the household activities, and you know that is physical work because we don't use any technology. I was also teaching at that time, so I will go to work, and when I come home, I will sweep, scrub the floor, do the cooking, wash our clothes with my hands, then will look after my children. All these kept me very active and busy throughout the day and all the time. I did not have time for anything else.

Regarding their feelings towards housework, some of the women felt that their housework was demanding, and they had often felt overwhelmed and stressed juggling these responsibilities. For instance, P12 expressed how stressful she found that period in her life:

When I was taking care of my children, that time, because I didn't have any help, I went through so much stress. Every morning I had to prepare their breakfast and get them ready to for school. When I come back from work, I will go and pick them up from school, I will go and fetch water from the well, I wash their clothes, cook for them, clean the house. I was always on my feet. Too much pressure of having to do many things. It was very overwhelming for me.

Others stated they enjoyed doing these chores and felt some sense of fulfilment taking care of their homes and family. For example, P15 stated:

I enjoy doing my home duties. I care for my husband and children, that's what I do. I know the importance of caring for your family, and I don't let anything interfere with taking care of my family. I take so much pride in doing it and to the glory of God, my family is doing well.

Although having devoted much of their adulthood to caring for their home and family, many of middle-aged women stated that having their children grown up provided some relief from childcare. Some of these women also revealed that their adolescent children normally helped with most of the housework, which allowed them time to rest and focus on their work or businesses. For instance, P14 stated:

Now, that my children are not little anymore, I do less work. You know the challenges of raising your children is no longer there. My youngest child is 14 years now so I can tell him to wash clothes. My children do all the work in the house, and they cook too. I still go to the market and cook when I feel like, but they are here to help me. When I come back home from work I can rest.

However, some middle-aged and older women expressed that they have had to take up their household responsibilities after all of their children had grown up and left home. For instance, P12 stated:

My children were helping before. When they were living with me, I didn't have to worry about the house. But I think I became lazy at the time, but they are all married and it's just me and my husband left in the house. Even though I don't have children to take care of, I have to take care of the house. Cleaning of the house, washing and preparing food. I am definitely more active now

7.3.6 Retirement

Many older participants in the study identified the transition from work to retirement as a significant turning point in their lives that created new patterns of activities, which involved lesser practices of physical activity. For instance, P26 stated:

I retired five years ago and the things I do now are not energy-sapping like what it used to be. I still have the energy, but I have nothing to do. P26

Some of the older adults in the study, particularly those that were retired, viewed old age and retirement as having earned them the right to rest, which meant them leaving their homes less frequently and engaging in fewer physical tasks. For example, P24 stated:

Since I retired two years ago, I have not been doing much activity to be honest. You will mostly find me at home, or I occasionally go out to see my friend. [...] I have been very active almost all of my life. I have worked very hard and now

my body is tired. I am not as agile as I used to be. So now that I am retired, I think it's time for me to relax. P24

This belief was also shared among some of the participants' family members, as several older participants stated that their children discouraged them from doing any exercise because they viewed ageing and retirement as a time when one should be resting, and not 'stressing oneself'. For example, P33 and P32 stated:

Now that I am retired, my children think I should be slowing down. They think I should be resting and if I do any exercise, it will affect my health. If they find me doing anything physical, they get upset with me. P33

When I used to have a shop in the market in town, I went there every day, but my children asked me to let go of it. They said I am getting older and shouldn't be stressing myself going to town every day. My son opened a shop for me in front of my house, so I don't have to be leaving the house often. P32

7.3.7 Type 2 diabetes diagnosis

For many participants, the notion of physical activity as exercise was only introduced into their lives after being diagnosed with type 2 diabetes. While most participants shared similar cultural values related to the significance of keeping active, it appeared that engaging in physical activity for health purposes (exercise) had not been a common practice in the everyday lives of these participants. For instance, P01 and P27 expressed:

I only found that being active was good for my health after discovering I had diabetes. I didn't even know what it was called exercise. What is exercise? I was just active from all the physical work I used to do in the house. P01.

When I was young, I didn't know [being physically active] has something to do with my health. I didn't know the benefits when I was growing, it was when I got old, I knew the benefits. I didn't know it has any correlation with diabetes. P27.

Participants felt that the cultural perceptions around physical activity were that 'being active' for a productive purpose and exercising for no productive reason was considered a waste of time. For instance, P22 explained:

People here, we don't know anything about exercise. We are very active people but it's all productive. Anything you do must be productive. If you are seen exercising for no productive reason, people will think you are going crazy.

However, only about one-third of participants reported purposely incorporating some form of physical activity into their management practices. Many participants alluded to the fact that engaging in structured exercises was alien to their lifestyle, and any significant physical activity they engaged in occurred as an incidental part of their daily activities.

7.3.7.1 Daily Activities as Exercise

During the interviews, some participants suggested that while they had not made significant modifications to their routines to incorporate more exercises since their diagnoses, they considered some of their daily routine activities to be exercise. Female participants in the study often framed their exercise practices around their household and caring responsibilities. For instance, some female participants believed that being occupied (throughout the day) in their homes with housework such as cooking, sweeping, and mopping the floors, fetching water, washing clothes and dishes, and taking care of their family provided them with adequate sources of exercise. Thus, engaging in exercise outside of their daily routine was often not viable. For example, P05 stated:

I am always busy; from the time I wake up in the morning until I go to bed. From 7 o'clock in the morning, I am walking around the house, cooking breakfast, cleaning, getting the children ready for school, sweeping the house, going to my cleaning job, cooking dinner until around 9 o'clock in the night, I'm doing something. All these things, I believe are enough exercise. I get very tired and don't have time to squeeze in any more exercise. P05

Most of the male participants in the study did not describe engaging in household tasks as part of their daily practices, which underlines the gender norms related to housework and caring responsibilities within the Yoruba culture. However, a few male participants cited engaging in tasks such as gardening and poultry as activities they

performed that counted as exercise. For example, when asked what exercises he performed, P26 stated:

I work in my garden. I grow plantain, green vegetables and tomatoes. I weed the grass, plant, and harvest. I sweat a lot working there. That is exercise. P26

Among participants, walking was the most frequently mentioned activity that participants counted as exercise. Some participants described regularly walking to and from everyday places that were within walking distance from their homes. For example, P06 stated:

My house is not too far from my school where I teach. So, in the morning I trek to the school, if I'm back going home in the afternoon, I will trek. I trek every day. P06

Some participants in the study did not own a car and relied on public transportation for their daily commutes. As such, some felt that they get some exercise from walking to and from public transport modes. For example, P16 stated:

The only exercise I do is if I am going out, I walk a distance to take a bike. Knowing that at least I will have to walk from my place to the place where I can get a bike, I will get some exercise. And that is the amount I do.

Some participants also reported deliberately incorporating more walking into their public transport commutes, or choosing to walk to destinations, to fit exercise into their routine. For example, P15 and P25 stated:

As for me, I am active. I do a lot of walking. Sometimes on Saturday, I drop whatever I bought in the market, give it to my husband, and take the bike home. There is a distance where I will be dropped, it's about 1km, I like to walk it. P15

When I take public transport, I ensure I walk for about 15 to 20 mins to exercise my body. Sometimes, where I'm supposed to a taxi or bike, I walk instead. P25

Additionally, several participants also described going to the market and walking around from stall to stall as an activity that they considered exercise. For example, P12 stated:

I go to the market at least once a week. When I go to the market you know I must walk a lot, I will walk for up to two hours, and it is helping me because it is a sort of exercise too. P12

7.3.7.2 Structured exercises

Only about one-third of participants in the study reported taking time out to engage in more structured forms of exercises outside their daily routine activities, since diagnosis. Among participants who reported actively incorporating exercise practices as part of their diabetes management, leisure walking seemed to be the most common form of exercise practice. Some of these participants reported taking walks around their neighbourhood and/or compounds during their leisure time. Several others also reported walking around the house after meals as advised by their healthcare professionals:

The doctor said I should be walking regularly. But I don't do it every day. Maybe two times a week. I walk around the compound like 10 times then I go back inside the house. P28

The dietitian told me to do more walking, especially after the meal. I go to work during the weekdays but during the weekend, I take a stroll, around my neighbourhood. P25.

A couple of male participants reported engaging in aerobic exercises in their homes, including push-ups and jogging around their compound a few days a week:

When I get home from work, I relax, eat and then I just do some push-ups for like 10 minutes to help the food go down properly. P11.

Sometimes I jog inside the compound, there is a way I do it, jogging around you know. I jog within the space in front here. I may programme it like 20 times jogging round. P13.

When asked why they chose to jog around their compound instead of the neighbourhood, P13 responded:

It will be strange. No other person does that. So, I will be the only one jogging. They will be like what's wrong with this man, is he okay (laughs). It's just because of the way our system is. Even when I am taking a walk, they expect me to have a destination. So, when I decide to make a U-turn back home,

people will be staring at me, like what is wrong with this person? So, you can imagine jogging every week.

One of the concerns raised by participants towards performing exercises such as brisk walking and jogging in their neighbourhood was due to negative social perceptions around these forms of exercise in their local communities. This was mostly attributed to the low levels of awareness about the significance and health benefits of exercise among members of their community. Many participants noted that it is uncommon to see people, especially middle-aged or older people, engaging in more structured or leisurely forms of exercise in their local communities:

It's not easy for an average Nigerian, nothing is wrong with your health, and you are just exercising. It is not part of us. We don't exercise in Nigeria. We don't inculcate that habit. We don't know the benefits of exercise. Like in western countries now, you will just see people after their day's activities, they will go to the gym, even if they don't want to go to the gym, they will just move out, you will flex your muscles. Everybody does it. But here nobody does it. P13.

Additionally, some participants expressed fears about being stigmatized due to having diabetes and therefore did not feel comfortable performing some exercises, particularly in public spaces. Participants felt that certain exercises may raise questions about their health status, which they prefer not to disclose to others outside of their close family members. As such, participants described feeling more comfortable exercising in their own spaces, in private, to avoid any 'raised eyebrows'. For instance, when asked why he preferred to jog inside his compound rather than outside in the neighbourhood, P11 explained:

You know most people here [in my neighbourhood] are not that educated. We have people that do not have beyond primary school certification. They would like to know what is going on with someone, why is he jogging? They do ask questions a lot and I want to cut that off. I don't want them to know so much about me. Especially when it comes to the issue of health. And you know diabetes is not even a death sentence, but the way people think in this [neighbourhood], stigmatization will occur. There was a time I lost so much weight before I visited the clinic. I do engage in photography too, so I went to the lab to print out pictures, a friend (that we used to talk) was like trying to

avoid me because he was thinking: what is wrong with this guy, why is he skinny like this? You know things like that, people like that, if they get to know more about someone, they may have a different view concerning your health. That is why I don't want everybody to know. That is why I jog inside my compound, there is a fence here, there is a gate. People will not see what I'm doing inside. P11

7.4 Summary of Key Findings

One of the main themes that emerged from the life history narratives is how practices of “doing physical activity” and the disposition to “being active” were associated with the presence of participants’ shifting social roles within participants’ life trajectories. Family responsibilities through caring for and helping family members and housework appeared to be a significant theme in participants’ understanding of the meaning of “being physically active” at different life course stages.

The study found that physical activity patterns varied across their life courses. Early life experiences of farm work in the villages constituted one of the physically active periods in the life trajectories for most people. Farming was also significant to people’s cultural upbringing of hard work and not being lazy. Additionally, travelling long distances by foot to trade was part of people’s daily practices. However, leaving the parental home and migrating to the city during early adulthood provided fewer opportunities for farming and walking as part of everyday life.

During transitions to marriage and parenthood, women were less involved in leisure-time sports and played activities as they prioritised their time attending to their new responsibilities of caring for their home and family. Engaging in housework and caring practices was considered their primary source of physical activity. However, their patterns of participation varied through mid and late adulthood, as they experienced changing contexts of family life. In contrast, while transitions to marriage and parenthood signified a decline in engagements in housework practices for men, they continued to engage in leisure-time physical activity such as street football beyond school, even while working and starting a family. However, these activities were

mostly discontinued during mid-adulthood as it was no longer deemed age-appropriate to play outdoors.

Later life-transitions such as retirement is identified as a turning point that created new patterns of daily practices, involving more sedentary practices and fewer physical activity practices. Retirement was often viewed as a time for rest and being looked after, especially after a life of 'working hard'. Many people had not made connections between physical activity and health prior to their type-2 diabetes diagnosis, as engaging in physical activity for health and fitness purposes was not part of their lifestyle.

The study revealed that many participants did not actively engage in exercise practices specifically for health purposes. The few participants who reported actively integrating exercise as part of their diabetes management practices seemed to do so on a more sporadic basis rather than having a regular pattern. Among participants, exercise practices were mostly the result of routine activities of everyday life, particularly household chores, and active transportation.

Correspondingly, several participants during the interviews expressed concerns about participating in some exercises such as sports, brisk walking and jogging in public areas, because of the social perceptions and negative age stereotypes attached to these forms of exercise in their local communities. Some people also expressed fears about being stigmatized due to having type-2 diabetes, and therefore did not feel comfortable performing some structured physical activity practices, particularly in public spaces

In the following chapter (chapter 8), I explore in greater details participants' knowledge about physical activity as part of diabetes management.

Chapter 8: Knowledge of Exercise as Part of Diabetes Management

8.1 Introduction

This chapter presents the data analysis and findings from the preliminary interview study, which aimed to examine the following questions: What are the primary sources of health information regarding exercise as part of diabetes management among patients with type 2 diabetes at the University College Hospital (UCH), Ibadan? What do these sources say about exercise as part of diabetes management? In what follows, I describe the data analysis process, present the data analysis findings, and provide a summary of the key findings.

8.2 Data Analysis

In this chapter, I conducted a thematic analysis (Braun & Clarke, 2006) to examine how people with type-2 diabetes construct knowledge about exercise and the role of healthcare professionals in promoting physical activity for diabetes management. The thematic analysis incorporated both deductive (top-down) and inductive (bottom-up) approaches, drawing on themes guided by the research questions and allowing for corresponding sub-themes and codes to emerge from the data (Braun & Clarke, 2019).

The data for the analysis included preliminary interview transcripts of thirty-five participants, informal conversational notes with healthcare providers at the diabetes clinic at UCH, and informal observation notes taken during diabetes health talks at the clinic. Although the findings of this analysis mainly drew upon the data collected through narrative interviews with patients, information gained from informal conversations with healthcare providers and informal observations at the diabetes clinic supplemented (and contextualised) those interview data. I included informal discussions and observations because I wanted to explore the perspectives of relevant healthcare providers regarding exercise, and their roles in providing information about exercise as part of diabetes management. Therefore, data from these informal conversations and observations were used to expand and corroborate the

understanding of how patients with type 2 diabetes at UCH, Ibadan, acquire knowledge about exercise as part of their diabetes management and how this knowledge is applied to their diabetes management practices.

The data analysis adapted the six phases of thematic analysis proposed by Braun and Clarke (2006). The first step of the analysis involved deductively identifying two overarching themes (independent of the data) that were important for the research questions. The two themes established to reflect the research questions were: the sources of obtaining health information related to exercise as part of diabetes management, and health information received from each source. The themes were then used as frames from which relevant codes and sub-themes emerged.

The next step of my analysis involved reading through each transcript of my preliminary interviews to get a general sense of the interview data. This process was followed by closely reading each transcript to highlight discussions relevant to the themes identified. I employed a colour-coded system to organise and categorise the highlighted texts into the three overarching themes. I used NVivo, a qualitative data analysis software, to help organise the transcripts and systematically code and categorise the data.

After filtering and categorising the interview transcripts into discrete, thematically organised data sets, I initiated an inductive line-by-line coding of the data within each overarching theme to identify sub-themes that emerged from the data. Upon completing the initial coding process, I conducted a focused coding process where I closely reviewed the initial set of codes to identify patterns representing relationships among them that could be clustered to form potential categories. This process led to the iterative refinement of the initial codes and the generation of a set of categories and sub-categories that were deemed significant for the research questions. I further reviewed the emergent sub-categories against their related overarching themes to make sure that the themes were consistent with the data.

Before finalising the themes and emergent sub-categories, I revisited my research journal to review data that may be relevant for the analysis and provide a broader context to the emergent ideas related to the role of healthcare providers in delivering exercise health information to patients with type-2 diabetes. Therefore, I read through my research journal to highlight information related to these discussions and observations for this analysis. I then transcribed the highlighted handwritten notes into Word documents, which I uploaded onto NVivo for further analysis.

The field note analysis followed a similar coding process to the interview transcript analysis. I read through the transcribed notes line-by-line, applying generated codes from interview data (where relevant) and adding new codes emerging from the data. I then iteratively cross-compared emerging principles and associated data excerpts from the field notes with those from the interview transcripts to explore commonalities (and differences) in perspectives. This process allowed for existing categories to be refined and new categories to emerge (when dissimilar data were identified). I further explored relationships and patterns across categories, clustering relevant categories around the overarching themes. Throughout the data analysis, I wrote memos within NVivo to record my developing insights and interpretation of the analysis. Some of these memos also guided me in drawing connections and comparisons across data sources. In the final phase of my analysis, once I gained a sense of how the themes and categories fit together, I refined and defined the descriptive labels of the overarching themes to capture my interpretations better.

8.3 Findings

In this section, I discuss the findings of the data analysis based on the two overarching themes: healthcare providers as primary information sources, and exercise information provided by healthcare providers.

8.3.1 Theme 1: Healthcare Providers as Primary Information Sources

Patients with type-2 diabetes receiving treatment at the diabetes clinic at UCH receive knowledge about diabetes management including exercise primarily through multiple healthcare professionals at the hospital. These include endocrinologists who offer consultation to the patients during their appointments, health educators and dietitians, nurses, as well as lectures offered by the Diabetes Association of Nigeria (DAN) support group at the hospital. Participants acknowledged the aforementioned healthcare professionals as their main information sources regarding exercise as part of their diabetes management. However, they didn't spontaneously mention whether other information sources were sought. When probed during the interviews whether they used other sources such as digital media and technology to seek information about exercise, almost all participants disclosed that they did not receive information outside of their healthcare professionals. For example, P05 stated:

I only get information [about exercise] from the hospital. I don't know where else I can get such information. P05

The diabetes clinic, at the medical outpatient clinic (MOP) UCH, Ibadan, runs every week on Mondays, where newly referred patients and follow-up patients are seen by endocrinologists. New patients attending the diabetes clinic are typically referred from other healthcare facilities (in or outside Ibadan) or the general outpatient department at UCH, Ibadan. After referral, newly diagnosed patients visit the MOP with their referral letter, where they are received by a nurse to book an appointment for a consultation with an endocrinologist.

During their first appointment at the diabetes clinic, patients go through a consultation with an endocrinologist who conducts initial assessments and orders further tests to confirm the diagnosis. Once diagnosis with type-2 diabetes is confirmed - during their second appointment at the diabetes clinic - the endocrinologists often provide initial advice regarding type-2 diabetes and its management to the newly diagnosed patients before referring them to a dietitian and a health educator at the MOP, for further counselling on the same day. The dietetics

unit and health education unit located at the MOP offer separate one-on-one diabetes counselling to patients on a referral basis, for a fee.

The health education unit provides more general diabetes education and counselling to newly diagnosed patients including information about what diabetes is, and how it can be properly managed. The health education unit also provides group health talks related to diabetes and its management to patients in the waiting area before the start of every diabetes clinic session. On the other hand, the dietetics unit provides more specific counselling and recommendations related to the nutritional management of type-2 diabetes. After the first consultation with the dietitian, patients are then booked for a follow-up appointment. Additionally, the Diabetes Association of Nigeria (DAN) support group (whose office is also located at the MOP) provides support for patients with type-2 diabetes and organizes regular group diabetes health education for its members on the first Monday of every month. Patients could be introduced to DAN through recommendations by their doctors, health educators, family and friends, or other members of the support group. Patients with type-2 diabetes can register to the DAN support group at MOP for a fee.

8.3.2 Theme 2: Exercise health information provided by healthcare providers

This theme provides a more detailed account of the exercise health information provided by these healthcare providers that provide support for diabetes patients at the MOP, UCH, Ibadan.

8.3.2.1 Diabetes health education by health educators

8.3.2.1.1 One-to-one health education

Through an informal interview with a health educator at the medical outpatient clinic at the UCH, I received some insights into the health educator's perspective of the education processes involved after a patient is diagnosed with type 2 diabetes at UCH. The health educator I spoke with stated that their role in supporting diabetes management is to provide counselling and education to new patients diagnosed with type 2 diabetes. The health educator explained that the health education unit serves

as a referral centre where several endocrinologists offering consultation during the diabetes clinic refer newly diagnosed patients with type 2 diabetes for counselling and education. However, during the interviews, when asked about their sources of information regarding physical activity, only a few patients explicitly mentioned being referred to health educators by their doctors for counselling and education. Several participants stated that they were being referred to the dieticians at the clinic by their doctors for dietary advice after their initial diagnosis. To clarify, I asked the health educator whether every newly diagnosed patient is being referred to the health education unit. The health educator responded that while it is expected that all newly diagnosed patients with type-2 diabetes receive counselling and education through the health education unit, some endocrinologists at the clinic do not refer their patients to them. The health educator also stated that some patients do not follow through with the referral, mainly to avoid the extra cost of counselling.

After referral, the health educator explained that they first provide the patient with a questionnaire comprising 25 - 30 questions relating to different areas of their diabetes care, including questions about their knowledge of diabetes. After completing the questionnaire, the health educators take them through a “partially structured” diabetes education based on their responses. The health educator explained further that they begin the education with an explanation about what type 2 diabetes is, its causes, risk factors, and complications associated with type 2 diabetes. The health educator also elaborated that they typically use posters with images and graphical illustrations to help explain some concepts to the patient.

According to the health educator, another aspect to their education involves emphasizing the lifestyle modifications required for controlling type 2 diabetes by explaining the relationship between diet and regular exercise in controlling their blood glucose levels. With regards to diet, the health educator stated that they advise the type of food, amount, and timing of meals appropriate for diabetes management. With regard to exercise, they mostly advise patients to integrate physical activity into their daily chores and activities.

When asked whether the health education unit provides follow-up health education to their patients, the health educator stated that they do not offer any regular one-on-one follow-up with patients. However, the health educator stated that they offered group diabetes health talks to patients during the weekly diabetes clinic at the medical outpatient clinic (MOP) to enlighten patients and their family members about proper diabetes management.

8.3.2.1.2 Group health talk

During one of the weekly diabetes clinics that run every Monday, I sat to observe the health education that takes place before patients receive a consultation with their endocrinologists. When patients arrive at the clinic for their routine appointments, they gather in a general waiting area while they wait for their files to be sorted and taken to their respective doctors. While patients (and their family members) are seated in the waiting area, a nurse from the health education unit comes to provide a general health talk (in both Yoruba and English) to educate them about type 2 diabetes and its management. The health talk I observed focused on education about what diabetes is, the causes of diabetes, complications related to diabetes, and ways to manage type 2 diabetes to prevent complications. The nurse also used a poster as a visual aid to illustrate what type-2 diabetes is and how it affects the body. Talks around diabetes management involved advice related to appropriate diet, foot care and exercise. This was consistent with the topics the health educator highlighted as being covered during the one-on-one counselling with the health educators.

Regarding exercise, the nurse encouraged patients to take daily walks, especially after meals. The nurse also demonstrated some stretching exercises patients could do in their homes as part of their exercise routine. During the interviews, only two participants referred to the health talk offered in the waiting area as their source of information about exercise. When asked about the exercises she performed as part of her diabetes management, P10 described a stretching routine which she stated she had learned from the health talk in the waiting area:

I do exercise on my bed by folding and stretching my arms and legs for about 50 times before I get up from the bed. That is what we were told to do by the nurse in the waiting area. P10.

During the health talk, from my observations, many patients and their family members seemed to be passively listening rather than actively engaging with the nurse giving the talk. While the nurse offered an opportunity to ask questions, only a few of the patients asked the nurse questions during the talk. Some patients appeared uninterested (or lost interest) in the talk and were mostly engaged in conversations with their family members. Additionally, the waiting area where the health talk took place is in an open area right beside a corridor leading to the MOP. Therefore, there appeared to be a lot of background noise and distractions caused by passers-by and people walking in and out of the waiting area. I also observed that some patients arrived after the health talk had begun and thus missed some parts or all of it.

8.3.2.2 Exercise health information by Dietitians

Dietitians at the MOP clinic at UCH provide nutritional management counselling to patients with type-2 diabetes on a referral basis. About seven participants in the study identified the dietitians at the MOP clinic as their primary source of information about exercise as part of their diabetes management. These participants stated that their doctors had referred them to dietitians for dietary advice after being newly diagnosed with type-2 diabetes. While the advice offered by the dietitian appeared to focus more on the nutritional aspects of diabetes management, information about exercise was also discussed, albeit in relation to dietary management. Participants who received advice on exercise from the dietitian stated that the dietitian mainly advised them against sitting after meals and encouraged them to walk around after eating their meal. For example, P05 explained:

The dietitian gave me a breakdown of what I can eat: breakfast, lunch and dinner, and the timing. That I can have my breakfast between 6 and 7 am, then I can have my lunch between 12 to 2pm, then dinner between 6 to 7. Then the quantity too, that it shouldn't be bigger than my fist. Then I should have more of vegetables with it. Then after food, I should make sure I don't sit in one place, I should walk around to help the food to digest well.

Similarly, P15 stated:

The dietician said that after eating, I shouldn't sit at a spot, that I should exercise. He said that I can walk to and fro, even inside my house.

8.3.2.3 Diabetes Association of Nigeria support group monthly health talks

Another medium through which patients with type-2 diabetes at UCH Ibadan receive knowledge about exercise is through the monthly health education sessions organised by DAN, Ibadan. DAN, Ibadan is a diabetes support group that organises regular group health talks at the MOP clinic on the first Monday of every month. During these sessions, a team of relevant healthcare professionals, including dietitians, health educators, endocrinologists, and physiotherapists, come together to educate patients on diabetes management. About eight of the participants interviewed stated that they attended the health talks offered by DAN, where they mainly received information about exercise. Some of these participants mentioned that a physiotherapist sometimes comes to specifically give them advice about exercise as part of their diabetes management during some of the health talks. For instance, P07 stated:

During the DAN meetings, we have a physiotherapist that comes, Dr... I can't remember his name; he sometimes comes to give us lecture on physical exercise. He comes to talk about the effect and the essence of doing physical exercise as a diabetic.

Almost all the participants who attended the DAN health talks identified brisk walking as the form of exercise which the physiotherapist mostly recommended.

In the diabetes association, the physiotherapist told us to be brisk walking on a daily basis, that we can walk 10 to 30 mins in a day. P34

The commonest exercise that is advised [in the DAN meetings] is brisk walking, morning and evening, at least about 30 minutes. P24

He [the physiotherapist] said we should be brisk walking, after we've taken our food, we should walk for 30 mins. P28

Most participants who regularly attended the DAN health talks appeared to express a greater understanding of the role of exercise in their diabetes management than many who did not attend any of the DAN health talks. During the interviews, many of the

participants explained what they had learned about the relationship between exercise and type-2 diabetes, highlighting some of the associated benefits of exercise and the negative consequences of prolonged sitting:

I learnt that the body, we have type I, type II, you know some people don't produce insulin at all, some people, the body using the insulin, that's the type I have, type II. By doing exercise will help, will make the pancreas work better.
P16

Additionally, this group of participants generally demonstrated a positive attitude towards the education received during these sessions, which was mostly referenced as a form of informational support in learning how best to manage their diabetes. Many of the participants expressed that the health talks have been beneficial in helping them understand how to modify their lifestyle, monitor their blood glucose levels, care for their feet and avoid complications, and apply these learnings to their diabetes management:

The diabetes association, they are really helping, because they invite the doctors and dieticians. So, they come and give us lectures on how to manage our condition. The type of food that we should eat, the exercise we should do and if there are any problems like bruises or wounds, what we should do. Then our eyes, how we should take care of them. They give us all these lectures. P12

Since I was diagnosed, I have been attending the DAN meetings. When you attend these meetings you will be educated, the doctor, the physiotherapist, the dietician, they come to educate us on what to do and what not to do. And since then I have been living a healthy life. P23

For the participants who did not mention attending any of the DAN health talks, several of them stated that they were not aware of the support group, as it had never been mentioned to them. For instance, P19 stated:

I don't know about any diabetes association, no one told me about it, but I adhere to the advice given to me by the doctor.

Others expressed awareness of the DAN support group, stating that it was recommended to them but had not signed up or attended any of the meetings. P35 stated:

After I was diagnosed, they told me about the association, but I have not joined because you have to pay to register, and I am already paying a lot of money for my treatment.

8.3.2.4 Exercise health education by endocrinologists

More than half of the participants interviewed identified the endocrinologists at the diabetes clinic as their primary source of information regarding exercise. These participants stated that their doctors had provided them with some information regarding exercise as part of their diabetes management, particularly during their initial diagnosis. However, the level of details received appeared to vary notably between these participants. A number of participants recounted being given explanation as to how exercise might benefit their health. For example, P11 stated:

The doctor told me that I have to be physically active, that after food I have to do some exercises like to make the food go down, so that the pancreas and the other parts of the body will work adequately. That's what he told me.

On the other hand, other participants appeared to be given relatively superficial information related to exercise. Some of these participants noted that the doctors were not explicit as to what exercises they should engage in, or why they should be exercising as part of diabetes management. For example, P19 stated:

The doctor talked to me about exercise but didn't specifically tell me the type of exercise to engage in, but I was told not to sit too long on a particular spot.

When asked why they thought they did not have sufficient details about exercise, several of these participants felt that very little communication related to exercise as part of their diabetes management took place with their doctors during their routine appointments at the clinic. Several participants felt that their doctors focused more on other aspects of diabetes management such as medication and diet, rather than

exercise. Some participants even noted that exercise had not been mentioned again at any future appointments, since their initial diagnosis:

When I go to the hospital for my check-ups the doctors always emphasise on medications and healthy diet, but they rarely talk about exercise. P09

Although these participants felt they were not sufficiently informed, most of them stated that they did not seek further information regarding exercise. When asked why they did not ask further questions, some of the participants stated that they did not necessarily know the appropriate questions to ask:

I don't think I have enough information [about exercise]. But I also take responsibility because, I didn't ask questions. But the issue is, I don't know what [questions] to ask, this is all new to me, I think they [the doctors] should have told me a bit more.

Others stated that they did not ask questions because they felt exercise was not regarded as a priority in controlling type 2 diabetes:

They [the doctors] didn't advise me much about exercise. It is not the priority during our appointments. I think, maybe it [exercise] is less important. So, I don't bother myself much about it. I am not sure it a priority for me.

Similarly (additionally), when asked why she did not seek further knowledge about exercise, P03 responded:

Is exercise necessary for diabetes? So why the doctors do not emphasise it, just like they do on taking our medicines and monitoring our sugar levels?

While having an informal discussion with a couple of endocrinologists, they expressed concern about having limited time to provide adequate education about diabetes management including exercise due to the high number of patients they attend to during clinic hours. They also stated that for this reason, the dietitians and health educators at the MOP clinic played a greater role in educating patients about proper diabetes management including exercise. The same issue was echoed by the health educator I spoke with, who acknowledged that the doctors were too busy to offer personalised and detailed guidance regarding exercise during consultation. The doctors also felt that only a few patients actively sought information about diabetes

management, while most patients merely passively receive any information given to them. He further elaborated that many patients seeking care at the diabetes clinic had limited health literacy skills, which makes it difficult for them to access and engage with appropriate health information regarding exercise. He attributed patients' limited health literacy to limited education, which he believes has impacted their ability to process information or ask appropriate questions about proper diabetes management including exercise.

8.4 Summary of findings

In this chapter, I explored how people with type 2 diabetes construct knowledge about exercise as part of their type 2 diabetes management. My interviews with people with type-2 diabetes receiving care at the diabetes clinic revealed that their knowledge regarding exercise as part of diabetes management was mainly established through the advice received from their healthcare providers including endocrinologists, dietitians, health educators, nurses, and lectures offered by the DAN support group at the hospital. The main medium used by these healthcare providers to communicate information about diabetes management and exercise is through face-to-face, verbal interaction.

The different healthcare providers shared a similar pattern in the advice that they offered patients in terms of the forms of exercise practices they should engage in as part of their diabetes management practices. They mainly emphasised brisk walking (particularly after meals). However, these healthcare providers varied in the level of details they provided about the role of exercise in diabetes management practices. The findings revealed that the lectures offered during the DAN meetings regarding physical activity seemed to provide more explicit information about why patients should be participating in exercises, as well as the frequency and duration of certain exercises, such as brisk walking.

Nevertheless, many participants did not feel they had concrete details about the health benefits of exercise and how it could be applied to their lives to achieve beneficial results. They associated their knowledge gaps with the limited education

provided by their HCPs regarding physical activity as part of diabetes management. Most people felt that their doctors did not prioritise physical activity during consultations and only provided recommendations that were too generic for their circumstances.

Additionally, many participants tended to be passive recipients of health information related to exercise rather than active seekers. While multiple sources of information were available at the diabetes clinic at UCH, the findings revealed that many participants were unaware of some of these sources, and therefore miss out on some of the health education provided at the hospital. The following chapter (Chapter 9) discusses the findings in relation to the literature.

Chapter 9: Discussion

9.1 Introduction

This chapter discusses the key findings of the main study in relation to the literature and outlines the key contributions of the research. It also provides a discussion of the implications of the findings to public health policy, clinical practice and future research. The chapter concludes with a reflection on the strengths and limitations of the research.

9.2 Discussion of Key findings

In this section, I situate my findings in the context of social practice theory (SPT) and life-course perspective (LCP) while also discussing the findings in relation to the previous work in the literature. The overall aim of the research was to gain a greater understanding of the socio-material and historical dynamics of physical activity participation among people with type-2 diabetes in urban Nigeria. The research moved beyond the traditional behaviour change approaches employed in physical activity promotion research to consider an understanding of the social, material, and historical contexts of people's experiences with physical activity. It extends prior studies emphasising the significance of exploring dynamic relationships - over time - between social practices and people's lives by elucidating this relationship in the context of physical activity.

In what follows, I discuss the findings of this research using the three-element framework (*material, meanings, and competences*) of SPT. Based on this framework, the research identified the significance of being physically active to people with type-2 diabetes in Ibadan (meanings), their knowledge and capabilities to integrate physical activity as part of diabetes management practices (competences), and the contextual influences of their physical activity participation (materials).

9.2.1 Meanings

In this sub-section, I discuss the findings in the context of the 'meanings' element of SPT and its relationship with other elements, and concepts of LCP. The findings from the main study revealed that the significance (meanings) of being physically active was

mainly attributed to familial and cultural values of working hard and keeping busy as part of daily life. Many people value 'being active' as a way of fulfilling family responsibilities at different stages of their life course. For example, the study revealed that early life experiences of 'being active' for most participants entailed helping parents with farm work, housework and small trade. However, the study highlighted gender differences in what entailed fulfilling family responsibilities during transitions to marriage and parenthood.

9.2.1.1 Transitions to marriage and parenthood (Family life trajectories)

For male participants, this transition signified a period of disengagement in housework, owing to the new role of being the breadwinner of the family and the need to work hard to provide sustenance for the family. In contrast, for female participants, transitions to marriage and parenthood represented periods of their lives where they attended to the cultural expectations of taking care of their family and doing housework. This underlines traditional gender norms of women being primarily responsible for housework and caring practices. Despite the increasing women's participation in paid employment globally, women remain primarily responsible for most housework and caregiving activities within the family life domain (Seedat & Rondon, 2021). However, it has been reported that women in LMICs devote more time to housework than those in high-income countries (HIC) (Seedat & Rondon, 2021).

Akanle and Oluwakemi (2012), in their study on the implications of traditionalism on the feminisation of household chores in Ibadan, Nigeria, found that women, regardless of their level of education or economic status, were more involved in housework than their male counterparts. The authors argued that in the traditional African social system, men are viewed as financial providers and breadwinners, and women are viewed as caretakers of the family and home, regardless of their engagement in paid work (Akanle & Oluwakemi, 2012). Particularly in the Yoruba culture, a woman's sense of pride is attributed to her busyness within the home (Akanle & Oluwakemi, 2012). Akanle and Oluwakemi (2012) also suggested that men did not deliberately preclude themselves from participating in housework or caring

activities. However, the social system creates a structural barrier to their involvement (Akanle & Oluwakemi, 2012). Similar findings have also been reported in other contexts, such as India (Beniwal, 2022), Lebanon (Dumit et al., 2016), Turkey (Koca et al., 2009) and Middle-east and North-African region (Chaabane et al., 2021). The findings resonating with Nigeria and the above contexts could be attributed to them being predominantly collectivist societies with patriarchal family structures (Solati, 2017).

Furthermore, the current research found that during their childhood and adolescence, both female and male participants were involved in sports activities in school and unstructured play outdoors in the neighbourhood during leisure time. However, female participants reported discontinuing leisure forms of physical activity after getting married due to social expectations of prioritising their time towards fulfilling their family responsibilities. On the other hand, male participants reported continuing their leisure-time physical activity, such as street football, even while working and starting a family. Although, these activities were mostly discontinued for men during mid-adulthood as it was no longer deemed age-appropriate to play outdoors. The findings correspond with prior studies conducted in Ghana, (Quainoo, 2021), Bangladesh, (Morrison, Jennings, et al., 2019), and India (Garg & Kutty, 2019), where women were found to prioritise family responsibilities over leisure time physical activity due to gender roles and cultural expectations. Similar findings were reported among mothers of low socioeconomic status in the UK (Wittels et al., 2022), immigrant Latina women in the US (Murillo et al., 2021), and Arab immigrants in western societies (Europe, North America, Australia and New Zealand) (Elshahat & Newbold, 2021).

Consistent with the current study, Morrison, Jennings, et al. (2019), in their study exploring factors influencing physical activity participation among men and women in rural Bangladesh, reported that men found it easier to prioritise leisure time physical activity than women due to having lesser work to do in the mornings than women. The authors also reported that while many male participants in their study used to play sports in their leisure time during their youth, as they grew older, they considered

playing sports an inappropriate use of time. In contrast, a study conducted in the US, exploring physical activity barriers and facilitators among working mothers and fathers, found that both working mothers and fathers prioritized family responsibilities over leisure time physical activity (Mailey et al., 2014). Although similar findings to the current study have been reported in other contexts with similar cultural norms, such findings have not previously been reported in the Nigerian context.

Moreover, Garg and Kutty (2019) support the current study's finding that women considered their housework and caring activities their primary sources of physical activity. This contrasts with Morrison, Jennings, et al. (2019) who reported that women did not associate their family responsibilities with physical activity and considered them barriers to physical activity. The findings from the current study suggest that women's patterns of caring and housework activities varied at different stages of their family life trajectories, mainly due to changing family contexts. For some middle-aged women, their children's transitions to adolescence and adulthood relieved them of their caring duties, with grown-up children taking on a more significant number of household responsibilities. However, some of the older women in the study described the transition to an empty nest as a period where they have had to take up more household responsibilities due to their children not being at home to assist them anymore. Other prior studies (Mailey et al., 2014; Morrison, Jennings, et al., 2019; Garg & Kutty, 2019; Murillo et al., 2021; Wittels et al., 2022; Qainoo, 2021;) did not report the influence of transitions within the family life trajectory on people's housework and caring activities. Unlike the current study, these previous studies did not integrate a temporal dimension in their inquiry.

This study is novel in highlighting socio-historical changes within the family life trajectories that influence women's physical activity patterns. This resonates with LCP's principle of linked lives, which suggests that people live interdependent lives and certain events and transitions in the lives of significant others can impact an individual's life (Elder Jr, 1994). The findings also support Greene's (2017) conclusions that social roles and relationships, such as commitments to family, bound people to

certain activities while limiting their capacity to engage in other activities. In a collectivist society like Nigeria, where family values take priority over individual identity, it is crucial to understand physical activity within a relational context of people's lived experiences.

9.2.1.2 Transitions to Retirement (work life trajectories)

The findings of the current study revealed that for older participants, later life transition such as retirement was identified as a *turning point* that created new patterns of daily practices. Transitions to retirement appeared to be more salient to the activity patterns of men, where work-related and transport-related physical activity was replaced with more leisure-time sedentary pursuits such as resting, listening to the radio, and spending time with family members, friends and neighbours. Retirement was often viewed as a time for rest and being looked after, especially after a life of 'working hard. Therefore, the social expectation was for retired adults to engage in lesser physically demanding activities. A similar finding was observed in one study conducted in Sweden, which examined the meanings attached to sedentary behaviour during the transition to retirement (Eklund et al., 2021). The study found that a group of participants viewed retirement as a time for rest and a slower pace in life. They felt that the ageing body deserved rest and recovery during retirement, particularly for those who had physically demanding occupations and were experiencing increased body aches and pain. Although being sedentary was seen as healthy and meaningful after retirement and a natural ageing process, a group of participants reported finding a balance between being sedentary and physically active (Eklund et al., 2021). They expressed an awareness of physical activity as being beneficial to the body and health. However, felt it was equally healthy for the body to be at rest after engaging in physical activity. Conversely, another group of participants within the study perceived retirement as an opportunity to reduce sedentary behaviour. This group of participants expressed that maintaining routines that kept the body active was beneficial to their health and gave meaning to life after retirement (Eklund et al., 2021).

In contrast to the findings in the current study, other previous studies related to physical activity during the transition to retirement have found retirement to be associated with an increase in physical activity, which was mainly attributed to increased leisure time availability after retirement (Barnett et al., 2012; Gropper et al., 2020; Hirvensalo & Lintunen, 2011; Huang et al., 2022; McDonald et al., 2015). A systematic review including a synthesis of five qualitative studies on physical activity experience after the transition to retirement highlighted reasons why people might increase their physical activity after retirement. These reasons include an increased awareness of ageing prompting the need to maintain health and wellbeing; lifelong participation in leisure physical activity, which is continued after retirement; the need to create new routines after retirement to re-establish a sense of purpose; and an opportunity for social interactions (Barnett et al., 2012). These findings are also reflected in more recent studies (Huang et al., 2022; Jones et al., 2020; Liechty et al., 2017; Socci et al., 2021).

The differing perceptions of physical activity during retirement between the current study and prior studies could be related to differences in exercise norms and history among cohorts. The findings from the present study revealed that most participants had not been aware of the health implications of being physically active before their type-2 diagnosis. The idea of engaging in physical activity for health and fitness purposes (exercise) was not part of their upbringing or lifestyle. People's physical activity mainly occurred as an incidental part of their daily practices, such as engaging in housework or caring activities, preparing and procuring food, work-related activities and commuting practices, rather than structured forms of exercise. The LCP principle of life-span development emphasises the influence of past experiences in shaping later life patterns (Elder Jr, 1994). Therefore, without a prior history of exercise and an understanding of its health implications, it may be challenging for people to integrate exercise into their lives during retirement. This also speaks to the relationship between the meanings and competences elements of SPT. The absence of an exercise culture in the lives of these older participants may have impacted their lack of prior knowledge of the health implications of exercise and vice versa.

Notably, the findings from the main study regarding exercise awareness contrast with the preliminary scoping study, which revealed that people were aware of the health implications of physical activity and valued being physically active as crucial for their health and fitness goals. This distinction, however, may be because participants in the preliminary scoping study were from a convenient sample of mostly younger people between the ages of 25 to 34 years with high educational levels between a bachelor's degree and a PhD degree. Participants' higher education level might have led to higher general knowledge and awareness about exercise and its health implications. Nevertheless, participants in the preliminary scoping study shared a general view that exercise is not part of the 'Nigerian lifestyle' and many people in the Nigerian society do not feel the need to exercise until they are diagnosed with a health condition that requires them to make lifestyle changes.

9.2.2 Competences

The competence element of SPT, which involves the knowledge and skills necessary to perform a practice (Shove et al., 2012), is crucial in our understanding of people with type-2 diabetes' knowledge and capabilities to integrate exercise as part of their diabetes care practices. This element of SPT overlaps with the concept of self-efficacy from social cognitive theory (SCT) discussed in chapter 3. *Self-efficacy* which is described as a person's belief in their capacity to engage in a particular action (Bandura, 1977), is an important mediator of exercise adoption and maintenance (McAuley & Blissmer, 2000) .

9.2.2.1 *Health Transition to Diabetes diagnosis*

As discussed in the previous section, being diagnosed with type-2 diabetes in mid and late adulthood was identified as a significant life event that prompted people to assimilate new meanings for physical activity in relation to their health. Narrative interviews with people with type-2 diabetes revealed that their knowledge about exercise as part of diabetes management was mainly established through the advice received from their healthcare providers, particularly their doctors at the MOP clinic

at UCH. This finding is consistent with a quantitative study examining diabetes patients' awareness and compliance with diabetes health information in Southeast Nigeria, which found healthcare professionals (HCPs) to be the primary sources of information (Onwuka & Uzochukwu, 2020). A systematic review of 26 studies on diabetes-related information-seeking behaviour found health professionals and the internet to be the most frequently cited sources of information (Kuske et al., 2017). The studies included in the review were conducted in Europe, North America, Asia, and Canada. The review also found that people with a higher level of education and income were associated with active information seeking and internet use. In contrast, those of lower educational backgrounds and income levels preferred verbal communication with healthcare providers. Additionally, younger people were found to use the internet more often to find health information and were more interested in diet and exercise than older people (Kuske et al., 2017).

Interestingly, all of the participants in the current study reported that they did not use any form of digital media, including the internet, as a source of information for their exercise management. This finding could be attributed to the fact that most participants were middle-aged and older people who reported not being well-versed in using the internet. Additionally, it could be because participants from the current study were engaged with healthcare services, and HCPs, mainly doctors, are considered the most trusted health information sources. According to Kuske et al. (2017), despite the internet often being used to obtain information about diabetes, HCPs, particularly doctors, were nevertheless considered the most important sources of information. Similarly, a literature review of 23 studies assessing information needs and sources of primary care patients found patients' physicians and the internet as the most common information sources. The review reported that while people described the internet as a more accessible source of information, people trusted their physicians more for their clinical expertise and would often verify information gathered from the internet with their physicians during the consultation (Clarke et al., 2016).

According to SCT, while knowledge about the health implications of health practices like exercise does not necessarily lead to change, it creates a precondition for taking up such practices (Bandura, 1977). Having the necessary *knowledge* about how exercise could support people in managing their diabetes may increase their *self-efficacy* in integrating exercise into their diabetes management. Moreover, an individual's perceived value of the outcome of exercise to their diabetes care (*outcome expectation*) is also important for increasing their *self-efficacy* (Bandura, 1977).

The findings from the present study revealed that participants portrayed varying degrees of understanding concerning the relationship between exercise and health. However, many participants reported inconsistencies and gaps in the information they received at the hospital about how to integrate exercise as part of diabetes management. Participants did not feel they had concrete details about the health benefits of exercise and how it could be applied to their lives to achieve beneficial results. The current study found that many participants associated their knowledge gaps with the limited education provided by their HCPs regarding physical activity as part of diabetes management. Most people felt that their doctors did not prioritise physical activity during consultations and only provided recommendations that were too generic for their circumstances. These findings resonate with previous studies conducted in the UK (Matthews et al., 2017), Australia (Maneze et al., 2019), Finland (Poskiparta et al., 2006) and Thailand (Wattanapisit et al., 2019), which found that patients with type-2 diabetes struggled to incorporate exercise into their diabetes management practices due to inconsistent and insufficient information provided by their HCPs. Similar findings were reported in studies conducted with patients with type-1 diabetes in primary care in the UK (Kime et al., 2018; Litchfield et al., 2019).

In the current study, some of the Endocrinologists running the diabetes clinic at UCH attributed this inadequacy of exercise information to the limited consultation time for each patient, which prevents them from providing more detailed or personalised exercise counselling. Therefore, these endocrinologists felt that exercise counselling was the role of other HCPs such as dietitians and health educators. While the findings

from the present study revealed that there are other multiple sources of diabetes management education such as health educators, dietitians, and the DAN support group, most participants reported that did not utilise these other sources for physical activity education. Some participants described not being aware of or referred to these counselling programs at the hospital, while others described being referred to these services but had not attended due to extra costs for utilising them. This finding is in line with previous studies (Kime et al., 2018; McPhail & Schippers, 2012; Wattanapisit et al., 2019), which have reported time constraints as the main barrier to adequate exercise counselling. These studies have also reported other barriers such as lack of structure for physical activity within diabetes routine care, and insufficient knowledge and lack of formal training of HCPs regarding physical activity as part of the diabetes management (Kime et al., 2018; Matthews et al., 2017; Osinaike & Hartley, 2021; Wattanapisit et al., 2019).

A study evaluating HCPs' - in primary care in the UK - delivery of physical activity guidance for people with diabetes found that most of the HCPs had received little or no education in physical activity for preventing and managing diabetes as part of their training (Kime et al., 2020). HCPs in the study reported that they were unaware of any guidelines relating to physical activity and diabetes and did not know where to find such information. As a result, some of the HCPs reported that they did not feel confident in delivering physical activity advice to patients with type-2 diabetes (Kime et al., 2020). Similar findings were reported in a cross-sectional study conducted in Canada, examining diabetes educators' perceptions of their abilities and those of their patients regarding physical activity in the diabetes management (Dillman et al., 2010). The study found that diabetes educators lacked confidence in their ability to counsel, prescribe and make referrals for physical activity and exercise (Dillman et al., 2010).

Although similar findings related to barriers to physical activity counselling for diabetes management have been reported in several studies in other contexts, such as the UK, Canada and Thailand, there are no relevant studies related to the Nigerian context. The results from the present study and previous literature highlight the significance of HCPs as important and trusted sources of physical activity counselling

for diabetes management for patients seeking care at the hospital. While the study did not assess HCPs' competencies, previous studies have consistently cited insufficient knowledge and competences as important barriers to physical activity counselling. The competences of HCPs in providing meaningful support for physical activity as part of diabetes management can have a significant influence on patients' self-efficacy to integrate physical activity as part of their management practices. Therefore, it is important that HCPs have the necessary knowledge and skills for providing support for physical activity as part of type-2 diabetes management. Future studies should explore in more depth the perspectives of patients and HCPs regarding barriers to integrating physical activity in diabetes care. It should also examine health systems role in promoting physical activity and ways health systems could be supported to better promote physical activity as part of type-2 diabetes care.

9.2.3 Materials

The materials elements of SPT, involve all the physical components required to engage in a practice. A key finding from the study related to the physical context in influencing physical activity participation involves people's scepticism towards engaging in exercise in public spaces due to concerns about how people in their local communities might negatively perceive them. These concerns were attributed to the low value placed on the importance of exercise and negative age stereotypes related to participating in leisure time physical activity. This finding is consistent with the result of a study (in a low-income setting) in Uganda examining perceptions of type-2 diabetes and lifestyle change among people with or at high risk of type-2 diabetes (Mayega et al., 2014). The study found that engaging in structured physical activities like running was not feasible because they were unfamiliar activities in the local community and were perceived as 'strange', 'laughable', or 'unsuitable for adults' (Mayega et al., 2014).

Similarly, a qualitative study exploring the facilitators and barriers to hypertension management in a rural town of Kwara state in Nigeria reported that local perceptions of exercise as "being needless or useless" or incompatible with ageing served as a key

barrier to exercise among patients. Participants in the study noted that such perceptions resulted from insufficient knowledge regarding the health benefits of exercise (Oduola et al., 2014). Another study exploring the influences of physical activity participation among middle-aged and older adults in Nepal found leisure time participation participating in physical activity (outside of daily routine activities) to be uncommon among this group. The study reported that this resulted from an absence of a supportive social norm regarding leisure-time physical activity, as it was not common in the community to see middle-aged or older adults participating in such activities (Paudel et al., 2021).

A similar finding related to negative age stereotypes was reported in a study conducted in Canada exploring perceptions of ageing and experiences of ageism among older adults who were proactively engaging in leisure time physical activity (Massie & Meisner, 2019). The study found that older adults encountered both positive and negative experiences of ageism while participating or trying to participate in leisure time physical activity in public settings. Negative forms of ageism met included comments by others - in locations where leisure time the physical activity occurred - about being too old to engage in certain activities, use certain equipment or join particular gyms (Massie & Meisner, 2019). Another study exploring perceptions of physical activity among older adults in rural Canada reported that people felt they were not socially supported to remain physically active because of their age (Schmidt et al., 2016). Participants in the study expressed that close family members advised them against going out or doing physical tasks, suggesting that they slow down (Schmidt et al., 2016). This is consistent with findings in the present study, where some older participants expressed that their adult children discouraged them from doing any physical activity because they viewed ageing as a time to rest and not stress. While Similar findings have been reported in studies examining barriers to physical activity other contexts, none of the studies were focused on patients with type -2 diabetes.


9.3 Narrating Cluster Analysis Findings Through Personas

In addition to life histories, the study examined the everyday patterns of activities of people with type-2 diabetes. The cluster analysis of people's daily activity patterns identified six groups within the sample, with members of each group having similar patterns of daily practices. The groups mainly differed with regard to their patterns of engagement or non-engagement in exercise practices, housework and caring practices, and recreational and work practices. I have created four different personas based on evidence from the cluster analysis of people's activity patterns to encapsulate key research findings about differential groups of people with type-2 diabetes in urban Nigeria and how they engage with physical activity.

Personas are narrative artefacts in the form of fictional representations, created to represent an individual or groups of individuals within a targeted (Putnam et al., 2012). They are based on empirical data used to communicate insights about different user groups to designers and other stakeholders during the design process to help develop a deeper understanding of their unique experiences and challenges (Putnam et al., 2012). The following personas developed are fictional representations and the personal details and photos used are not of actual participants in the study. Nevertheless, they embody key insights about important differences when considering designing interventions for people with type-2 diabetes in similar contexts. Each persona represents the unique patterns and challenges of participant groups.

9.3.1 Persona 1

Name: Mary James



Demographics

Gender: Female
Age: 46 Years
Occupation: Housewife
Relationship Status: Married
Living Arrangement: With husband and two children
Diabetes Diagnosis: 2 years

Background Description

Mary James is a 46-year-old housewife who lives with her husband and two young children. She spends most of her time doing housework and caring for her two children. She has been living with diabetes for the past 2 years and doesn't have any other health condition. Her husband provides financial support for her diabetes care.

Exercise Management

- Advised by a dietician at the clinic to exercise but unclear about what types of exercise she should perform
- Does not engage in exercise outside her routine activities
- Feels she needs to prioritize her family responsibilities, which she believes consumes most of her time and energy.

Housework and Caring Activities

- Fully responsible for household tasks and childcare
- Washes clothes and utensils with her hands and sweeps her home with a traditional broom
- Walks every day carrying buckets of water from a community well, usually taking multiple trips
- Cooking most of the dishes involves her pounding and vigorous stirring.

Recreation

- Spends her free time in the evening resting in the company of her children and husband.
- Goes to church every Sunday for worship
- Visits her relatives after church on Sunday


Commuting

- Uses public transportation for her commute

Figure 17: Persona 1 - Mary James

9.3.2 Persona 2

Name: Olu Gbenga



Demographics

Gender: Male
Age: 70 Years
Occupation: Retired
Relationship Status: Married
Living Arrangement: With Wife
Diabetes Diagnosis: 12 years

Background Description

Olu Gbenga is a 70-year-old retired teacher who lives with his wife in Ibadan. He has been living with diabetes for the past 12 years and is managing other health conditions, including hypertension, declining eyesight, and back pain. He has three adult children who provide him with financial support for his care.

Exercise Management

- Does not engage in any form of exercise
- Complains of difficulties engaging in physical tasks due to pain and weakness
- Views retirement as a time for rest

Housework and Caring Activities

- Does not engage in any housework or caring tasks
- Believes domestic work is a woman's domain
- Relies on his wife to take care of him and the household

Recreation

- Spends most of his time at home resting in his bedroom
- Enjoys listening to his radio while resting
- His adult children and grandchildren visit to spend time with him during the weekends
- Does not go to socialise because most of his friends have passed away


Commuting

- Only goes out to town when he has an appointment at the clinic
- One of his children drives him to the hospital for his appointments
- Not comfortable with using public transport due to the walking involved between transits

Figure 18: Persona 2 - Olu Gbenga

9.3.3 Persona 3

Name: Ade Bola



Demographics

Gender: Male

Age: 42 Years

Occupation: Lecturer

Relationship Status: Married

Living Arrangement: With wife and two children

Diabetes Diagnosis: 5 years

Background Description

Ade Bola is a 42-year-old lecturer who lives with his wife and two children. He teaches at a university in Ibadan. He has been living with diabetes for the past 5 years.

Exercise Management

- Did not know much about exercise to keep healthy before diagnosis
- Now more informed and conscious about being physically active since joining the diabetes support group
- jogs around his gated compound for 30 minutes about three days a week
- Does not feel comfortable jogging around his neighbourhood because he fears being stigmatised for his condition

Work and Recreation

- Teaches three 45 minutes classes in a day.
- Walks around his class while teaching but spends the rest of the time sitting at his desk.
- Spends his evenings at home chatting with his wife and children after work
- Goes to church for worship every Sunday
- Visits his parents during the weekend.

Housework and Caring Activities

- Does not engage in any housework or caring tasks
- Believes domestic work is a woman's domain
- Accompanies his wife to the market to buy food for the household


Commuting

- Drives his car to travel to work, church and the market.
- Walks to his parents' place who live walking distance away from him.

Figure 19: Persona 3 - Ade Bola

9.3.4 Persona 4

Name: Shola John



Demographics

Gender: Female

Age: 62 Years

Occupation: Retired/Trader

Relationship Status: Married

Living Arrangement: With husband and one adult daughter

Diabetes Diagnosis: 10 years

Background Description

Shola John is a 62-year-old retired woman who lives with her spouse and one adult daughter. She has a shop in front of her house where she sells convenience items to people in her neighbourhood.

Exercise Management

- Takes walks around her neighbourhood at least three days a week
- Her walks last between thirty minutes to one hour
- Sometimes stops to chat with her friends in the neighbourhood.

Work and Recreation

- Goes to sit in her shop in the morning to attend to customers and closes in the evening
- When a customer arrives, she gets up to attend to them, then goes back to her seat
- Her neighbours visit the shop to chat with her.
- She likes to sit and chat with her children in her free time.

Housework and Caring Activities

- Does not engage in any housework or caring responsibility
- Her adult daughter assist with all the housework.
- They also discourage her from doing any physical task in the house because they think she needs to be resting.

Commuting

- Most places she visits are within walking distance.
- Uses public transportation when going to church and the hospital.

Figure 20: Persona 4 - Shola Johns

9.4 Contributions

9.4.1 Empirical Contribution

This research makes an empirical contribution by providing an in-depth multi-layered account of the socio-historical dynamics of physical activity in the lived experiences of people with type-2 diabetes in an urban Nigerian context. While prior studies have explored social factors influencing physical activity participation in various contexts, limited research has been conducted on physical activity among people with type-2 diabetes from a relational and temporal perspective.

This research gathered comprehensive and nuanced biographic and everyday life accounts of physical activity practices from multiple theoretical and methodological viewpoints. As such, the study has found that people's physical activity patterns vary across the life course and are strongly shaped by processes including changing social roles within the family life trajectory, transitions to retirement, type-2 diabetes diagnosis, gender norms, absence of an exercise culture, and negative age stereotypes. More generally, the findings contribute to the existing literature by instantiating this knowledge in the context of people managing type-2 diabetes in urban Nigeria, where physical activity research for addressing NCDs is still in its infancy.

More specifically, the findings highlighted gender differences in how patterns of physical activity evolved over the life course. For women, shifting social roles within the family trajectory appeared to be especially salient to their patterns of activities, which were largely implicated in their household and caring responsibilities. Although prior studies in similar cultural contexts have found women's physical activity to be implicated in family responsibilities, this study is novel in highlighting socio-historical changes within the family life trajectories that influence women's physical activity patterns. Moreover, the findings revealed that for men, shifting roles within the work-life trajectories (transitions to retirement) appeared to be particularly salient to their activity patterns. The study found that people mostly associated retirement with reduced physical activity, viewed as a period of rest and slowing down. This finding

contrasts with prior studies that found retirement to be associated with increased physical activity. Therefore, this research contributes to the limited evidence that suggests retirement is associated with reduced physical activity.

Lastly, the research has also contributed four personas based on a rigorous and evidence-based approach that encapsulates key insights about the diversity among groups of patients with type-2 diabetes in Ibadan and important differences to consider when designing interventions for promoting physical activity among people with type-2 diabetes in similar contexts.

9.4.2 Theoretical contribution

The theoretical contribution of this research lies in the novel application of social practice theory and life-course perspective to physical activity research on people with type-2 diabetes. An integrated approach using SPT and LCP as guiding theoretical frameworks allowed for an in-depth exploration of physical activity as a set of socially situated practices from the perspective of people with type-2 diabetes' lived experiences. This helped to reveal how transitions and turning points in people with type-2 diabetes' life trajectories interact with the shifting materials, meanings, competences of their physical activity participation.

Conceptualising physical activity as a set of socially situated practices shifts our focus away from the dominant framing of behaviour change discourse, which places responsibility for one's health on the individual level. However, previous studies have argued that contemporary SPT's focus on social practices such as physical activity as the unit of analysis runs the risk of relegating the role of individuals to merely carriers of social practices (Spurling, 2010; Hards, 2011; Greene 2018). LCP's principle of human agency argues that people are active agents of their actions but do so within the constraints and opportunities of their socio-historical context (Elder Jr, 1994).

This research, consistent with the works of Hards (2011) and Greene (2018), acknowledges individuals' active role in shaping their activity patterns by considering the perspectives of people with type-2 diabetes in understanding physical activity as

a social practice. However, it has elucidated that physical activity is more than a matter of individual choice. It was evident from the findings that people with type-2 diabetes in Ibadan engaged in physical activity practices in relation to their changing social structures. This research supports the work of Anthony Giddens (1984), one of the earliest proponents of SPT, who argues that social structures and human agency are not separate phenomena, nor can one exist apart from the other. While people act within the context of social structures, the recursive actions of people as they go about their daily lives, in turn, reproduce and transform the social structure itself. This interdependent and recursive interplay between structure and agency, termed as 'duality of structure', is what Giddens refers to as social practices. According to Giddens (1984), social practices lie at the intersection of agency and structure, and neither can be understood without the other (1984). To this end, this research has sought to explore physical activity at the intersection of people's lives and the socio-historical context within which they are situated. In doing so, the study contributes to the theoretical debates regarding the role of individual and social structures in shaping people's practices.

Moreover, combining SPT with concepts from life-course perspectives facilitated a relational, temporal and dynamic approach that has not previously been used in physical activity research with people with type-2 diabetes. This allowed for a nuanced and multidimensional understanding of the lived experiences of physical activity in people with type-2 diabetes in Ibadan.

9.4.3 Methodological Contribution

Methodologically, this work contributes to the applications of visual elicitation methods for studying the context of people's daily activity patterns. The study employed a multi-modal approach which combines diary tools and wrist-worn triaxial accelerometry to support participants' reflective engagement with the research to stimulate narratives about the intricacies of daily life that may otherwise escape their conscious awareness. While diary studies are established empirical methods for capturing people's daily activities in real-time, accounts provided by participants

may lack details and comprehensiveness. Triaxial accelerometers have been used extensively to obtain objective measurements of physical activity. However, to my knowledge, this research is the first to use them (in combination with diary methods) as research tools to support the collaborative exploration and reconstruction of detailed narratives about the context of people's daily activities. This innovative multi-modal method of data gathering was instrumental in developing our understanding of the nuances and contextual processes of everyday life that shape people's physical activity. It also illustrated how quantifiable dimensions of physical activity could be leveraged to stimulate reflection and elicit contextual narratives about people's lived experiences. This thesis has provided the groundwork for future researchers interested in adopting a similar methodological approach to understanding the context of people's activity patterns.

9.5 Implications for Policy

Physical activity policies to address the rising burden of NCDs including type-2 diabetes, continue to be a public health priority at international, national and local levels (Hills et al., 2018). However, previous studies examining the status of physical activity policy in Nigeria and SSA have reported that there is no national standalone physical activity policy in Nigeria (Kassa & Grace, 2022; Oyeyemi et al., 2018). These studies have also argued that there is limited qualitative research related to physical activity for the prevention and management of NCDs in Nigeria to support evidence-based policy implementations (Kassa & Grace, 2022; Oyeyemi et al., 2018).

To the best of my knowledge, this research is the first to explore in-depth the contextual processes influencing physical activity participation of people with type-2 diabetes receiving care at a tertiary care institution in Urban Nigeria. The findings from this research provides policymakers with formative knowledge regarding challenges and opportunities to physical activity participation for prevention and management of NCDs such as type-2 diabetes in an urban Nigerian context. This knowledge will help guide policymakers in their considerations of how to develop culturally adaptable policies and interventions aimed at promoting physical activity among populations in

urban Nigeria. The findings from this research revealed that the social context, including the health systems and local communities, are crucial to the way people with type-2 diabetes in Ibadan understand and navigate physical activity as part of their diabetes management practices. This highlights the need for the Nigerian Ministry of Health to consider targeting policies and interventions not only at the micro-level, but also at the meso-level of communities and healthcare systems.

9.5.1 Community- level Policies and Intervention

9.5.1.1 *Community-Based Awareness and Education Programs*

A key finding from the study revealed that most patients did not have prior knowledge of exercise before diagnosis, and physical activity primarily occurred as an incidental part of their daily lives, rather than for health reasons. People also expressed reluctance towards performing exercises in public, due to concerns about negative social perceptions due to low awareness of and the value placed on exercise in their local communities. This highlights the importance of a community-wide approach in educating and raising awareness about exercise, rather than solely focusing on educating individual patients. Community-level knowledge and awareness may help to reduce the negative social perceptions and stigma around type-2 diabetes and exercise.

It will be useful for policymakers to empower and engage community health workers (CHWs) in developing physical activity awareness and culturally sensitive education programs, owing to their close relationship with the communities they work with, and their ability to reach people outside the healthcare system (Standing & Chowdhury, 2008). CHWs are community members who are trained to serve as intermediaries between healthcare systems, social services and the community. Their main roles include promoting health in their communities through facilitating access to health services and community resources, community health education and capacity building, outreach, informal counselling, and advocacy (Standing & Chowdhury, 2008). CHWs are trusted by their respective communities because they share similar ethnicity, language, and life experiences with the community they serve (Standing &

Chowdhury, 2008). Therefore, their local knowledge and cultural competency, coupled with relevant training, can be leveraged to gain a greater understanding of the communities' unique challenges and design contextualised and culturally sensitive education and awareness programs regarding physical activity.

9.5.1.2 Community Engagement in Policy Research and Intervention

Prior studies have shown that raising awareness and providing education alone is not sufficient to support the prevention and management of NCDs such as type-2 diabetes (Fottrell et al., 2019). Beyond raising awareness, the findings from this study suggest the need for further research to gain a comprehensive understanding of the local context and socio-cultural barriers and facilitators to integrating sufficient exercise into the daily lives of people, within local communities. Public health policymakers should engage communities and work in partnership with relevant stakeholders such as HCPs, DAN, public health researchers, sociologists and HCI researchers to co-create context-specific and culturally informed local policies and interventions. This can be achieved through well-established community-driven participatory research and design approaches. Community engagement interventions have been shown to be successful in addressing type-2 diabetes in communities in LMIC settings (Fottrell et al., 2019; Morrison, Akter, et al., 2019; Morrison & Arjyal, 2021).

Fottrell and colleagues (2019) examined the effects of two community interventions, mHealth health messaging and community participatory learning and action (PLA) in preventing and controlling type-2 diabetes and intermediate hyperglycaemia in rural Bangladesh (Fottrell et al., 2019). The study found that community PLA intervention led to a significant decline in the prevalence of type-2 diabetes and intermediate hyperglycaemia, while the mHealth intervention did not have any effect on diabetes outcomes (Fottrell et al., 2019). Moreover, Morrison and colleagues (2019) conducted a qualitative process evaluation of the same community-based PLA intervention report in (Fottrell et al., 2019) to prevent type-2 diabetes in rural Bangladesh. The authors concluded that the participatory approach helped community members to

examine how their context impacted their health behaviours and enabled feasible and acceptable community engagements and actions (Morrison, Akter, et al., 2019).

Several scholars within HCI and design fields have proposed participatory speculative design approaches as potential tools for engaging groups and policymakers in critical reflections and discussions relevant to addressing complex societal problems (Khan et al., 2021; Tseklevs et al., 2017; Tseklevs et al., 2022). Speculative design is a design research approach that enables individuals and groups to envision and analyse desirable and possible future scenarios through tangible artefacts or processes, known as design fiction (Dunne & Raby, 2013; Tseklevs et al., 2020). Design fiction uses a fictional paradigm to ask what-if questions that challenge the status quo and stimulate debates about the potential cultural, ethical, social, and political implications of the design of interventions (Dunne & Raby, 2013; Tseklevs et al., 2017). These are all possible approaches that could be explored within this context. However, these approaches might need to be examined for feasibility or adapted to suit the local context.

9.6 Implications for Clinical Practice

9.6.1 Enhancing patient-provider communication

The findings from this research revealed that current approaches to physical activity counselling at UCH, Ibadan are mainly based on traditional health education, with HCPs delivering physical activity recommendations and patients playing a passive role in receiving information. Prior studies have shown that traditional health educational approaches are less likely to resonate with patients' needs and life circumstances. This suggests a need for a shift towards to a more collaborative approach that supports asking questions to understand patients' needs, values and challenges and tailoring recommendations according to those needs and challenges. Previous research has shown that using person-centered approaches, where people with type-2 diabetes are actively involved in their care to meet their individual needs, can yield positive outcomes (Öberg et al., 2019). Encouraging patients towards taking a more active role in their care will help them to develop relevant knowledge and competencies necessary for negotiating and integrating adequate physical activity as part of their

diabetes management practices. Further research is needed to explore the feasibility of a person-centred based approach to counselling.

9.7 Recommendations for Physical Activity Intervention Design for People with Type-2 diabetes

The table below (Table 10) summarises key themes/findings and their corresponding implications and recommendations for designing physical activity support interventions for type-2 diabetes (and other NCDs) in similar contexts and beyond.

Key Themes and Findings	Implications	Recommendations
The Value of Understanding the Broader Context and Lived Experiences of People		
<ul style="list-style-type: none"> • People mostly framed and experienced physical activity within the broader context of their daily activities and attributed different sociocultural significance to physical activity engagement beyond exercise or healthy behaviour. 	<ul style="list-style-type: none"> • This corroborates the need for a shift in the predominant framing of physical activity as an individual health behaviour to socially situated practices in everyday life. 	<ul style="list-style-type: none"> • Designing and implementing physical activity intervention programs for managing type-2 diabetes and other NCDs requires a comprehensive understanding of the broader sociocultural context of people’s lived experiences and how this relates to their physical activity engagement. • Future public health and clinical care interventions should support meaningful active living for NCDs management beyond structured physical activity to include incidental physical activity embedded within people’s daily realities.
The Value of Understanding the Complex, Temporal and Dynamic Realities of People’s Lived Experiences		

<ul style="list-style-type: none"> • People’s patterns of continuity and change in physical activity engagement, over time, were implicated within different contingent life circumstances such as transitions, turning points and changing social contexts as they moved through their life course. 	<ul style="list-style-type: none"> • This corroborates the need for physical activity engagement to be examined as a complex, dynamic and ongoing process of change rather than a simple linear engagement in response to recommendations or rational choices to be more active. 	<ul style="list-style-type: none"> • Future public health and clinical care interventions should consider the varying temporalities and contingencies of people’s daily lives and identify ways key moments of change (at different life stages) can be managed to support people in negotiating and adapting their physical activity routines.
The Value of Tailored, Contextualised and Culturally Appropriate Approaches – No One Size Fits All		
<ul style="list-style-type: none"> • Different groups of people reported different experiences of physical activity in their daily lives and the factors that enable or constrain their engagement. • The diversity in physical activity participation among subgroups was mainly implicated in people’s different social interactions, roles, norms and identities, their different life phases, capabilities and competencies, and perceptions about exercise norms and stereotypes. 	<ul style="list-style-type: none"> • This highlights a diverse image of people with type-2 diabetes and corroborates a need to depart from the traditional structured and one-size-fits all approach to management support for type-2 diabetes and other NCDs towards a more data-driven, culturally informed, and tailored approach that supports people in navigating the varied interplay of their individual, socio-cultural and situational circumstances. 	<ul style="list-style-type: none"> • Future public health and clinical care interventions should support should be appropriate for diverse group of people by working together with them to understand their unique realities and tailoring management support according to those realities. • Fostering the active engagement of people living with type-2 diabetes (and other NCDs) with their care will empower them to critically reflect on the factors influencing their physical activity and negotiate feasible and appropriate ways

		<p>to integrate regular physical activity into their daily lives. This will in turn help to improve the accessibility, contextual and cultural sensitivity of intervention programs</p> <ul style="list-style-type: none">• Future public health and clinical care intervention efforts would also benefit from utilizing the local knowledge and cultural competencies of CHWs in designing culturally sensitive programs promoting physical activity.• Future public health and clinical care should also consider the role of other social entities such as HCPs, family members and the larger community in influencing how people understand and navigate physical activity as part of their diabetes management and involve them where appropriate.
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The Value of Participatory Methods and Collaborative Problem Solving		
<ul style="list-style-type: none"> • The study employed a participatory and collaborative approach, including diary methods and visual elicitation interviews to obtain in-depth narrative accounts of factors influencing people’s physical activity in their daily lives. 	<ul style="list-style-type: none"> • The findings from this approach highlighted the value of engaging collaboratively with people to stimulate reflection on their lived experiences and gain access to their nuanced understanding of physical activity and how the socio-historical and material context in daily life, interact with their physical activity practices. 	<ul style="list-style-type: none"> • Future public health and clinical care intervention efforts should employ participatory and collaborative approaches that empower people to develop relevant competences for integrating relevant physical activity into their diabetes management practices.

Table 10: Summary of Implications and Recommendations for Intervention De

9.8 Research Limitations

Firstly, the study population included only patients with type-2 diabetes actively receiving routine care at the diabetes clinic at one tertiary hospital in Ibadan. Therefore, the research findings may not represent the perspectives and experiences of patients in other healthcare settings, or people with type-2 diabetes who do not seek care at the hospital. Future studies should explore the experiences of patients in non-clinical settings, or in primary and secondary care settings (in various parts of the country). Secondly, the study planned to recruit a balanced number of male and female participants, however, due to a higher number of female patients at the diabetes clinic, more females than males volunteered to participate in the study. Thirdly, although data from informal observations and interviews with HCPs were used to supplement patients' perspectives on exercise as part of diabetes management, the study did not formally explore - in-depth - the perspectives of HCPs. This would have provided a more balanced representation of the health systems' role in promoting exercise as part of diabetes management. Future research should examine HCPs perspectives on barriers to incorporating exercise as part of diabetes management. Lastly, language barriers and the use of bilingual research assistants as interpreters and translators may have resulted in certain meanings and nuances in participants' narratives being lost in translation. I discussed extensively in Chapter 5 the strategies the research team employed to mitigate this limitation throughout the data collection and analysis process.

9.9 Future Research Recommendations

The main study in this thesis was designed to gain broader insights into the dynamic and multidimensional aspects of physical activity participation of people with type -2 diabetes in Ibadan. Therefore, in expanding our current understanding, future research would benefit from exploring the design space of physical activity interventions for people with type-2 diabetes in an urban Nigerian context. The findings from this research highlighted that healthcare professionals play a role in patients' understanding of physical activity as part of diabetes care practices. Future research should therefore explore their perspectives on influencing patients' physical

activity engagement as part of their management practices and ways existing diabetes care pathways can be improved to better support patients in managing their physical activity.

The findings of the current study suggest that research efforts promoting daily routine activities as forms of exercise may be more feasible in an urban Nigerian context. Design research efforts will benefit from mixed-methods research exploring the extent to which unstructured forms of physical activity, derived as incidental parts of daily routines can be recognised as offering viable and meaningful sources of physical activity. Additionally, future research should employ participatory approaches that engage key stakeholders in critically reflecting on existing salient social dynamics and their implications for promoting physical activity among different groups of people with type-2 diabetes. For example, future research could explore ways normative gender practices can be supported or negotiated (at different life stages) to facilitate meaningful physical activity in the daily life of people with type-2 diabetes. It could also explore ways to support older adults experiencing later life transitions such as retirement and changing health status in integrating physical activity that is feasible and helps increase a sense of purpose and structure in their daily lives.

9.10 Conclusion

This research gathered comprehensive and nuanced physical activity biographic and everyday life accounts from multiple theoretical and methodological viewpoints. It challenged the dominant framing of physical activity as an individual behaviour, instead viewing it as a socially situated practice in everyday life that transforms across time and space. In doing so, it has made an original contribution by enhancing our understanding of the dynamic processes of change in physical activity engagement that encompass an interplay of transitions, turning points, and social structures in the lived experiences of people with type-2 diabetes in an urban Nigerian context. It has also contributed to our understanding of the diversity among groups of patients with type-2 diabetes in Ibadan and important socio-historical differences to consider when exploring interventions for promoting physical activity among people with type-2 diabetes in similar contexts. This understanding opens up avenues for further

exploration of the interventions design space to support people with type-2 diabetes in urban Nigeria (and beyond) in managing their physical activity.

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Appendix A

PRELIMINARY INTERVIEW GUIDE

The following questions will be used to guide interviews with participants with type-2 diabetes.

[Introduction]

Thank you very much for agreeing to participate in this interview. Today you will be participating in a one-on-one interview with me, which should last about 45 - 60 minutes. The purpose of this interview is to gain better insights into your physical activity perceptions and practices within the context of your everyday life and factors that influence those perceptions and practices. During this interview, we will cover topics such as your history with type 2 diabetes, how you manage your condition daily, your typical routines and the role of physical activity over your life-course.

Your participation is voluntary. If you do not wish to participate, you may stop at any time. You may also refuse to answer any questions if you feel uncomfortable. Your responses will be completely anonymous and if results of this study are published or presented, your name and other personally identifiable information will not be used. Remember this interview is not evaluating you in any way and there are no right or wrong answers.

As a researcher, I am not asking you any questions to make a judgment on how you manage your diabetes or how you embed physical activity within your life, but simply here to learn from you and understand your experience and views on the topic. Feel free to ask me anything thing that is unclear for you at any time.

[Demographic Information]

Before we begin, I will need some background information about you to assist me with my study report. You do not have to answer any if you prefer not to. As with all study information, the information you provide here will be held in confidentiality.

1. What is your gender?

- Male
- Female

2. What is your age range?

- 18 – 24
- 25 – 34
- 35 – 44
- 45 – 54
- 55 and older

3. What is your ethnic group?

- Hausa
- Igbo
- Yoruba
- Other _____

4. What is the name of the area you live?

5. What is the level of education you have completed?

- No formal education/Never attended school
- Trade/apprenticeship
- Vocational school
- Primary school
- Secondary school
- Bachelor's degree
- Master's degree
- Doctorate degree (PhD)
- Other _____

6. What is your occupation status?

- Employed full-time
- Employed part-time
- Home duties
- Self-employed
- Unemployed
- Retired
- Other _____

7. What type of work do you do? _____

8. What is your marital status?

- Single

- Married
- Divorced
- Widowed

9. Who do you currently live with? Please say yes to all that apply.

- I live alone
- I live with my parents
- I live with my spouse
- I live with my children
- I live with my grandchildren
- I live with my friend(s)
- I live with other family members
- Choose not to answer

10. What is the total number of your household members? _____

11. What are the family average monthly earnings?

- Less than N10000
- N10000 to N20000
- N20000 to N40000
- N40000 to N60000
- N60000 to N80000
- N80000 to N100000
- N100000 and above
- Do not know
- Choose not to answer

12. Do you own a mobile phone?

- Yes
- No

13. Which type of mobile device do you own?

- Basic/Ordinary mobile phone
- Smartphone
- Do not know

14. How often do you use your mobile phone?

15. Do you have Internet access on your phone?

- Yes
- No

16. Do you use your mobile phone for health purposes?

- Yes
- No

17. Do you use any devices/technology for your diabetic management?

- Yes
- No

18. How many years since you have been diagnosed with type-2 diabetes?

[PRELIMINARY INTERVIEWS]

[Living with and managing type-2 diabetes: impact and coping strategies]

- To get us started, can you please tell me a little bit about your experience with type-2 diabetes?

Probe:

- How and when did you find out you have type-2 diabetes? How did you feel when you were first diagnosed with type-2 diabetes?
- Did you know anything about type-2 diabetes prior to your diagnosis? If yes, what was your first source of information?
- What did your health care provider advice you on how to manage your type-2 diabetes when you were first diagnosed? To what extent do you follow through with the recommendations given by the health care provider?
- Can you tell me about the ways in which type-2 diabetes may have affected you and aspects of your every life over time?

Probe:

- Was a lifestyle change important to you and why? Which changes did you make?
- How has your daily routine and social life changed? In your opinion, is this change positive or negative? Why do you think so?
- What kind of reactions have you gotten from significant others (family, friends) in your life since you were diagnosed with type 2 diabetes?
- What has been the most challenging in changing your lifestyle?
- How do you integrate diabetes management in your daily life routine?

Probe:

- Can you tell me in detail, how you manage your diabetes in the context of a typical day?
- In what ways (if any) do significant others (family, friends) get involved or support you in taking care your type-2 diabetes?
- Are you involved in any activities/ support groups or organisations outside your home that you find helpful or supportive?
- What other resources do you use for managing your type 2 diabetes?

- Have you ever used the Internet to find information about managing your type-2 diabetes? Has this been helpful (or not)?
 - Have you used any type of devices or mobile applications in managing your type-2 diabetes? E.g blood pressure monitor, glucose monitor e.t.c? How does this help (or not)?
- Overall what forms of assistance or resources have been most helpful for managing your diabetes?
- What would you say are the major challenges you have been facing in integrating the management of your diabetes in your daily routine? How have you attempted to overcome these problems?
- What do you think might help you to better manage of your type-2 diabetes?
- Do you know other people in your community living with type-2 diabetes?
 - How do you relate with other people with type-2 diabetes?
 - How is the way you manage your type-2 diabetes similar to or different from how others in you know or in your community manage their type-2 diabetes?

[Daily activities]

Please can you walk me through a typical weekday in your life (starting from when you first wake in the morning to going to bed at night): the various activities/things that you do and the people you interact with.

- How is your weekday routine different than your weekend routine?
- What activities are most important to you? Why are they important?
- What roles and responsibilities (at home, work, school, community) do you assume in your daily life?
- Who do you spend most time with? Tell me about what you do with them?

Follow up any activities mentioned with a view to getting a feel for when, where and with whom they are physically active

I would like to talk about your perceptions of and experiences with physical activity throughout your life. I am also interested in what influences you think have affected your practices of physical activity at different times in your life.

[Current experience with physical activity and and ascribed meanings]

- What comes to mind when you think of the words “physical activity”? What do you associate with the words “physical activity”?
 - What activities do you consider to be physical activities? Why?
- Could you please tell me how physical activity fits into a typical day for you?

Probe:

- Thinking about your typical day, what activities do you do that you consider physical activity?
 - Probe: which activities in your routine involve you moving your body or some sort of physical effort?
- Why do you engage in these activities?
- Thinking about the things you do on a daily basis, how important is engaging in physical activity or being active as part of your daily life?

Probe:

- What makes it important or less important?
- What do you think are some of the good things about engaging in physical activity? Do you think you personally benefit from physical activity? How so?
- What do you think are some downsides of engaging in physical activity? Do you think engaging in physical activity costs you in any way?
- How does physical activity make you feel, about yourself and your health? What is it like when you in engage in activities that are physically active? (Probe for emotions)
 - What is it about these activities that you like or do not like?
- Do you see a relationship between physical activity and health?
 - What kind of effect do you think physical activity has on type-2 diabetes?

- Where or from whom do you obtain information about physical activity and health (including type-2 diabetes)? What or who is your most trusted source of information about physical activity and health?
- How much physical activity do you think you need to do everyday?
 - Have you been told about how much and types of physical activity you should perform every day?
 - Have you ever discussed this with your doctor or nurse about physical activity? What advice did they give you regarding physical activity?
 - Do you feel that you have been able to follow through with these recommendations/advice? Why? Why not?
- How do you feel about the amount of physical activity you've been doing?
 - Do you think you do enough physical activity on a daily basis? Why? Why not?
 - Would you like to include more physical activity in your daily routine?
 - What aspects of your daily life make it easy/difficult to engage in more physical activity?
 - Are there any physical activity that you feel you should do everyday but either don't do, or do not very often?
 - What are they and why do you feel this way?
 - What would have to be different so that you would do them more often?
 - Which of the important roles you play in your daily life do you think influence your physical activity?
 - How would you resolve any conflicts that arise between fulfilling these important roles and being an active person?

[Past experiences with physical activity]

- Can you tell me about your experiences with physical activity in the past? Do you think your patterns of physical activity have changed over your lifetime?
 - How does your current involvement in physical activity compare to what you used to do, before your diagnoses?

- Are you aware of any changes in your physical activity since being diagnosed with type-2 diabetes? What might have influenced those changes?
 - What kinds of physical activities did you participate in during this typical day prior to diagnosis?
 - How important was PA in your life?
 - Did you make any deliberate changes to your physical activity since you were diagnosed?
 - Why was it important to make these changes?
 - How (if at all) have your beliefs and feelings about physical activity changed since your diagnosis?
- Overall, are you more or less active now than you were before your diagnosis, or is your activity level about the same? Why?
- How much is your current practice of physical activity similar to, or different from when you were a child, an adolescent and a young adult?

Probe:

- What were your views about physical activity in these times of your life? How important was in these times in your life?
- Looking back to your childhood and growing up years, how has your physical activity levels changed since then?
 - What were the circumstances or events that impacted your physical activity participation?
 - How do you feel about the changes?
- Can you tell me about some of the times in your life when you were regularly physically active?
 - What helped you stay physically active during those times?
- Can you about some of the times in your life when you were less physically active?
 - What prevented you from being physically active during these times?
- How have your past experiences impact your current practices of physical activity?

[Closing]

- Is there anything you'd like to add about our discussion today? Do you have any questions for me?

Those are all of the questions I have for you today. Thank you very much for your time it has been a pleasure speaking with you!

[DIARY STUDY INSTRUCTIONS]

[INTRODUCTION]

Thank you for agreeing to participate in this diary study, your help is appreciated and I hope you will enjoy this experience too. Find below the instructions on how to carry out the study. You are provided with a kit containing an accelerometer, a video camera, and a paper diary for this study.

Accelerometer

The accelerometer is a small device that records body movements during daily activities. It records no other information and it is not harmful in any way. Please wear the accelerometer on your wrist for a period of one week during the time you are awake, putting it on in the morning and taking it off when you go to bed at night. You also need to remove the monitor when engaging in water-based activities for example, before you take a bath, as it may get damaged if it gets wet. Please do not alter your normal routine or physical activity behaviour while wearing the accelerometer; I am interested in your normal patterns of activity.

During this one-week of wearing the accelerometer, you are also invited to keep a diary of your everyday life activities using either photos, short videos, audio, paper diary or any combination of tools you are most comfortable with....

Video camera

The video camera both still images and video clips.

To take photographs of various aspects of your life that represents your everyday activities.

- 1) Photos that depict your daily routine (what you did in the morning, afternoon and night)
- 2) Photos that depict the challenges and struggles of physical activity in everyday life
- 3) Photos of places and things in your environment that make it easy or difficult for you to engage in physical activity
- 4) Photos of places you go to on a daily basis that are meaningful to you.

Take photographs of the things that you do during a normal day, places, people and the things in your everyday environment that you associate with physical activity. For example images that capture your feelings about things that make it easy or difficult to be physically active in your environment.

Take the pictures and/or short video clips of things that you do in various times and spaces in your daily life, meaningful places that you go, that might be relevant that you would like to share. You can also ask your friends or family to take photos or short video clips of you as you engage in activities of everyday life (if that will make it easier for you). Photos of you will be blurred or masked out so that you do not need to worry about privacy. Remember you will be asked to explain the reason you took your photographs.

If you take photographs or videos of other people, you should explain why you are taking their photograph. You will also be given consent forms for any person to sign before you photograph them. Please do not take photos of anyone who doesn't want their photo taken or who doesn't give you their permission. They have a right not to take part.

It is up to you what you to take photos or short video of, it should be your choice. Within one week after this session, I will call you to check in your progress and offer encouragement,
Text reminders will be sent every morning to remind you to wear accelerometer.
Please try to make your diary legible

Audio Recorder

We will then arrange to meet to do a second interview to talk about the diary study and about what we can learn from them about your everyday life experiences.

If any questions arise, please feel free to contact me at xxxxxxxxxxxx.

[FOLLOW-UP INTERVIEWS]

The follow up interview will be guided by the accelerometer data and diary data generated by participants. This data will be different for each participant, and will therefore act as a unique interview probe for each participant.

[Introduction]

- Thank participant for their participation.
- Remind participant of the purpose of the study.
- Define and describe the follow-up interview and its purpose.
- Remind participants about issues of rights of participation, confidentiality and respect
- Verbally confirm continued consent to participate

[Opening Questions]

Accelerometer data and diary data will be printed out and shared with the participant at the beginning of the interview, and participants will be given sometime to review and familiarise with their data. Subsequent interview questions will be driven by the data as well as participants' observations and responses.

Together, we will look at the data you've gathered and we will use them to lead our discussion. I have a few questions in mind that I would like to ask you but we'll just see where the conversation takes us.

- Could you start by telling me what the seven-day diary study period was like for you?
 - How did it compare with a typical week for you? If different, how was it different and why?
 - Were there any physical activities that you did more or less of than usual? Why? What was that like for you?

[Accelerometer data]

The following questions may also be used to prompt discussion during the interview
I would like to show you your accelerometer data. (Explain accelerometer data to participants including levels and patterns of activities to participants).

- Can you describe to me what happened on this day?
 - What were you doing at these moments?

- Why were you doing this activity?
- Where did this activity take place? What was involved?
- Who were you with?
- Tell me how you do this activity?
- What does (activity) mean to you? What would it mean if you couldn't do it anymore?
- Why were you more/less active at these particular moments compared to other times/days?
- How did you feel about those moments where you were more/less physically active?
- Are you surprised by what you see on the accelerometer data? Why or why not?
- Why do you think your activity pattern is the way it is?

[Photograph and video data]

- How did you find the experience of taking pictures/video clips of your activities and environment?
- Why did you choose to take photographs/videos instead of (other diary tools) for your data collection?
- Can you tell me more about these photographs/video clips?

Probe:

- What is this photograph or video clip of?
- Can you describe what was happening when you took this picture or clip?
 - Where was the photograph taken, what were you doing, who were you with?
 - What does the activity mean to you?
- Why did you take this photograph/video clip? What's important about this situation/place/object/people?
- What does this photograph tell us about your everyday practices of physical activity?
- How does this photograph make you feel?

- Is there anything important about the activities you do that aren't shown in any of these pictures?
- If you could change anything about the way in which you participate in physical activity, such as the types that you are involved in or the time and spaces in which they take place, what would these be, and why?
- Is there anything else you would like to tell me?

[Audio/written diary]

Thank participants for their time and participation.