

Social network sites as a means to collect
health behaviour data for young people; a
comparative-descriptive cross sectional study

BY

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Declaration of Originality

I, Fahdah Alshaikh, declare that the contents of this thesis are from my own work. Where the work of others has been used, this has been indicated and appropriately referenced.

Abstract

This thesis is original in the sense that it examines a relatively new method of collecting data using Social Network Sites, and explores the feasibility of this method for survey research providing valuable data regarding health behaviours among young Saudis.

Aims: The primary aim of this study is to assess the feasibility of Social Network Sites (SNS) as a mode of collecting data for health behavioural surveys by comparing data collected from an SNS-based questionnaire with data collected from a traditional paper questionnaire using the same variables. It also aims to provide descriptive information about health behaviours among young people in Saudi Arabia.

Methods: The study demonstrated the Young Risky Behaviour Survey “YRBS” questionnaire cross-sectionally by two modes for different participants groups. Each mode of participant’s recruitment is considered as a sub-study. The first one is the “offline study” where participants were recruited randomly from schools and universities in Saudi Arabia. The second sub-study is the “Online study” where participants were recruited using Facebook fan page and Facebook ads. Results from both sub-studies were analysed and compared in order to answer the research questions.

Results: The main results of reported risky health behaviours indicated that 15% of participants are current smokers, 41% drank fizzy drinks (4-6 times a week) and 94% did not meet the recommended level of physical activity. Comparison between SNS and PAP indicated that SNS is an effective tool for collecting health behaviour data and

Abstract :

yielded sufficient sample size with a wider geographical reach. Moreover, mode effect on reporting risky behaviours was only significant in 8 out of 25 risky behaviours.

Conclusion: Comparisons between the approaches suggest few notable differences, and both methods have produced similar figures regarding health behaviours. Though the limitations of both methods are also discussed in this thesis, the results support the argument that SNS can be a very useful tool leading to representable data.

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Abbreviations :

Abbreviations

BMI	Body Mass Index
CDC	Centre of disease control
CGM	customer generated media
COPD	Chronic obstructive pulmonary disease
PAP	Paper And Pen
SNS	Social Network sites
WHO	World of Health Organization
WOM	Word of Mouth
YRBS	Young Risky Behaviour Survey

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CHAPTER 1

Introduction

1 Introduction

1.1 Introduction

A key public health aim is to prevent illness in the population and to provide services that meet population needs. Today, diabetes and chronic obstructive pulmonary disease (COPD) have become major causes of death around the world. Moreover, chronic diseases are related to lifestyle and dietary habits, which usually become ingrained during youth (13-24 years), it is therefore essential to direct health research at this age group, to identify strategies and solutions to help prevent them from being stricken by chronic disease later in their lives [1].

The first step is to provide accurate and reliable data about current health behaviours among youth. This notion was recognised years ago by a number of health authorities and organisations, including the Centres for Disease Control and Prevention (CDC) and the World Health Organization (WHO), when they established surveillance systems to track health behaviour changes. However, with the development of new media and technologies, more opportunities have also emerged for health research and data collection. In the digital world, social network sites (SNS) are where young people socialise, play and exchange personal information and photographs. These sites account for a large portion of their time, and they are becoming an increasingly important part of their social, emotional and cognitive development. Although SNS are gaining in popularity among different age groups, the highest proportion of SNS users can be found amongst teens and young adults aged between 18–23 years [2-4]. SNS have evolved into a dynamic and accurate source of gathering information because they

contain a feature not found in traditional media: active and two-way participation [5]. The idea of using the power of social networks to reach young age groups and to conduct health surveys and research is the starting point for this study.

1.2 Identifying the gap in the literature

Interest in online social networks has been increasing over the past few years as a result of the adoption of new technologies around the world. However, my fundamental research question: ‘How effective are social network sites as a tool for collecting youth health behaviour data?’ remains unanswered by current research. This study seeks to fill this gap by demonstrating the effectiveness and usefulness of this tool in health behavioural research, as well as to explore the advantages and disadvantages of SNS by comparing them to paper and pen (PAP) methods of data collection.

The gap in the literature was identified by conducting a comprehensive search for relevant literature. Chapter 3 will provide explicit details of the review process. The literature review indicates that SNS have been used as a means of surveillance in many social research studies focusing on the ways people interact or share information, as well as by marketers who are interested in identifying audience preferences, whereby every post or picture done by an SNS user is recorded for research use. Yet, it also highlights a gap in the literature regarding the potential of utilizing SNS to collect data with user permission and anonymity.

1.3 Contributions

This study will provide baseline information and guidance for health research in collecting health behaviour data through online social networks. It will also highlight the most prevalent risky health behaviours among young Saudis.

1.4 Project outline

The project outline will follow the stages of the thesis; each chapter represents a different stage of the investigation. The next chapter presents a background and rationale of the study, followed by the theory behind the thesis. The fourth chapter includes a comprehensive literature review regarding the uses of social network sites in health research. Chapter five presents a systematic review of social network sites as a mode of data collection, followed by the methodology of the study in chapter six, results in chapter seven and discussion in chapter eight.

CHAPTER 2

Background and rationale of the thesis

2 Background

2.1 Background

Because this study is focused on the use of SNS in collecting health behaviour surveys in Saudi Arabia, this chapter will begin with a review of background information regarding available health behaviour surveys and the importance of these kinds of surveys. This is followed by a rationale of the study population. The chapter ends by providing an overview of Saudi Arabia and explaining why it is suitable to this study.

2.2 Health behaviour surveys:

Measuring health behaviours is an aim of many national and local surveys. The European Health and Behaviour Survey was designed to assess the health behaviours and beliefs of people aged 18 and over. There are a large number of surveys in the United States that measure the prevalence of risky health behaviours, such as “The Behavioural Risk Factor Surveillance System” and “The Youth Risk Behaviour Surveillance System”, along with others that measure nutrition levels and rates of drug use. All of these surveys depend on either interviews or telephone surveys for collecting data, and though these tools are very useful, they are both expensive and time-consuming. The surveys were conducted over different time periods and were performed to address the increasingly pressing need to measure population health behaviours. The information obtained from these surveys is critical for health intervention planning, delivery and evaluation [6-8].

2.2.1 Social network sites:

In 1997, the first SNS, sixdegrees.com, was launched. Since then, more than thirty-five sites have been established, and they have attracted the attention of millions of people around the globe. Sites such as Facebook and YouTube generate an obvious effect on social relations, culture, and research interests. Signing onto these SNSs has become a daily activity for millions of users [9]. For example, Facebook claims that more than 500 million active users access its site and spend more than 700 billion minutes per month surfing it [10]. These SNSs allow people to create personal profiles, join groups, add friends, upload photos, and use other methods to build communication networks with others [11]. In addition, SNSs are being used by researchers as a source of information about users' characteristics, patterns, and usage behaviours[12]. These social networks have become a modern source for information and data gathering. They have evolved into a dynamic and accurate source of gathering information because they contain a feature not found in traditional media: active, two-way participation [5]. SNSs are also an extraordinary marketing tool, able to reach almost any type of person, which changes communication from 'one-to-one' to 'many-to-many' [13]. Finally, they have become sources of collecting timely information, converting data into profitable results more efficiently than ever before. They contain great opportunities for future research in public health because they have the potential to reach hidden and hard-to-reach groups [14].

2.3 Youth as a study population:

Adolescence ensues at the age of puberty and continues until growth stops, a period generally ranging between the ages of 12 and 21. During this period, a young person

experiences rapid physical growth and significant considerable hormonal and psychological changes. The adolescent years are considered to be years of optimal health and well-being. They are also a critical period of development that has an appreciable effect on personal behaviour and health [15]. During these years, many young people may engage in risky health behaviours for the first time in their lives¹, and in fact, around 40% of young people develop at least one type of risky behaviour that can be modified to lessen the chance of developing a chronic disease [16]. Moreover, when thinking about modifying unhealthy behaviours in populations, it is crucial to target young people because their behaviours are likely to be less established and less resistant to change in comparison to older adult behaviours.

2.3.1 Youth and social networking sites:

In today's world, being young usually also means being skilled in the use of computerised and digital technologies. Young people have grown up with technology, and are thus familiar with computers, digital games and the Internet. In the digital world, SNSs are where young people socialise, play and exchange personal information and pictures. It becomes an important part of their social, emotional and cognitive development, and accounts for a large portion of their time [2, 3]. Although SNSs are gaining in popularity among different age groups, the highest proportion of SNS users is found among teens and young adults ages 18–23 [4]. Two studies regarding SNS have been conducted in the United States. One study by Miller found that undergraduate

¹ Risky health behaviour is defined here as chronic disease risk factors: i.e., smoking, diet and physical inactivity.

students are using these sites intensively: 88.5% of the participants visit SNSs daily, while 60% reported visiting them multiple times a day and spending 10–60 minutes per visit [17]. Another study found that 87.1% of participant students have SNS accounts, and these spend 3 hours per day on either their own or their friends' accounts [18]. The numbers among teens are similar: Butcher notes that 82% of youth aged 14–17 and 55% aged 12–13 have SNS profiles. These figures indicate that the youth presence in SNSs is worth notice [5].

2.4 Saudi Arabia

2.4.1 Country profile:

Saudi Arabia is the largest country in the Arabian Gulf Area, is the birthplace of Islam and has the largest world oil reserve. Its total population is about 29 million people (including Saudi nationals and non-nationals) with half aged younger than 25 years old and 30% younger than 15 years old. Only 2.9% of the population is aged 65 or older. The country is divided into thirteen provinces. The highest population is found in Makah region, followed by Riyadh, the capital city, and the Eastern Region [19]. Figure.1 illustrates a map of Saudi Arabia.

The country has endured tremendous changes in many sectors, which are reflected in population lifestyles and health. Disease patterns in the country have shifted from communicable or infectious diseases to a prevalence of non-communicable diseases such as diabetes, hypertension, heart disease and childhood obesity [20-22]. Scholars

attribute this shift to health behaviour factors such as tobacco consumption, dietary behaviours and an increasingly sedentary life style. Governmental efforts are directed at preventing non-communicable diseases through a variety of prevention programs among health institutions, yet there are a number of challenges affecting the Saudi population's quest for better health, with influences ranging from the religious, cultural and governmental sectors of society[22].



Figure 1 Saudi Arabia map.[23]

2.4.2 Health system in brief:

The World Health Organization's comparative assessment of healthcare systems ranks Saudi Arabia at 26th of 191 member states on overall health system performance [24].

The Saudi Arabian government has begun to add greater support to the development of

health systems, allocating 12% of the total government budget for 2014 to the health and social affairs sector, an increase of 8% from the 2013 budget [25]. Noticeable improvements include several projects for the construction of health facilities and sport clubs, as well as social rehabilitation centres [19, 26]. Health care in Saudi Arabia is free for all citizens, and 40.2% of health services are managed by the Ministry of Health (MOH), while the remaining 58.8% are managed by the semi-public and private sectors [27, 28]. Yet the accessibility of health services remains less than optimal, as the MOH health facilities and personnel are not properly distributed throughout the nation, and there are limited health services available for the elderly, adolescents and people with disabilities, particularly in rural regions [29].

2.4.3 Internet penetration and social networks use:

Saudi Arabia is experiencing rapid growth of Internet use and access all over the country, though use is concentrated mostly in three large provinces: Makah, Riyadh and Alkhobar (Eastern region). Forty-one per cent of the Saudi population are regular Internet users, with about 41% of these using the Internet mostly for playing games, entertainment and SNS access. Sixty per cent of regular Internet users access SNSs, and 12% of the population are Facebook users. Facebook is the third most visited website among Saudis [30].

The numbers of SNS use in Saudi Arabia are expected to increase rapidly because of SNS popularity among young age groups, which are dominant among Saudi population demographics. Moreover, social networking was the main reason for Internet use

among young Saudis as reported by the “Communication and Information Technology Commission” in Saudi Arabia. All the previous facts shed light on the importance of using the Internet and particularly SNSs in different aspects of research of the Saudi population [31].

2.4.4 Health behaviours of Saudi youth:

The prevalence and deadliness of chronic diseases in Saudi Arabia is linked to the Saudi population lifestyle and widespread health behaviours. Mermish et al. have reported the burden of diseases and risk factors in Saudi Arabia by reviewing available data such as surveys, active screening data, disease registries and other sources, finding that non-communicable diseases and road traffic injuries are the leading cause of death and disability, and that high body mass index and high glucose levels are major risk factors for disease among the Saudi population [32].

It is clear that with the urbanization of the whole population, the high dependency on motor vehicles and the use of technologies are affecting the level of physical activity, as well as unhealthy dietary behaviours such as the high consumption of fast food, which is very common in the Saudi community. All of these are alarming indicators for future health, particularly in a country like Saudi Arabia, where chronic diseases have become prevalent.

A number of scholars have examined rates of risky behaviours such as smoking, physical inactivity and dietary behaviours [23, 33, 34]. Reported smoking rates show

variability due to different study designs, samples and protocols, and most of the results represent only one city or region, or even a single academic institute. Figures range from 2.4% to 52.9% with a median of 17.5% for youth, and 11.6% to 52.3%, with a median of 22.6% among adults, with males generally reporting higher smoking rates than females [35].

Physical inactivity is another significant risk factor, as it is associated with heart disease, obesity and diabetes. In Saudi Arabia, as reported by different studies and measurement tools, numbers of people engaged in physical activity ranged from 43% to 99% [36-39], yet obesity and overweight are known to be prevalent in the Middle East region, particularly in the Gulf. In Saudi Arabia, a recent national survey indicated that the prevalence of obesity among those aged 15 years or older was 28.7% [40]. Overall, the Saudi Arabian population is at a high risk for developing chronic diseases due to lifestyle and health behaviours. And while most studies have been performed on a small-scale and are not geographically representable, they provide useful indications regarding rates of risky behaviours among the Saudi population.

2.4.5 Sex education and behaviour in Saudi Arabia:

Among all health behaviour problems affecting younger age groups, sexual behaviour is among the most significant, as the numbers of sexually transmitted diseases, including human immunodeficiency virus (HIV), are increasing globally as a result of unsafe sexual practice. These diseases primarily affect young adults, and actions regarding this matter are defined as meeting public health needs for this age group. In Saudi Arabia,

increases have been reported for the numbers of people affected by HIV and STDs, yet little is known regarding the magnitude of the problem, as there is limited research and information about sexual practice in the country, as is the case for most of the Arab or Middle East region.

As in most of the Arab world, in Saudi Arabian communities, premarital sex and extramarital sex are viewed as culturally unacceptable, and although these phenomena exist in the community, their presence is generally denied in official or public venues. Thus, educational or awareness programs, as well as other health interventions regarding safe sexual practices, are extremely difficult to deliver. A series of recent cross sectional studies targeting young male students found that 31% of the sample had engaged in premarital or extramarital sexual practice, yet the study did not include females because of the sensitivity of this issue in the region. The numbers are considered high relative to those demonstrated in other studies in the Middle East, which report rates of male extramarital sex ranging from 7 – 28% [41].

The sensitivity and importance of this health issue strengthens the need for a flexible means of gathering information about sexual behaviours among young adults in Saudi Arabia. As the first step toward any public health solution is assessing needs, it is important to find valid sources of information, and the Internet and social network sites hold great promise for that. Social network sites and online surveys have yet to be explored in sexual health research for this region, but they are widely recognised as an effective mode for collecting data about MSMs (men who have sex with men) and other

hard to reach groups to gather information regarding sexual behaviours. In Saudi Arabia, where it is taboo to openly discuss sexual issues, it is almost impossible to gather accurate information from members of younger age groups, particularly school aged youth, where the academic environment is not encouraging of frank and truthful responses regarding such topics.

This research examines the use of online surveys and social network sites for collecting information about other health behaviours and did not include sexual behaviours in the investigation, yet based on the results, a sexual behaviour questionnaire will be designed for future use online, applying lessons learned from this investigation.

2.5 Feasibility studies:

This study is focusing on assessing the feasibility of SNS in collecting health behaviour and it is important to note that researchers use the term feasibility study broadly to include any sort of studies that aims to investigate a new intervention or a product.

Feasibility studies are usually used to determine if an intervention is appropriate for further testing and it enables researchers to assess whether or not the ideas and findings can be shaped to be relevant and sustainable [42, 43]. These kinds of studies are desirable when researchers want to compare different recruitment strategies. It is proposed that feasibility studies have eight areas of focus: Acceptability, demand, Implementation, practicality, adaptation, Integration, expansion. Each area is described in [Appendix A]. Our study focuses on six of them which was described by Bowen et al

as followed [42] :

- **Acceptability:** This relatively common focus looks at how the intended individual recipients—both targeted individuals and those involved in implementing programs react to the intervention.
- **Demand.** Demand for the intervention can be assessed by gathering data on estimated use or by actually documenting the use of selected intervention activities in a defined intervention population or setting
- **Implementation.** This research focus concerns the extent, likelihood, and manner in which an intervention can be fully implemented as planned and proposed, often in an uncontrolled design.
- **Practicality.** This focus explores the extent to which an intervention can be delivered when resources, time, commitment, or some combination thereof are constrained in some way.
- **Adaptation.** Adaptation focuses on changing program contents or procedures to be appropriate in a new situation. It is important to describe the actual modifications that are made to accommodate the context and requirements of a different format, media, or population.
- **Expansion.** This focus examines the potential success of an already successful intervention with a different population or in a different setting.

Feasibility studies design depends on two elements, first are the areas of focus and second are the questions that researcher is trying to answer. And with new intervention

or a tool to be developed, the question *Can it work?* Is usually the main question which demand evidence that this new intervention or tool might work, the next question is *Does it work*, and under what conditions or situations in comparison to other practices. And after providing evidence and answers to previous questions, the question *Will it work?* If applied in other contexts settings and cultures require answers.

This study is designed to compare a relatively new mode SNS and assess the acceptability of the tool by comparing response rates and drop-outs. And assess the demand of new tool for collecting health behaviour data for Saudi population by comparing advantages and disadvantages of SNS in comparison to PAP, also to assess implementation of SNS by measuring cost and timeliness. In addition, assessing practicality, adaption and expansion of SNS.

2.6 Aims

The primary aim of this study is to assess the feasibility of SNS as a mode of collecting data for health behavioural surveys by comparing data collected from an SNS-based questionnaire with data collected from a traditional paper questionnaire, using the same variables about health behaviour. The study also aims to provide descriptive information about young health behaviour in Saudi Arabia.

2.7 Objectives

1. To determine the effect, if any, of the questionnaire type on the response rate.
2. To determine the effect of questionnaire type on data quality.

3. To explore the differences in health behaviours proportions between the two types of data collection modes.
4. To identify specific challenges/strengths in adopting social network sites for health surveys targeting youth.
5. To determine possible strategies to reach and collect health-related data from young people using SNS.
6. To inform health services and education programmes, and to address policies aimed at preventing chronic diseases among Saudi youths in Saudi Arabia.

2.8 Research questions

1. Are online social networking sites an effective tool for conducting health behaviour surveys for a young population?
2. What effect does the survey method have in reporting risky health behaviours?

2.9 Key points from Chapter 2

- Health surveys are an important element of any health intervention plan or implementation.
- Young people are viewed as difficult to reach in public health research, yet SNSs offer a valuable opportunity to reach them effectively.
- Half of the Saudi population is less than 25 years of age.
- SNS use in Saudi Arabia is rapidly growing, mainly among younger age groups.

- Saudi youth engage in risky health lifestyles and demonstrate high percentages of risky health behaviours.
- SNSs hold great potential for sex education and sexual behaviour research in Saudi Arabia.

CHAPTER 3

Potential of online social networks in health research and data collection- Theory behind the thesis

3 Potential of online social networks in health research and data collection- theory behind the thesis

In this digital age, all types of communication, trading and learning are altered by the presence of technology and the opportunities different kinds of technology presents in various aspects of research. The Internet is an example of a recent technological innovation that has created new means of reaching broad audiences in a unique, interactive, and efficient manner. The Internet offers a platform or multiple forms of communication and interaction for researchers, the most notable of which are online social networks, which have proliferated over the past decade.

Scholars from a variety of disciplines have utilized online social networks as a source of information: marketers have researched consumer preferences; social scientists have examined social network uses and behaviours. Currently, however, the possibilities presented by online social networks to reach and collect data from young age groups (who are highly present in these sites) has not been widely applied to health research. Existing research suggests that using new media is a successful strategy in marketing products, and the use of some features and techniques may make it useful for health research and surveys.

In this chapter, I assess the particular kinds of power and opportunities that social network sites (SNS) offer for health research, exploring some of the existing marketing

techniques that can be applied to health research and web-health surveys. First, I present a health communication model that is based largely on the use of new media in general and social network sites in particular. Second, I explore some of the digital marketing features, strategies and concepts that highlight the effectiveness of social networks in the health sector, especially in targeting young age groups. Finally, I suggest ways of applying these marketing concepts in web-health research.

* Part of this chapter was produced as an article in the Global Village Imperial College's publication. [Appendix B]

3.1 Introduction

Marketing has become the key to the success of any project or business, and connecting products and services to an identified group of consumers is the central concept behind modern marketing. Marketing research agrees that young people aged 12-17 are a valuable age group for interactive digital marketing. In 2008, a marketing survey found that 58% of this age group spends an average of \$46 per month on online purchases. As a result, many marketers have focused a great deal of attention to that age group, particularly when implementing digital marketing strategies. Digital marketing emerged as the predominant method of marketing when people lost interest in Television advertisements and printed materials [44]. Recognising this, food and beverage marketers have tailored their marketing methods for young people and developed interactive digital advertising by using a range of platforms, including social media, video games and online videos.

Realising the power of digital marketing by different marketers in a number of sectors, health researchers may ask themselves: would digital marketing be effective in engaging and reaching youth for health research and health surveys?

3.2 Why SNS is suitable for health research?

Health and the Internet have long been linked. In the early days of the Internet, people began to use search engines to research health conditions, and most health organizations have had an existence on the Internet ever since. There are three health application areas of the Internet: Communication; Content and Community [45].

- A. *Communication*: examples of Internet communication for health related issues include a patient asking online questions, appointment reminders and e-mails.
- B. *Content*: patients seek information and advice regarding a health problem or symptoms.
- C. *Community*: communication through support groups and advocates for health issues is very common on the Internet; communication provides a high level of anonymity and is much easier without geographical barriers.

These three areas can operate on separate platforms, however if SNS is used as a platform all three areas can be applied at the same time. Through SNS, patient and health professionals can interact through these platforms either privately by messages or publicly through forums and fan pages. Moreover, health information (content) can be provided through social networks, not only in the traditional ways but also with new types of media such as videos and images. The third and most important health

application on the Internet is community: SNS is a favourable platform for communicating with groups and friends because its design lends itself to instant sharing for information and events. Existing marketing research supports the assumption that SNS holds great promise for reaching large groups in health surveys, as participants may spread the word and advertise for the survey by updating their status or showing their participation on their profiles and/or sending invitations to their friends [46].

Marketing research also discusses the impact of new media such as SNSs on consumer behaviour and how SNSs are key components in building product-consumer relationships. SNSs can be used not only for peer-to-peer recommendations, but also for interacting more directly with consumers, and these contacts are valuable for evaluating consumer preferences in order to develop effective products or marketing plans. Researchers have also recognized that online advertisements can be as effective as offline advertisements [4, 44, 47-51]. Some companies consider SNSs an efficient platform for advertising and engaging consumers because SNSs produce user-generated content and discussions, which pave the way for connecting with consumers regarding their common interests and needs. A number of companies who utilise SNS to interact with their customers have even invited them to create advertisements or slogans, giving the consumer a role in advertising and marketing strategies. This is an example of customer-generated media (CGM), which has become a marketing tool to engage costumers and to generate ads at a low price. Though the above conclusions concern paid products and goods, rather than health services or research, the uses of SNS by marketers in engaging the public suggests that it is a platform that can also be

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effectively linked to health services and health research, particularly when all three health application areas can be applied through SNS simultaneously.

The health communication model is based on a mass communication model where the communication mode is based on the principle of one-to-many. This often manifests as a one-way relationship, whereby consumer feedback is not highly appreciated or even gathered due to the difficulty of reaching consumers. Figure 2 is a representation of the traditional health communication model, while the model presented in Figure 3 demonstrates the effect of SNS as a mode of communication, whereby the feedback will be instant and updated on an ongoing basis:

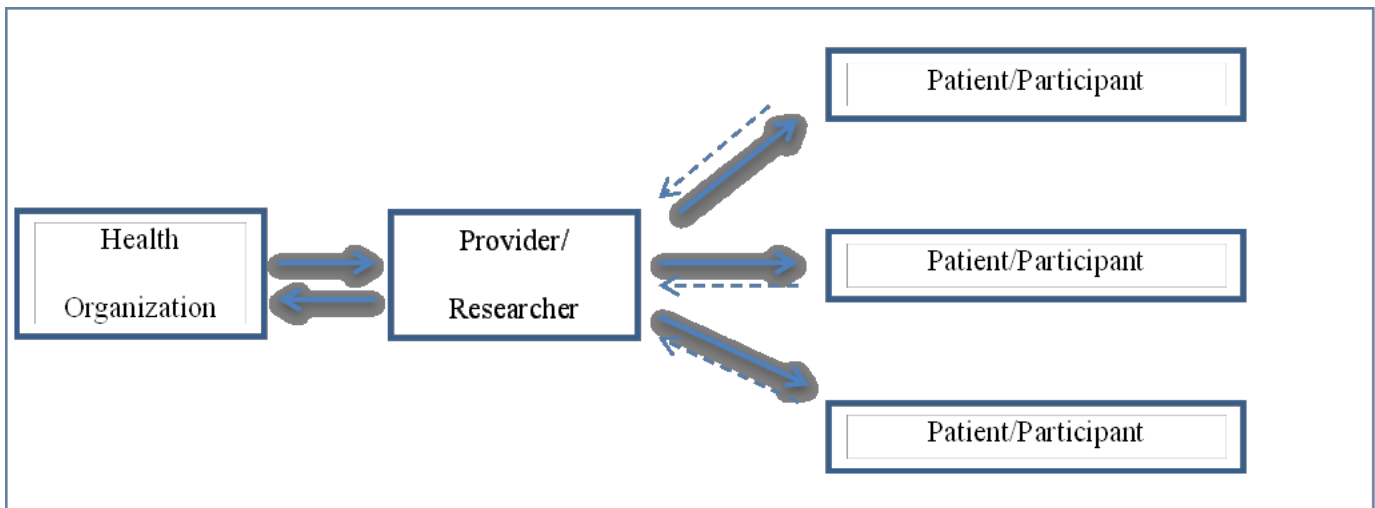


Figure 2 Traditional health communication model.
*Adapted from Hoffman and Novak [51, 52]

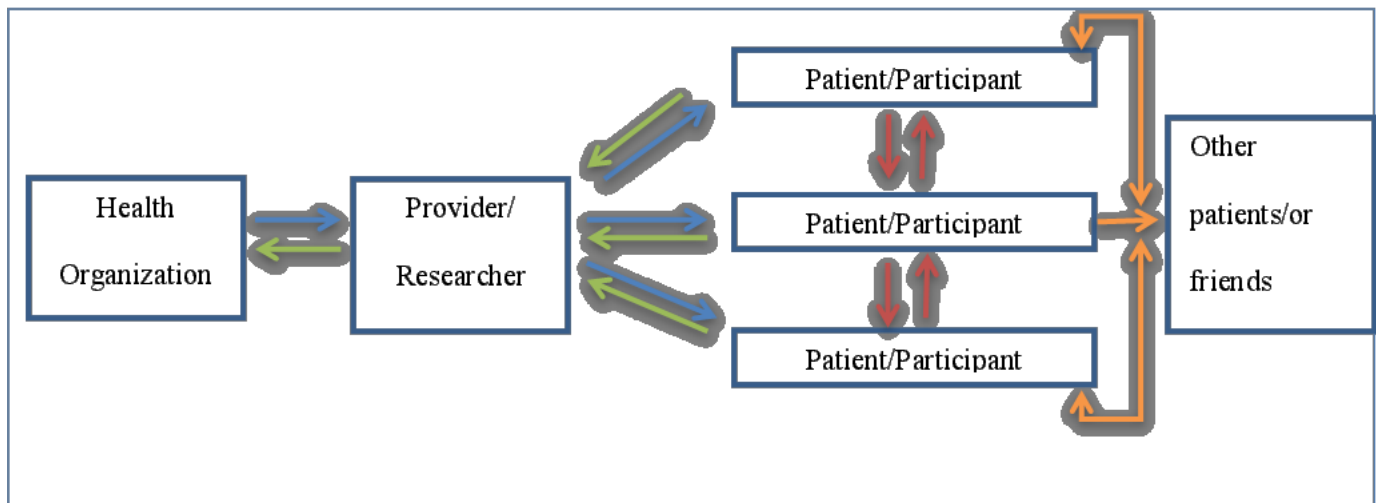


Figure 3 SNS effect on health communication.

*Modified Mass communication Models Adapted from [87, 88]

3.3 Digital marketing and marketing concepts

Marketing has existed for a long part of human history. All types of marketing share the same aim, which is to create or demonstrate the value of the product among consumers to prompt voluntary exchange [53]. Two concepts are fundamental in digital marketing:

Targeted marketing involves developing marketing strategies designed for consumers that share similar needs or characteristics, which is also known as “social marketing” in public health. Targeted marketing is based on the notion that if you speak to consumers in a manner that aligns with their attitudes, beliefs and values, you will get a better response to what you are marketing [53]. Moreover, Targeted Marketing aims either to persuade a consumer of a new product’s value or to maintain or enhance consumption of established brands.

The **Word of Mouth** (WOM) concept refers to consumer product recommendations to friends or family based on their personal experience or opinion, and strategies aimed at influencing the exchange of messages and recommendations is called “Word of Mouth Marketing”. Marketing researchers recognise that WOM marketing, when combined with online social network communication, can create what is called “viral marketing” whereby consumers spread the word or recommend a product by posting a link on their wall or updating their SNSs profiles. Marketing researchers note that if marketing campaigns are aiming for young age groups, they must consider online social media, on which young people rely for instant and new information [54, 55].

3.4 Successful digital marketing elements

In commercial marketing, Internet technologies are seen as powerful methods at reducing the cost and time of message delivery, thus eliminating geographical boundaries. However, simply using the Internet will not result in immediate success in digital marketing. Kierzkowski [90] has developed a framework for success in digital marketing that revolves around five elements [56, 57]:

- The first is to **attract** the audience by using tools to guide them to your brand or website. The most important tool to provide ease of access and make the brand or firm easily found is to market it on the web. Strategies and tools used to attract audiences increase awareness of the website and the content. Examples of such strategies include banner ads and listings in search engines.

- The second element is to **engage** audiences by creating an active page that allows a high level of interaction and participation. An active web-page contains informative, useful content and virtual communities, and offers creative engagement strategies such as contests and discussions.
- The third element is using tools to **retain** an audience. This can be achieved by keeping the content up-to-date and responding directly. The importance of retaining customers or audiences depends on the marketer and the type of service or product provided. Some services or products need a visitor to enter the website only once or on a few occasions, but in the case of health services and research through SNS, it is important to retain the audience and have a fully interactive relationship with them. Up-to date content is crucial for the effectiveness of fan pages, as loyal users are the key for wide reach.
- The fourth element is to **learn** about your consumers. Contacting the audience and costumers give you an opportunity to learn about their preferences, communication styles and their needs, and it is important to react to what you learn. A very strong tool available on the Facebook social network is “Facebook Insight”, which provides detailed information about the company’s audience members: their age, sex, activity levels, etc. Similar information could be used in health research to better understand the needs of the consumer.

- The fifth and final element is to **relate** to audiences, and relates to personalizing and customizing products to suit audience preference and needs. For health services or a research fan page, it would be important to use language accessible to clients and to offer interesting topics in the content section.

3.5 Digital marketing for health communication

We hypothesise that the effective use of social network sites in health research and data collection can be achieved by applying the above reviewed elements of successful digital marketing (attract, engage, retain, learn and relate). In Figure 3, “Applying Marketing Strategies to Health Communication”, each communication direction is numbered:

(1) SNS → Patient/Participant:

This is the most important direction, and the one that needs a lot of attention in order to succeed. Most of the digital marketing elements for success must be applied in the Patient/Participant relationship. A strength of SNS is that Targeted Marketing can be achieved, as the network chooses and targets participants through ads and invitations. This allows the provider or researcher to **relate** to the patient or participant.

(2) Patient → SNS → Provider/Researcher:

This is an interactive mode of communication whereby the patient can give feedback easily and quickly. For SNS, this is a particular means of distinguishing it from other modes of communication, as patients in SNS are more open to sharing information and

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expressing feelings or preferences, and allowing the researcher/care provider to **learn** about the subject or patient.

(1) & (2):

To maintain interactive communication between researcher/provider and patient/participant, researchers must **retain** and **engage** their audience as discussed above. In SNS especially, one must give information in order to gain information.

(3) Patient → Patient:

This form of communication in SNS can be enhanced by providing an engaging mode of interaction that allows discussion between participants.

(4) Patient → Others/ Friends:

Here is where the concept of WOM is most obvious in relation to SNS, which is an endless network of connections through which information passes almost instantly. These links also can be enhanced by improving the aforementioned digital marketing elements.

(5) Researcher/Provider:

All of information obtained through SNS is provided voluntarily and stored electronically with a high level of feed analysis.

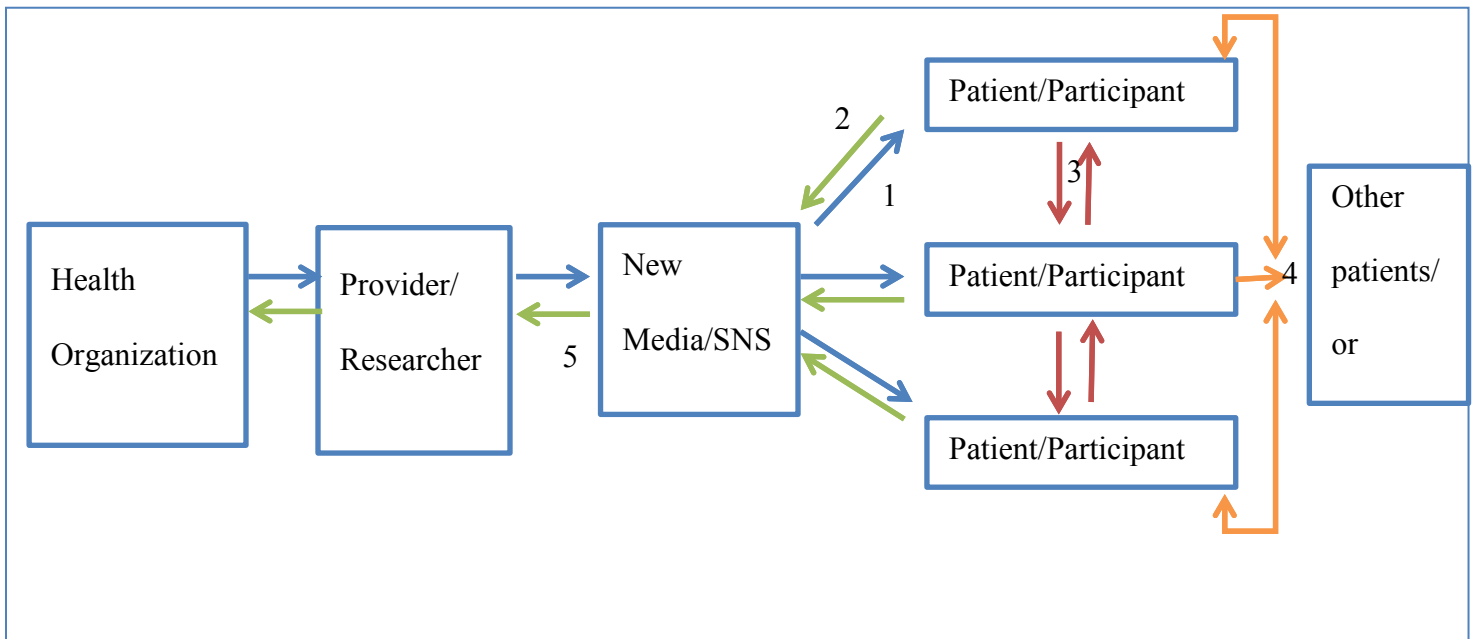


Figure 4 Applying marketing strategies for Health Communication.

3.6 Conclusion

The suggested model explores the possibilities of applying digital marketing techniques to web health research and services, specifically to social network sites. By diagramming possible paths of communication between health researchers and participants through SNS, we can picture the overall process and begin to focus our efforts on applying the digital marketing elements for success. It is critical for health providers and researchers to understand the opportunity that SNS holds for health communication and to be able to use this mode effectively. This broad model may be the first step to achieving this goal, though a multitude of factors may alter the communication modes, including type of SNS, user age, gender and culture, among other variables. This chapter provide strategies that can increase the effectiveness of SNS in collecting data. It also represents the theory behind this thesis and the reason of

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using SNS in collecting health behaviour data and using marketing techniques to enhance this tool.

CHAPTER 4

Literature review of SNS in Health research

4 Literature review of SNS in Health research

4.1 Literature review

This chapter will present the initial literature review that was conducted for this investigation in order to obtain an overview of the available research on SNS, as well as to understand the strengths and limitations of using SNS as a research tool.

4.2 Aims of the literature review

The literature review aims to examine current research literature on SNS and to identify how SNS is defined and used in research:

How do scholars define SNS? In what context is SNS used in research, and has it been used for health research? What are some strengths and limitations of using SNS in research?

4.3 Methods of literature review

A comprehensive search for relevant literature was conducted using the keywords “Online Social Networks/Sites” on the Ovid/MEDLINE, PubMed and Google scholar databases. Search results were exported to Endnote software, and abstracts were reviewed. Inclusion criteria were based on titles and abstracts, with no restrictions based on study types or field. The literature review focuses on the aims, objectives and methodologies of the studies.

4.4 Results of the review

Using the specified search terms, the search yielded 906 papers. After removing duplicates and studies that did not focus on online social networking, 879 study abstracts were reviewed. The papers were broadly grouped according to discipline: education, social research, marketing research, and health. Studies were examined in terms of methodology, objectives and utilization of SNS. The results are presented below according to the field of study.

4.4.1 SNS in education and social science:

Most available literature on SNSs (212 of the reviewed studies) focused on analysing the structure of social networks. The majority of papers were conducted by social researchers interested in the effects of SNSs on human behaviour and activities among online/offline social networks [5, 58-60]. These studies tend to analyse publicly available data – such as profile data, posted messages and user activities – for social research purposes [58, 61, 62]. This method, known as social network analysis (SNA) includes different techniques to examine patterns of communication and interaction within a group of individuals (network). These techniques were adopted by social researchers and by researchers interested in SNS and education (10 of the reviewed studies), who examined SNS involvement in learning experiences and the relationships between SNS use and student academic performance [63-72]. However, the investigators' reliance on publicly available data raises questions of ethics regarding the necessity of obtaining users' permission to view their personal information. Moreover, the recent proliferation

of privacy settings on SNSs suggest that these methods are not consistent with existing SNS regulations and reduce the availability of publicly available data.

4.4.2 SNS and marketing research:

SNS was the main topic in a number of marketing researches (13 of the reviewed studies) [47, 48, 50, 54, 55, 73-80]. These studies often explore the Word of Mouth (WOM) concept, whereby consumers recommend products to friends and acquaintances based on their personal experiences or opinions, with WOM occurring via the exchange of messages and product recommendations. Marketing researchers recognise the importance of WOM marketing, particularly when combined with online social network communications to create what is known as “viral marketing”, whereby consumers spread product ratings or recommendations by posting links or status updates on their SNS profiles. These researchers note the reliance of young people on online social media for instant and new information, and advocate their use in marketing campaigns aimed at younger age groups [81].

Results of marketing research support the notion that SNSs hold great potential for reaching large groups with health-based or other surveys, as participants may “spread the word” and advertise the survey by updating their status, displaying their participation on their profiles and/or sending invitations to participate to their friends [78]. Marketing researchers have also explored the impact of new media such as SNSs on consumer behaviour, as well as their importance in building product-consumer relationships, and have begun using SNSs to interact with consumers and identify their preferences for the

development of products or marketing plans. The results of these efforts have demonstrated that online ads can be as effective as advertisements presented in the traditional media forms. While some of these findings may transfer to other forms of research, marketing research focuses on paid products and goods, and none of the studies explored any health products or research methods related to gathering information about health conditions.

4.4.3 SNS and health research:

Examining research regarding SNSs in a health context, we find that some studies have analysed SNS health information content, such as research conducted by Greene[82], which examined the wall posts of 15 Facebook groups concerned with diabetes. The main objective of the investigation was to evaluate the health information available from these groups, and the results indicated that Facebook contains various types of participants that may serve as support communities, promotional spaces and recruitable research subjects. Yet, the study findings were based on descriptive and cross-sectional data gathered during a limited time period, which raises questions regarding the ability to generalize the results among other online communities concerned with chronic diseases[82]. Farmer [83] also searched Facebook for groups interested in non-communicable diseases, analysing the number of users in each group and the diseases of interest to them. Farmer explores different issues related to the availability of health information on online social networks (Facebook), yet his conclusions are based on personal opinions rather than on empirical data [83].

A recent study explored the potential of SNSs to deliver sexual health services for youth. Researchers collected data through surveys and focus groups among young people aged 14–19 from low-income communities. This investigation concluded that “SNSs and other technologies have a potential for reaching wide diverse youth with critical health information if implemented as a part of comprehensive outreach strategy” [84]. Although this study supports using SNS as a means to reach young age groups, it lacks a detailed explanation regarding methods of data collection and the selection of participants.

Few studies focus on SNSs as a way to reach and recruit participants or collect data. Seeing it as a cost-effective and easy means to reach a broad range of college-aged youth, Lord et al. [85] advertised an online survey concerning misused prescriptions on Facebook for a two week period. Their method resulted in 527 valid completed surveys; however, the survey was also posted on a different Web site where the number of viewers was not counted, so total response rates could not be calculated [85]. Moreover, the study did not explore other Facebook features such as fan pages, wall posts, or updates, focusing only on Facebook ads, which have become more sophisticated since the time of the study. In addition, at the time of the study, Facebook was restricted to users with valid institutional email addresses, which may have limited the reach of the investigation [85].

Raymond [86] compared three different methods of sampling MSMs (men who have sex with men) in San Francisco: time-location sampling; a venue-based approach on the

Internet; and direct marketing, whereby advertisements were placed on Facebook. Researchers concluded that time-location sampling was the most successful method based on higher participant response rates; however, this method depended on one-to-one interviews, which may explain its success [86]. Nevertheless, Raymond noted that Internet recruitment led to a large sample size in a short period of time. A similar study targeted MSMs by placing advertisement banners on an online social network called Gay.com in order to recruit participants for an online survey, resulting in a large and geographically diverse and high-risk sample of Latino MSMs [14]. Silenzio suggested that SNSs provide a novel opportunity to engage young lesbians, gays and bisexuals for suicide prevention research. He mapped social network connections for this identified group, and then applied a peer-driven diffusion hypothetical preventive intervention that reached a sample size of up to 18,409 individuals [14].

An investigation conducted by Nwadiuko used SNSs to trace young people for follow-up studies, finding that “social networking Web sites such as Facebook or MySpace provide a feasible supplement to conventional follow-up procedure” [87]. The study engaged 35 subjects, of which only seven agreed to participate in future studies [87]. Moreover, the methodology of the study was unclear, and the use of SNS was not explained to participants at the beginning of the study. It is my opinion that if the participants had been recruited through SNS rather than schools, SNS would have had more of a chance to engage the subjects’ participation in follow-up studies [87].

4.4.4 Similar study:

In 1999, Pealer and colleagues collected health behaviour data from college students using two different methods: a) mailed self-administered surveys and b) web surveys [88]. Mail invitations were sent to the two random sample groups (web/self-administered), each of which comprised 300 people. This investigation compares several variables: response time; response rate; item completion errors; and number of sensitive items completed [88]. Researchers administered the YRHB survey, providing a two dollar incentive for participation. The results provide evidence of the feasibility of web-based surveys in conducting health behaviour research among college students [88].

The use of mail invitations and reminders sent by mail and to college email addresses by Pealer's group indicates that response rates were not affected by the mode of engaging the participants. Nevertheless, their results suggest that web-surveys are less expensive and easier to answer, though at time of their study, SNS was not popular as it is today, when young people can be easily reached using these sites. Pealer study have used the same questionnaire used in this thesis and reached similar age group however, This thesis differs in term of reaching young age group by SNS and conduct health behavioural surveys in an informal setting where young people usually entertain themselves in their spare time.

4.4.5 Related Systematic review:

The on-going literature search that was conducted throughout the research period, found that Amon's systematic review proved highly relevant, as it particularly explored Facebook as a recruitment tool for adolescent health research. The review included six studies out of 587 search results. These investigations explored Facebook as a recruitment tool, looking at recruitment outcomes as well as the cost of recruitment based on the usage of a Facebook search, a Facebook fan page and Facebook advertising. The reviewed studies demonstrate that Facebook has the capability to recruit participants from targeted age groups, genders and geographical regions, and emphasises the impact of Facebook advertising on recruiting timelines. Although six studies reported Facebook as a recruitment tool, most used it merely to enhance traditional methods, and only one of these identified the number of participants.

The literature review suggests that Facebook fan pages should be investigated in future research, as they can be used both to connect with interested supporters and to provide updates regarding the study. Yet, it also raises ethical issues regarding the administration of consent forms and obtaining parental approval for adolescents under 13 years old, as few of the studies provide a detailed explanation of their approach to this issue. Lastly, the literature review indicates that Facebook recruitment holds great potential for engaging eligible participants in health research, and highlights the need for future research addressing the methodology of using this type of recruitment tool in adolescent health research [89].

4.5 Internet-based survey methods - strengths and challenges

As an outcome of the literature review of the use of SNS in research, the challenges and strengths that was reported in included studies were summarised below.

Traditional pen-and-paper questionnaires are influenced by a number of “complicating factors”. One of these is the “politeness to strangers effect”, whereby participants do not wish to be rude or appear socially inappropriate, but answer inaccurately when the researcher hands them the questionnaire. Another complicating factor occurs when the participant judges and assesses the researcher’s race, gender or general appearance, and responds differently according to this assessment. An additional possible influence on survey responses is the presence of the interviewer or researcher, which may alter the participant’s responses, especially if the questions are of a sensitive nature [90]. All of these variables affect the quality of a participant’s responses and may result in an unfortunate paradox.

Due to such issues, traditional self-administered methods such as interviews and paper-and-pen questionnaires are often less attractive to those searching for accurate responses, while alternative methods such as computer-based questionnaires and other technologies are becoming more popular. This led Knapp and Krik to compare responses from three methods: paper-and-pen, Internet survey and an automated touch-tone telephone response system, arriving at the conclusion that when used with populations familiar with technology, all three methods will have equivalent results regardless of the method or sensitivity of the questions [91]. However, the sample size

of this study comprised only 352 individuals, which was given as the reason for the insignificance of the results [91].

A 2005 study by Mangunkusmo and colleagues compared the scores of health questionnaires administered by three methods: two based on the Internet and a traditional pen-and-paper questionnaire, finding that the scores of Internet questionnaires were mostly equivalent to pen-and-paper scores [92]. They also collected student evaluations of the three methods, with the Internet techniques being more positively evaluated by students. Yet, the study found few differences between the types of methods in terms of participants willingness to answer sensitive health-related questions, and noted that more investigation was needed into effective methods of reporting health and health-related behaviour via the Internet [92].

In a 2007 study, Ekman and Litton found that traditional methods of collecting lifestyle and demographics data failed to produce high quality results within financial limits [93], yet they also noted that the Internet held great potential for collecting epidemiological data, as Internet use is increasing all over the world among all categories of society. They advocate that “the Internet presents a powerful alternative for the collection of data with several intrinsic features still unexplored” [93].

Internet-based methods of data collection have been widely implemented in psychological and marketing research, and the Internet could also be a powerful tool for collecting data in epidemiological research, specifically for recruitment and follow-up.

Yet, in the epidemiology and health domain, it was used only in one per cent of published studies. Gelder states that “Web-based questionnaires are less prone to social desirability bias than other methods of data collection” [90] suggesting that more epidemiological studies comparing Web-based methods to traditional methods are needed to determine the reliability of data collected by these techniques and disclose whether they can result in the same outcomes and expectations as traditional methods [90].

Although there is growing evidence of the equivalence of results between traditional methods and Internet-based methods, there are multiple reasons to consider implementing the latter in the collection of health behaviour data [94-97]. These reasons are based on different studies that may have some limitations and issues, yet it is important to consider them for future research:

1. As access to the Internet rapidly increases around the world, Internet-based methods can reach large numbers of eligible participants in any population, especially if hidden populations are targeted.
2. Internet-based methods offer a rapid means of data collection, from planning the research questions to gathering the data and finding the answers. Along with features such as web advertising and follow-up reminders, the process of collecting the data is timeless in comparison with other methods. However, designing the questionnaire and the Web tool may take a considerable amount of time.

3. Interviewer bias is limited with Internet-based methods. In the case of paper-and-pen self-administered questionnaires, the participant's interaction with the interviewer or researcher may induce bias.
4. Data collected electronically through the Internet are more useful and accurate. Because electronic methods have features that eliminate multiple or incorrect answers, accuracy can be enhanced by adding explanatory messages or menus to the online questionnaire.
5. Online methods facilitate interaction and provide a platform for feedback. There is also a possibility to provide and recommend health services or referrals according to a participant's need.
6. Internet-based methods provide a higher level of anonymity and privacy, which may increase the level of response to sensitive questions and reduce issues related to social desirability, especially when teenagers and youth (who tend to be more secretive about risky behaviours) are targeted.
7. Internet surveys allow active participation, where respondents are part of the survey dissemination process and the research team provides the participant with a summary of the results. According to Gelder [59], providing survey results may significantly improve response rates.
8. Collecting data through the web will identify the dates and times of survey completion and provide useful insights about the answering process.
9. Finally, when comparing Internet-based methods in terms of cost, this method is shown to have lower cost, as fewer personnel are needed to collect the data and

less time is needed because electronic data entry is automatic. However, the cost of designing and developing electronic questionnaires may vary.

Although Internet-based methods have multiple strengths, they also face a number of challenges that may be avoidable by using methodological designs. One potential issue is the response rate, which cannot always be calculated accurately and because the survey tool mostly will be included in a Uniform Resource Locator (URL) that will reach many people who may not be counted.

Another challenge is sampling errors and identifying how representative the sample is of the wider population, as it will not be possible to generalize the results; however, this is an issue with any data collection method, and its impact can vary according to the targeted population. Multiple responses by the same participant also arise as a challenge facing Internet-based methods, yet this can be limited using several methods (recording IP addresses; notifications; simply asking participants to respond only once; or asking them identifying questions such as their post code or date of birth to identify duplicate responses). Finally, varying levels of computer literacy and Internet access may have an enormous effect on response rate and the representativeness of the sample. Nevertheless, with the rapid growth of the Internet around the world, this issue will not be a challenge once the target population is familiarised with computers and technology [94-98].

4.6 Conclusion of the literature review

Overall, the literature supports the notion that SNSs have promising potential for reaching young age groups as well as people located on the physical or interactive margins of a population. Nevertheless, at the time of the review, SNSs had not been examined in health research as a means to engage and communicate with youth. In addition, they have not been explored as a platform to collect data regarding health behaviours. The need for research about SNSs in a health context is demonstrated and recognised.

CHAPTER 5

Systematic review: SNS as mode to collect data

5 Systematic review: SNS as mode to collect data

Following the literature review the need for a more specific systematic review that answers some important questions related to SNS in health research as recognised. This chapter present details of the systematic review. This work was published in the *Journal of Medical Internet Research* in July 2014 [Appendix C].

5.1 Introduction

Since their introduction, Social Network Sites (SNS) have attracted individuals, businesses, social organisations, and lately health organisations and providers. There are millions of users, each with a different purpose for using these networks.

This review focuses on those networks defined as ‘web-based services’, which allow individuals to construct a public or semi-public profile within a bounded system, articulate a list of other users with whom they share a connection, and view and traverse their list of connections and those made by others within the system’ [99].

Social network sites and social media include all types of online social platforms that allow participants to share interests and opinions and engage in many other forms of social interaction. The use of these platforms is becoming dominant among all Internet usage purposes, and today, web content often includes a feature that allows readers to share or link to SNS. Companies and individuals are recognising that the social significance of a topic is linked to its presence in SNS [100].

Social networking is not just about websites; it is a type of community that shares and interacts. It is a powerful community that has shifted the concept of media and is rapidly and extensively penetrating into society [101].

5.1.1 Social network sites in health research:

For researchers SNS is an environment where sharing information, knowledge, interest, and opinion is meaningful and fun, which makes it ideal for conducting research [100].

The promise that SNS holds for health services and research has been explored and discussed in previous publications. There are two major arenas in which SNS may play a role for health. First, the presence of health organisations on SNS may attract patients in search of information or treatment. Secondly, SNS may be an effective means of helping patients with chronic diseases manage their health conditions. The importance of SNS is reflected in increasing efforts within health sectors and organisations to embrace SNS [101, 102].

However, efforts towards using SNS are still in their infancy, and more inventive interventions and other ways of benefiting from SNS are yet to be explored and discussed [101]. One of the many possible uses of SNS for health is using this powerful platform to collect data and recruit for research studies.

5.1.2 Potential of SNS for data collection:

Interest in online social networks has been increasing over the past few years as a result of the widespread adoption of this technology all over the world.

The literature shows that researchers have used SNS as a source of information regarding user characteristics, patterns of “friending” and usage behaviours [12]. These social networks have become a modern source for information and data gathering. They have evolved into a dynamic and accurate source of gathering information because they contain a feature not found in traditional media: active and two-way participation [12].

SNS are also an extraordinary marketing tool, able to reach almost any type of person, which changes communication from ‘one-to-one’ to ‘many-to-many’ [13]. They have also become sources of collecting timely information, converting data into profitable results at a faster rate. They contain great opportunities for future research in public health because they can be a great means of engaging hidden and hard-to-reach groups [14]. Yet there is still relatively little direction on how SNS can be used in health research and whether they can provide valid and reliable data.

5.1.3 Research objectives:

The aim of this study was to systematically review the available literature and explore the use of SNS as a mode of collecting data for health research. The review aims to answer four questions: Does health research employ SNS as mode of collecting data? Is data quality affected by the mode of data collection? What types of participants were reached by SNS? What are the strengths and limitations of SNS?

5.2 Methods

5.2.1 Systematic review:

The literature was reviewed systematically by searching several bibliographic databases: MEDLINE, EMBASE and PsycINFO, using the Ovid and PubMed interface in March 2013 to search for articles published during the period from 1996 to the third week of March 2013, using the following keywords: “Online Social Networks”/”Online Social Sites”/”Social Media” AND “Health”. In addition, a manual search was undertaken, searching the reference lists of all included studies.

Two reviewers conducted the review independently, and search results were extracted to an Endnote database. Inclusion and exclusion processes were recorded and all abstracts and titles were reviewed. The initial selection criteria were:

- a) *Intervention*: The review is of SNS use as a mode of collecting data, rather than as a form of social intervention such as support groups.
- b) *Time and place*: Studies produced at any time and place will be included in the search.
- c) *Study Participants*: Community or patients.
- d) *Outcomes*: Included studies must contain outcomes related to the data collection mode. Examples of outcomes may include the following: response rate, completeness, missing data, timeliness, cost and perception of privacy and anonymity. In order to ensure that as many studies as possible were assessed for relevance to the review, no language restrictions were placed on the search.

Studies were excluded if they examined SNS participant interaction rather than SNS as a mode of collecting data, if they did not involve SNS or the article was a general discussion paper that did not present data or methods. All included studies were required to specify the use of SNS as a tool to collect self-reported health data.

The review focused on the quality of data, the strengths and limitations of the data collection methods, and reported strategies to facilitate the data collection. After choosing certain studies based on title and abstract, full articles were retrieved and data was extracted with a predesigned extraction form that included a checklist to assess the quality of each included study. The checklist was developed by the Centre for Reviews and Dissemination (CRD), and studies that scored 5 out of 7 or below were considered low quality while studies ranking above 5 were considered high quality [103].

5.2.2 Data analysis:

The wide variety of methodologies and outcomes among the included studies limited the possibility of performing meta-analysis. For example, study populations varied from study to study, and studies that had similar populations may have used different research methods. A descriptive qualitative analysis was carried out to answer the four research questions.

The PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) checklist was followed in this systematic review [Appendix D]. The checklist items are essential for transparent reporting of a systematic review. The author covered most of

these items, with the exception of items related to meta-analysis, as they were not applicable for this review.

5.3 Results

A total of 1534 citations were identified using the search engine on electronic databases. Search results were combined with articles identified by searching manually and removing the duplicates. In total 1213 citation titles and abstracts were reviewed.

A full text assessment was undertaken on the 13 papers that met the inclusion criteria, three of which were excluded: two for not employing SNS directly to collect data; and one discussion paper did not include any results. Ten papers were reviewed and assessed, and Table 1 depicts the search results from each database and Figure 5 illustrates the review process.

5.3.1 Included studies:

All included studies were cross-sectional and primarily used self-reported data (Table 2). Whilst the majority of studies undertook quantitative analysis, one study was based on qualitative focus group data. All included studies were defined as high quality after they were assessed by the CDR checklist (Table 3).

Table 1 Database search results.

Database	Database provider	Years searched	Number of citations retrieved
MEDLINE	OVID	1996- March week 1 2013	403
PsycInfo	OVID	1996- March week 2 2013	142
Embase	OVID	1996-March week 11 2013	609
MEDLINE	Pubmed	1996- March 2013	380
Manual search	-		2
Total			1536

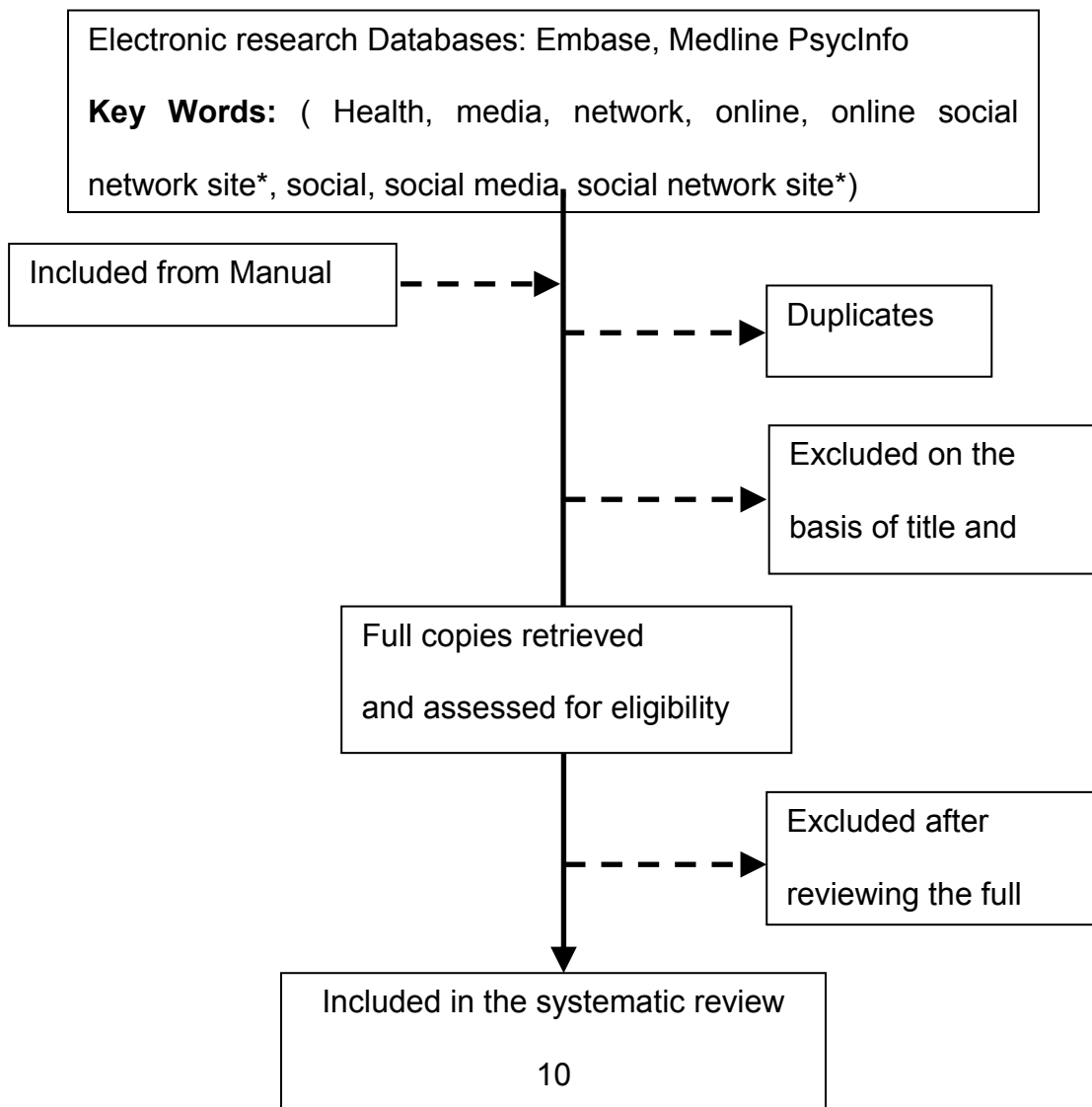


Figure 5 Summary of the systematic literature review process.

Table 2 Summary of included studies.

Reference	Study ID	Title	Objective of the study	Target Population	Data type	Data collection tool	SNS	Related outcomes
[104]	Heather, 2009	Social media and health: Social support and social capital on pregnancy-related social networking sites.	Whether participation on online social network related to health was associated with health outcomes.	Pregnant women >18	Quantitative	Survey	8 SNS-pregnant health related	<ul style="list-style-type: none"> • Strategy • Data quality • Limitations
[105]	Levine, 2011	Formative research on MySpace: online methods to engage hard-to-reach populations.	Describe the process of conducting formative research on a popular social networking site, MySpace, in an effort to involve youth of colour in design of programmatic content and formats for an Internet intervention.	Youth (16-24)	Qualitative	Focus group	My Space	<ul style="list-style-type: none"> • Strategy • Data quality • Strength
[106]	Woolley, 2012	Efficacy of a health-related Facebook social network site on health-seeking behaviours.	Determine the impact of a health-related Facebook fan page on health-seeking actions, thoughts, and behaviours.	>18	Quantitative	Survey	Facebook	<ul style="list-style-type: none"> • Strategy • Data quality • Limitation
[107]	Fenner, 2012	Web-based recruiting for health research using a social networking site: An exploratory study.	To assess the feasibility of recruiting young females using targeted advertising on the social networking site Facebook.	Females (16- 25)	Quantitative	Survey	Facebook	<ul style="list-style-type: none"> • Strategy • Data quality • Strength

Reference	Study ID	Title	Objective of the study	Target Population	Data type	Data collection tool	SNS	Related outcomes
[108]	Ramo, 2012	Broad reach and targeted recruitment using Facebook for an online survey of young adult substance use.	Examined Facebook as a mechanism to reach and survey young adults about tobacco and other substance use.	Young smokers (18-25)	Quantitative	Survey	Facebook	<ul style="list-style-type: none"> •Strategy •Data quality •Strength •Limitation
[109]	Shindel, 2012	An Internet survey of demographic and health factors associated with risk of sexual dysfunction in women who have sex with women (WSW).	To investigate the associations of high risk for sexual dysfunction in an Internet cohort of WSW.	WSW >18	Quantitative	Survey	SNS for WSW + Facebook	<ul style="list-style-type: none"> •Strength •Limitation
[110]	Strasser, 2012	Feasibility study of social media to reduce intimate partner violence among men who have sex with men (MSM) in metro Atlanta, Georgia.	Examine the feasibility of enrolling 100 gay men from Atlanta into an Intimate Partner Violence survey study. The survey was administered via Facebook.	MSM	Quantitative	Survey	Facebook	<ul style="list-style-type: none"> •Strategy •Data quality •Strength •Limitation
[111]	Lohse, 2013	Facebook is an effective strategy to recruit low-income women to online nutrition education.	Examine Facebook as a strategy to recruit low-income women, within a specific age and geographic location, to participate in an online nutrition education program.	Females (18-45)	Quantitative	Survey	Facebook	<ul style="list-style-type: none"> •Strategy •Data quality •Strength

Reference	Study ID	Title	Objective of the study	Target Population	Data type	Data collection tool	SNS	Related outcomes
[112]	Cucchetti, 2012	The use of social networking to explore knowledge and attitudes toward organ donation in Italy.	Investigate issues regarding organ donation.	Community no targeted age.	Quantitative	Survey	Facebook	<ul style="list-style-type: none"> •Strategy •Data quality •Strength •Limitation
[113]	Lord, 2011	Connecting to young adults: an online social network survey of beliefs and attitudes associated with prescription opioid misuse among college students.	<p>(1) Assess the feasibility of implementing a survey study about prescription medication misuse with college students on Facebook</p> <p>(2) Identify the characteristics, motivations, beliefs and attitudes associated with experimental versus regular misuse of prescription opioid analgesic medications.</p>	young adults (18-25)	Quantitative	Survey	Facebook	<ul style="list-style-type: none"> •Strategy •Data quality •Strength •Limitation

Table 3 Quality assessment of included studies.

Reference	Study ID	Indicator								Quality indicators met
		1.Appropriate research design?	2.Appropriate recruitment strategy?	3.Response rate?	4.Sample representative?	5.Objective and reliable measures?	6.Power calculation or justification of numbers?	7.Appropriate statistical analysis?	8.Evidence of bias?	
[104]	Heather, 2009	1	1	-	1	1	-	1	-	5/8
[105]	Levine, 2011	1	1	1	-	1	-	1	1	6/8
[106]	Woolley, 2012	1	1	1	-	1	1	1	-	6/8
[107]	Fenner, 2012	1	1	1	1	1	1	1	-	6/8
[108]	Ramo, 2012	1	1	1	1	1	1	1	-	7/8
[109]	Shindel, 2012	1	1	-	1	1	1	1	1	6/8
[110]	Strasser, 2012	1	1	-	-	1	-	1	-	5/8
[111]	Lohse, 2013	1	1	1	1	1	1	1	-	7/8
[112]	Cucchetti, 2012	1	1	1	1	1	1	1	-	7/8
[113]	Lord, 2011	1	1	1	1	1	1	1	-	7/8
	Total	10/10	10/10	7/10	7/10	10/10	7/10	10/10	2/10	----

5.3.2 Does health research employ SNS as mode of collecting data?

The large number of search results indicates that health research is utilising SNS in many forms, with the majority of studies investigating the effect of SNS use on health seeking behaviour and knowledge. However, there are a limited number of studies that focus on SNS as a tool for research recruitment or data collection: 10 of the 1213 studies explored this potential.

Type of collected data

Nine of the included studies collected survey data through SNS, while Levine conducted an online focus group within a SNS [105], and Fenner [107] used SNS for recruitment, rather than only for data collection. In summary, most of the included studies collected quantitative data, with one, Levine [105] collecting qualitative data through MySpace and exploring possibilities to increase response rates. It is more convenient to collect quantitative data through SNS, rather than qualitative information, as the latter may require more resources.

Data collection

As this review examines SNS as a mode of collecting health research data, all included studies reached their participants through SNS, though they used different approaches to do so.

Heather [104] distributed an invitation for an online survey on eight SNS related to pregnancy and baby health; this approach resulted in 288 valid surveys in a two-month period. Levine [105] conducted a focus group by forming a 'MySpace' profile embedded with a chat room and sent invitations to members to join the network;

738 people joined the study's network. Although this methodology produced an accurate set of qualitative data it required several staff members to aid with the recruitment process employed [105].

Woolley [106] was interested in monitoring the impact of a specific Facebook health fan page: 'Get Up And Do Something (GUADS)' on participant health seeking actions and behaviours. This investigation used the fan page to collect data by inviting all fans to participate in an online survey [106]. Although the study reported the use of multiple recruitment methods, no further explanation was given as to the recruitment process [106].

Four of the included studies used Facebook ads, an online advertising affiliate program, which is a powerful targeted advertisement method. Fenner [107] assessed the feasibility of recruiting young females using this method. In total, 278 participants were recruited, 139 chose to participate in the online survey and the remaining 139 opted to physically attend the research centre [107]. Ramo [108], Lohse [111] and Lord [113] also used Facebook advertisements to advertise online surveys to their target populations.

In addition to Facebook advertisements, two other applications within Facebook were used by health researchers: Facebook Event, a new feature on Facebook, a plug-in giving the fan page administrator the ability to add details about upcoming events, e.g. Event Name, Location and Date; and Facebook Poll, a page widget that gives the fan page administrator the ability to add 'poll questions' with established voting systems and closing dates [109, 112]. Finally, Shindel [109] investigated the

association of high risk for sexual dysfunction among women who have sex with women (WMW); individuals were invited to participate by emailing the entire member list of online social networks catering to WMW.

5.3.3 Is data quality affected by the mode of data collection?

In order to address this question, one must assess data quality indicators such as response rates; completion times; dropout rates; timeliness; missing data and costs. A comparison was undertaken where appropriate, as studies differed substantially in methodology and population. However, none of the included studies performed an in-depth examination of the quality of data or any type of analysis regarding quality. Response rates, costs, timeliness and missing data were reported in some studies.

Response rate

Response rate is defined as the 'number of participants who completed a questionnaire' divided by the 'total number of participants who were asked to participate' [114]. Lord [113] reported the highest response rate of 27% (N=2583); the survey had been advertised on Facebook for two weeks and targeted a young population with no strict inclusion criteria.

The lowest response rate, 0.02% (N=738) was reported by Levine [105] and was attributed to the recruitment method employed by the investigation; participants were invited to a synchronous online focus group only during a specified time. Changing the participation mode to 'asynchronous', i.e. no specified time, caused a slight increase to 0.07% (n=250) [105].

The collection of qualitative data is challenging in that, as reported by the study authors, it requires more effort and staff time, and it was not always possible to calculate response rates [106]. To summarise (Table 4), the reported response rates ranged from 0.02% to 27%, with an average of 12%.

Table 4 Reported response rates of included studies.

Reference	Study ID	Response Rate	Participated/Reached
[113]	Lord, 2011	27.0%	689/2583
[112]	Cucchetti, 2012	22.8%	2414/10584
[111]	Lohse, 2013	17.4%	18/465
[106]	Woolley, 2012	11.0%	90/804
[108]	Ramo, 2012	10.5%	1548/14808
[107]	Fenner, 2012	6.9%	551/7940
[105]	Levine, 2011	0.02% [synchronous] 0.07% [asynchronous]	16/738 18/250

Cost & Timeliness

Four studies used Facebook in their recruitment strategy; three were able to report on the cost and timeliness of data collection (Table 5). [107, 108, 111]. Strasser [110] set out to recruit 100 participants, and closed the survey as soon as this target was met; evidently time was not a key factor and the recruitment process could have continued as required.

However, cost is an implication that must be considered, as studies may have limited budgets and can only recruit as many participants as possible within a specific time frame. Ramo [108] reported the lowest cost per participant: \$4.28 over a 13 month period, which yielded 1548 participants who were young smokers. Lohse [111] and Fenner [107] targeted females within specific age ranges, which could account for the higher costs reported. Nevertheless, the highest reported cost of \$20.14 was considered favourable over the cost of traditional methods of recruiting [107].

Table 5 Reported cost and timeliness of included studies.

Reference	Study ID	Duration (days)	Participants	Response per day	Cost (\$): US dollars		
					Per participant	Per click	Total
[108]	Ramo, 2012	390	1548	4	4.28	0.45	6628.24
[111]	Lohse, 2013	19	62	3	9.26	1.28	596.71
[107]	Fenner, 2012	150	278	2	20.14	0.67	5598.92
[110]	Strasser, 2012	16	100	1.6	--	--	--

Other quality indicators

Fenner [107] was the only author to report on 'missing data', though this did not exceed 5% for the demographic questions, and this figure was less than 8% for remaining questions. The author considered this a positive indicator on the quality of data.

Lohse [111] reported a 93.5% completion rate for the survey, which is indicative of good data quality. The validity of the data was reported by Lord [113] as 76%; however, no further explanation was provided as to how this figure was assessed.

5.3.4 What types of participants were reached by SNS?

Although SNS is a tool that can be widely used to recruit participants, it may be more effective for certain groups. For example, if targeting an ageing population, one has to take into account that this group may not be as computer literate, and therefore may be less likely to use SNS. The types of participant more suited to SNS (Table 6) would be found among younger populations and those that are hidden or ‘hard to reach’, e.g. homosexuals.

Table 6 Types of participants targeted by SNS.

Reference	Study ID	Participant type	Target age
[104]	Heather, 2009	Pregnant women	aged >18
[107]	Fenner, 2012	Female	16- 25
[111]	Lohse, 2013	Female	18-45
[109]	Shindel, 2012	WSW	>18
[110]	Strasser, 2012	MSM	No targeted age
[105]	Levine, 2011	Youth	16-24
[113]	Lord, 2011	Youth	18-25
[108]	Ramo, 2012	Young smokers	18-25
[106]	Woolley, 2012	Community	>18
[112]	Cucchetti, 2012	Community	No targeted age

5.3.5 What are the strengths and limitations of SNS?

One of the most frequently reported strengths of SNS is that it is an effective recruitment method. Four studies noted their success in engaging populations defined by researchers as ‘hard to reach groups’: young age groups [108]; females [107]; low-income females [111] and MSM [110].

Facebook was particularly highlighted by Ramo [108] as a successful mechanism to reach and recruit young age groups in smoking-related health research, which has been a challenge in the past. In addition, Levine [105], Fenner [107] and Ramo [108] reported that SNS proved to be much more cost effective than traditional methods of recruiting used in health research. SNS can also provide representative and valid data: Fenner [107] indicated that the SNS sample yielded demographically representative data, while Lord [113] noted that SNS provided a rich pool of qualitative and quantitative valid data.

Another strength of SNS is that online focus groups can be created and managed easily if conducted asynchronously through SNS. This allows one to better capture the exact language of participants and participant actions can later be used for analysis [105]. Finally, an important quality of SNS for health surveys and other research is the potential for sharing and extending invitations within the network, enabling surveys to be diffused rapidly between SNS participants [112].

The predominant limitation of SNS for collecting data is that it may introduce self-selection bias, which frequently results in sample bias and associated representation and generalizability issues. Strasser [110] has also noted that self-reported data may affect the reliability and validity of results.

5.4 Discussion

This comprehensive review addressed the research questions and found a gap in the literature for evaluating the effectiveness of SNS as a tool in health research. The findings demonstrate that SNS is considered a research tool that can reach wide

audiences and simplify the data collection process for health research, especially quantitative data, along with wide range distribution of surveys reaching many participants through SNS.

SNS is a powerful tool that can provide a wealth of information about research participants and has the potential to capture good quality data, as some of the studies included here have shown. However SNS lends itself to self-reported data, which may introduce self-selection bias, sampling bias and other problems related to generalizability and reliability; however, this aspect was not fully investigated in the studies reviewed here, indicating the need for future research and systematic reviews that focus on these issues.

Facebook was used in 8 out of 10 of the studies reviewed here, which indicates its strong potential as a tool for conducting health research, as many features within Facebook empower the research process, particularly advertisements, polls, events and the “Insight” tool. The potential of Facebook needs to be highlighted, especially in health research, where validity is of utmost importance for research results. Hence, further studies assessing its potential in health research are needed.

This review is characterized by number of strengths, beginning with an overview of the existence of SNS use in health research literature, which illustrates the strengths and limitations of this method of data collection. Secondly, the literature review was comprehensive and explicit, with broad inclusion criteria, leading to a review of 1213 studies, which identified a gap in the literature regarding the use of SNS as a tool and its effect on data quality.

A limitation of this review is the heterogeneity of the included studies. Although all of the researchers used SNS to collect data, their individual objectives, populations and outcomes are unique. Analyses were found to be primarily descriptive.

5.5 Systematic review outcomes

SNS can be suitable for health research, and it has been recognised to be an effective tool for data collection, yet more research is required to identify the range of its effectiveness. A comparative study that examines SNS against other modes of collecting data would be valuable for elucidating the differences between the quality of obtained data as well as costs and sample sizes. This review indicates that the quality of collected data was not thoroughly assessed, although it led to an acceptable level of validity for surveys and online questionnaires. Yet, SNS use for data collection proved to be more successful when younger age groups were targeted. Finally, Facebook SNS was used in a number of the studies included in this review, and it was demonstrated to be a powerful tool that provides multiple features which can be used to improve online health research.

5.6 Conclusion of the systematic review

This review concludes that SNS has a niche in health research, but we need to ascertain how to utilise it effectively without affecting the quality of research. The field of SNS is growing rapidly, and researchers need to take advantage of the strengths of this tool and avoid its limitations by employing effective research designs.

CHAPTER 6

Methods

6 Methods

This chapter presents the methodology used to answer the research questions of the study. The research design, study instruments, Pilot phase of instruments, participation conditions, population and sampling, the procedures that were followed during collecting data and data analyses methods.

The design employed in this study was an experimental survey research design. Participants reached by two modes; SNS and PNP and responses to the two different survey modes were compared. This comparison enables us mainly to decide if there is a mode effect between the two survey methods, and to determine if Facebook SNS is a feasible mode to collect health behaviour data.

6.1 Overview of Research design:

The study demonstrated the Young Risky Behaviour Survey “YRBS” questionnaire cross-sectionally by two modes for different participants groups. Each mode of participant’s recruitment is considered as a sub-study. The first one is the “offline study” where participants were recruited randomly from schools and universities in Saudi Arabia. The second sub-study is the “Online study” where participants were recruited using Facebook fan page and Facebook ads. Results from both sub-studies were analysed and compared in order to answer the research questions.

6.2 Study instruments:

6.2.1 YRBS questionnaire:

YRBS is a survey system that was developed and conducted by the Centres for Disease Control (CDC) to monitor health behaviours contributing to the leading causes of death and measure the prevalence of obesity and asthma in the United States.

The CDC assessed the reliability of this survey in 1992 and in 2000, and both assessments indicated that the YRBS questionnaire was suitable for students in eighth grade and above, though the reliability of some items was questioned, and those items were reviewed or deleted. The CDC also conducted a literature review in order to assess factors that may affect the validity of adolescent self-reported questionnaires, determining that the effects of cognitive and situational factors on the assessed behaviours were not equal. The validity of assessing certain behaviours differs depending on cognitive and situational factors, and these must be considered when interpreting the results [115].

In 2000, the CDC assessed the validity of adolescent height and weight reporting and found that adolescents tend to overestimate their height and underestimate their weight. The strength of the YRBS survey lies in the series of method studies conducted in 1992, 2000, 2002, 2004 and 2008 to improve the quality of this tool [115].

6.2.2 The modified version of YRBS questionnaire:

For this study's purpose, the YRBS questionnaire was translated to the Arabic language by two independent translators, and was test-piloted on a sample of thirteen young Saudis to ensure clarity of the questions. It comprises thirty-one questions, split into five sections concerning: demographics, tobacco smoking, body weight, dietary habits, and physical activity. Sections regarding drug use, suicide, and alcohol consumption were excluded because this study was conducted in Saudi Arabia, where alcohol and drugs are sensitive issues that may affect the distribution of the survey and obtaining ethical approval. Furthermore, we added an additional question to the paper survey regarding shisha smoking habits, as this behaviour is highly relevant to the study population.

The questionnaire was recreated to the online survey software to be able to link it to the Facebook fan page in the online study. And it was assured that the order of questions and appearance are similar to avoid question order effect on responses. However, online surveys guidelines were followed in terms of number of question per page and font size. The number of questions was limited to 4 per page.

It comprises thirty-one questions, split into five sections concerning: demographics, tobacco smoking, body weight, dietary habits, and physical activity, the questions were multiple choices style except for demographic section that was "fill in blank" and the first page of questionnaire was a consent form with information about the study. [Appendix E]

6.2.3 Facebook fan page:

Facebook can be an important part of an individual's life, as well as the life of organisations and businesses. These corporations may use a networking tool provided by Facebook called the "Fan Page", a tool developed by Facebook in March 2009 and given similar functions and tools as personal profiles, including the ability to publish new feeds that differentiate a fan page from regular Facebook groups. There are currently 200–300 million Facebook fan pages. The power of the fan page is that it can include a large number of people and unlimited numbers of fans. The creator or administrator of the page can deliver a message, provide information or gather data. There are fan pages for marketing, health promotion, and social activities, among other purposes. Many brands and businesses use fan pages because they are an easy way to reach and engage consumers. Large companies such as Domino's Pizza, Mountain Dew and Coca-Cola use Facebook to reach as many people as possible through data recognition technologies, which allow them to capture profile data automatically and target people based on their profiles and interests.

At the onset of the study, the fan page was created using an application provided by Facebook called Facebook Markup Language (FBML) that uses java and html codes to customize and design fan pages in order to add questionnaires or design "landing" pages in a creative manner [116] However, Facebook Timeline was introduced on December 2011 and has since been used for the study.

Facebook fan page for this study was created with the name given to the study "Saudi health behaviour", it includes information about the study and its objectives

and how the information obtained will be used. In addition health promotion messages was posted according to a planned timeline considering the holiday times, school days, Ramadan and other important events. This was provided in order to increase traffic to the fan page and applied as marketing technique to encourage fans to participate in answering the questionnaire.

6.2.4 Facebook ads:

A Facebook ad is a tool provided by Facebook for business and marketing, it can be designed as admins wish. The process of designing an Advertisement banner start by creating a Facebook fan page. The second step is to decide what to promote, this can be the fan page or a post or a product. The third step is the most powerful criteria of Facebook ad, it is targeting the audience, this step will define to whom the ads will be shown and directed. The age and gender and country can be specified. Finally a budget of the ad must be chosen.

Facebook ads can be managed and the performance of the ad can be checked regularly by the admin of Facebook fan page. In this study Facebook ads was directed to the fan page not to the survey itself, and this was applied to be able to determine the number of people reached by the fan page and asked to participate in the questionnaire. And the targeting criteria were: (age 13-21 who are Saudis or live in Saudi from both gender)

6.2.5 Facebook insight:

Facebook insight is a tool provided by Facebook to fan page admins or creators, it helps in giving an overview of the page activity and fans. Five main statistics are provided by Facebook insight [117];

- *Likes*

Allow fan page's admin to see how many likes the page have, how the number of likes changes over time and where they come from.

- *Reach*

Allow fan page's admin to see how many people like, comment on and share content of the fan page. It also allows seeing how much of that came through the fans and their friends, and the response from adverts.

- *Visits*

Allow fan page's admin to see which section of the page people are responding to most, and where they're coming from – such as Facebook or a search engine.

- *Posts*

Allow fan page's admin to see a daily breakdown of posts, and how many people responded with clicks, likes and more.

- *People*

To help understand the fan page audience, it provides demographic info such as age, gender and location, along with what times they're looking at the Page and how they found it, in order to be able to create posts for the best response.

For this study purpose the Facebook insight was only used to obtain information about Likes, reach and people. To be able to have an overview of the most reached

regions, the highest age group, and gender of fans and how active is the fan page in order to assure that the page is targeting the desired number of people.

6.3 Procedure:

In this study data was gathered in two independent phases. Phase one is called the Offline study and phase two is the Online study.

A. Offline Study:

Saudi Arabia comprises four fifths of the Arabian Peninsula, divided into thirteen provinces. This study targeted three large provinces—Al Riyadh, the Eastern region, and Makah—that are economically strong and considered more developed than other provinces. The study focused only on these provinces to avoid differences in Internet access as Internet coverage is the highest on the three regions.

To be able to collect data from young Saudis from schools and universities the ministry of education was contacted for ethical approval and to assist in data collection procedure and sampling. After obtaining ethical approval and choosing the sample randomly Questionnaires were sent to schools in concealed envelopes for each chosen schools from the three biggest regions in Saudi Arabia (Riyadh, Mekkah and Eastren region). Each envelope contained detailed instructions for the collectors as to assure students understand that participation is voluntary and anonymous.

Students were from secondary and high schools from private and public schools equally. And data was collected in classrooms and answered questionnaires were

sent to researcher in closed envelopes. Data was entered electronically to Access database sheet by the researcher.

B. Online Study

A Facebook fan page was designed and launched for the purpose of this study, which aims to increase participant engagement by posting a variety of health messages. In addition, Facebook ads were used to drive traffic to the fan page.

The Fan page was targeting youth who are Saudi nationals or live in Saudi Arabia. The page recruited 4,442 individuals, and resulted in a total of 371 completed and eligible questionnaires for use in this study.

Daily posts were provided to participant and it was designed to be suitable for the time and season for example; posts related to summer and dehydration in summer holiday and posts about health in Ramadan month and fasting. This was planned to keep participant engaged and interested in the page. In addition, with each post a link to the questionnaire was added with an encouragement statement to participate. This was done to insure the privacy of the participants and to prevent multi-responses of the same participant by controlling each participant's IP address in the online survey.

Responses to the questionnaire was collected and stored in the online survey software (SurveyMonkey). The questionnaire was designed in the same order of questions as the Offline study questionnaire. After reaching the desired number of responses the survey was closed.

6.4 Piloting instruments:

Since the questionnaire of this study is modified for a different country and different culture it was necessary to test pilot it before using it in the main study. In addition this study is using a relatively new mode that was not fully addressed and used for research purposes before and that was also necessary to pilot the Fan page and the online version of the questionnaire.

To test the clarity of the questionnaire, wording and order of questions, it was tested on a sample of thirteen young Saudis to ensure clarity of the questions. The participants were asked to comment on questions if they think its unclear or not related to them. Three questions out of thirty-one was re-worded and added more clarification.

The fan page was launched for a week with an external link to the online questionnaire in two languages (English/ Arabic) in order to test the acceptance of the online fan page and the online questionnaire, and to correct any possible errors. Forty responses were obtained and only one preferred the English language version, which was why the questionnaire was decided to be available only in Arabic. Participants were asked to participate by posting on the fan page and using the Facebook ads with the minimum cost. We posted questions on the fan page asking about their opinions and if there was unclear items. Only two comments were obtained; the first was mentioning that there was repetition on questions, and we replied that some question was asked in different way to assure accuracy of answers. The second comment was from a female stating that questions about

physical activity was not possible to answer because her school has no physical education classes. And this was an important issue that will be discussed in further detailed in this thesis.

6.5 Participation conditions:

Participation on both sub-studies was completely voluntary with no risk on participants. All responses were kept confidential and anonymous. In the Offline study each questionnaire was kept in a sealed envelope and collectors were provided with an instruction sheet that highlights the importance of confidentiality issues. In the Online study fans; who have choose to subscribed to the Facebook fan page; were asked to participant and it anonymity assurance was clarified, the questionnaire was placed in online survey software “Survey Monkey “ so it wont be linked to the Facebook account. The IP address was checked by the software to detect multiple responses but this was not stored or analysed by researcher. The primary researcher is the only one who has access to both the online and offline completed questionnaires.

6.6 Population and Sampling:

The targeted population for this study is young people, between the age of 13 and 21 years old, who are either Saudi nationals or live in Saudi Arabia. For offline study Participants are either secondary school students, high school students, or in their first year at university. Students attend both private and public schools. For the online study the Facebook ads was designed and crested to target people who have accounts in Facebook and aged between 13 and 21 living in Saudi Arabia.

6.7 Outcome measures:

Two types of outcomes are important in this study. A. Participants demographics and health behaviours B. Questionnaire quality measures

A. Participants demographics and health behaviours

For this research, demographic information on all participants; including (age, gender, and institution type), physical information including height and weight, used to calculate each student's body mass index (BMI) was collected. Lastly, this study relies on data regarding risky health behaviours: smoking, dietary habits, and physical activity.

B. Questionnaire quality measures

- **Response rate:** indicate the number of respondents of the return rate. It was calculated for PAP by dividing the number of returned and answered questionnaires by the number of questionnaires sent to institutions. For SNS it was calculated by dividing the number of answered questionnaires by the number of Facebook page fans.
- **Number of dropouts:** A respondent is considered a dropout if one question is missed followed by unanswered questions to the end of the survey.
- **Completion rate (per question and per person):** Completion rate is a measure that can be an evaluation measure of the participant's survey acceptability. There are two types; the first is the completion rate per unit or question, which is the rate of answered responses over unanswered responses for each question.

- **Timeliness:** The survey timelines is usually defined as the start of the survey process to the time of analysis. For both modes, the timeline is defined as starting on the date of applying to ethical approval to the time of analysis.
- **Data preparation time:** Data preparation time was calculated as the time after data collection until the time of analysis.
- **Cost:** the total cost of the process of PAP and SNS was calculated. Each mode included different cost element i.e.; PAP included printing cost and SNS include Facebook ads cost and survey software cost.

6.8 Data management:

In the Offline study data were entered into a custom built Microsoft Access 2010 database by the main researcher, and entries were double checked by an assistant to eliminate any data entry errors. The data was extracted from Microsoft Access to Microsoft Excel 2010 for further cleaning and coding.

For the online study Data were extracted to Microsoft Excel for data cleaning and coding. And some of Facebook insight data was extracted to excel and other was used directly from Facebook insight.

6.9 Analysis method:

For each data set (offline and Online) descriptive analysis was carried out for frequencies and prevalence; Chi-square tests were used to compare different groups within the sample and explore relationships between risky behaviours, and a p-value of <0.05 was taken as the level of significance. All of the analysis was carried out using the statistical package STATA version 12. In addition, for online study data

Facebook insight was used as a tool to describe the page performance and participant characteristics without linking this information to questionnaires.

The final stage of analysis and the core of this study was analysing and measuring the differences between the two data sets according to the mode and prevalence of risky behaviour reporting. In order to compare difference in responses for PAP vs. SNS, Chi-square test was applied to determine significant differences between proportions, and Logistic regression test to obtain Odds ratios of mode effect for each question.

6.10 Ethical Approval:

For Offline study ethical approval and authorisation were obtained from the research centre in the Ministry of Education (MOE) in Saudi Arabia. An informed consent form was attached for each questionnaire with details of the questionnaire aims and the use of data. Access to collected data was limited to the primary investigator. [Appendix F]

The Online study ethical approval and authorization was obtained from the Imperial College Research Ethics Committee. Each online survey began with an “Informed Consent” page with details regarding the questionnaire’s aims and how the data would be used. Access to the collected data was also limited to the primary investigator. [Appendix G]

6.11 Summary of the research methodology:

6.11.1 Offline Study

Study design: Cross-sectional

Setting:

- High schools (public and private) and applicable universities in three regions of Saudi Arabia: Riyadh, Jeddah, Dammam.
 - These three regions have the highest population density among all Saudi Arabia provinces.
-

Participants:

- High school and first year university students.
 - Traditional PAP questionnaires will be distributed at randomly selected high schools and applicable universities, in the three regions.
-

Variables:

- 1-Demographics; 2-Tobacco smoking; 3-Physical activity; 4-Dietary habits; 5-Height and weight.
 - Drug use, suicide and alcohol consumption were assessed because this study was conducted in Saudi Arabia, where alcohol and drugs are sensitive issues that may have affected the distribution of the survey.
 - In order to compare groups, an additional question was added to the paper version of YRBS inquiring whether or not the participant has a Facebook account.
 - Ethical approval and authorization was obtained from the Ministry of Education (MOE) in Saudi Arabia.
-

Data source:	YRBS: Young Risk Behaviour Survey (Appendix C)
Study size:	415 valid questionnaires
Data Analysis:	Data stored in custom-built Microsoft Access 2010 database, subsequently cleaned and analysed using Microsoft Excel 2010 and STATA version 12.

6.11.2 Online study:

Study design:	Cross-sectional
Setting:	Facebook fan page
Participants:	<p>Young Saudi participants:</p> <ul style="list-style-type: none">• Targeting: Facebook ads were used to target users aged 13-23 living in Saudi Arabia.• In order to build and engage audiences, health and other interesting information was posted daily. (Appendix D) shows the posts' planned timeline.
Variables:	<p>1- Demographics; 2- Tobacco smoking; 3- Physical activity; 4- Dietary habits; 5- Height and weight.</p>
Data source:	<ul style="list-style-type: none">• A YRBS self-administered questionnaire was designed on web-survey software (SurveyMonkey)• The survey was placed on an external website (SurveyMonkey), and linked to the Facebook page in order to assure anonymity and avoid linking surveys to participant's Facebook user names.
Study size:	430 valid questionnaires
	<ul style="list-style-type: none">• Data was extracted from the online questionnaire into Microsoft

Data Analysis: Excel 2010 for data cleaning, and analyses were performed using Stata version 12.

- Facebook provides page creators and administrators with an evaluation tool called “Insights” that offers daily statistics about performance indicators such as how users interact, how engaging the content is, a comparison to pages of similar size and age, number of fans over time, home location and language of fans.
 - These results are exportable to Excel.
-

Table 7 Overview of the study methodology

Methods	Offline	Online	Comparative analysis
Study design	Cross-Sectional	Cross-Sectional	---
Settings	Schools and Universities(1)	Facebook fan page (2)	1 & 2
Participants	Students	SNS users	Saudi youth
Variables	<ul style="list-style-type: none"> • Demographics • Health behaviours proportions. • Response rate/Data quality 	<ul style="list-style-type: none"> • Demographics • Health behaviours proportions. • Response rate/Data quality 	1 & 2
Data sources	YRBS, PAP	YRBS, SNS	1 & 2
Data Management	<ul style="list-style-type: none"> • Access Database • Excel cleaning • STATA 	<ul style="list-style-type: none"> • Excel cleaning • STATA 	STATA
Analysis	Descriptive Statistics	Descriptive Statistics	Comparative

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Results

7 Results

7.1 Results:

This chapter represents the analysis results that answer the research questions starting with an overview of the research design and the proposed research questions. Next the results will be given by the phase of the study, starting by the “Offline study” including descriptive information about participants and the questionnaire answers. Followed by the “Online study” results and the fan page insight analysis, Finally the comparative analysis between the two data sets.

7.1.1 Overview of the research design:

The research is carried by two phases, the offline study where participants were reached through schools and universities in Saudi Arabia and the online study where participants were reached by the SNS Facebook fan page. The analysis was done in three stages; stage one analysing the Offline study data set, stage two analysing the online study data set. The final stage in analysis is comparing the two data sets in terms of reporting health behaviours and data quality.

7.1.2 Research questions:

1. What are the proportions of risky health behaviour (tobacco use, unhealthy diet and physical inactivity) among the young Saudi participants?
 - Analysing proportions of risky behaviour answer this question. Data was obtained from the self-reported questionnaire by the two modes Offline and Online.
2. Are online social networking sites an effective tool for conducting health behaviour surveys for a young population?

This was answered by the online study. Assessing the procedure of collecting data through Facebook fan page and by comparing the results regarding the quality of data to the results obtained from the offline study.

3. What effect does the survey method have in reporting risky health behaviours?

This question is answered by comparing reported risky behaviour by the two modes (online and offline) and analysing the results to determine any mode effect in reporting risky behaviours.

7.2 Offline study Results

This study aims to provide risky health behaviours proportions estimates of three risky health behaviours (smoking, physical activity and dietary habits) among the Saudi youth population and explore differences between genders and regions, based on data from a sample of three large provinces in Saudi Arabia. In addition, because paper and pen questionnaires is considered as a traditional mode of collecting health behaviour, it is necessary to provide it in order to compare the results to the relatively new mode SNS.

7.2.1 Participant's characteristics:

With a total response rate of 67%, 468 valid questionnaires were analysed. While questionnaires were distributed equally across genders, the number of female responses analysed was higher than the number of male responses. Twenty-five invalid questionnaires submitted by male respondents were excluded.

Table 8 shows participants' demographic characteristics and response rates by those demographics. Information includes participant gender, region, institution type, and education level. In total, there were 468 responses representing a total response rate of 66.8%. There were 309(66.03%) female participants and 159 (33.97%) male participants . 88.29% of female survey recipients responded, compared to 45.43% of male survey recipients. 88.29% of female survey recipients responded, compared to 45.43% of male survey recipients. 403 participants (86.11%) were Saudi, and 61 participants (13.03%) were of another nationality. The response rate per nationality could not be calculate because the number of Saudis and non-Saudis reached was unknown. The only university to respond was in the Al Riyadh region. 166 participants (35.47%) were from the Makah region, 248 participants (52.99%) were from the Al Riyadh region, and 54 participants (11.54%) were from the Eastern region. The response rate for each region was 83%, 82%, and 27% respectively. 193 participants (41.24%) were students at private institutions, with a response rate of 55.14%. 275 participants (58.76%) were students at public schools, with a response rate of 78.57%. 369 participants (84.62%) were high school students, 7 participants (1.5%) were middle school students, and 65 participants (13.89%) were university students. Finally, 401 participants (85.68%) were between the ages of 13 and 19 years, 54 participants (11.53%) were between the ages of 20 and 24 years, and 6 participants (1.28%) were between the ages of 25 and 29 years.

7.2.2 Risky health behaviours:

Table 9 demonstrates the proportions of the investigated risky health behaviours. It is important to note that proportions were calculated by the number of total responses to the question itself rather than the total responses to the questionnaire.

Smoking

Smoking has been subdivided into 11 risky behaviours. The highest reported behaviour was of participants trying to smoke at least once in their lifetime (39.8%). Approximately 17.8% responded that they had smoked shisha in the past thirty days. The data showed no significant difference between the proportions of these two behaviours across genders. All other reported smoking behaviours, however, showed a highly significant difference between male and females, with more males reporting smoking. In total, 14.6% of participants identified as current smokers; 10.3% purchased cigarettes from a store or gas station; 9% identified as daily cigarette users, and 9% admitted to having smoked on school property within the past 90 days. The other reported behaviours are shown in Table 9.

Body weight

Participants were asked to provide their height and weight; no measurements were done, in order to estimate the BMI of participants. About 25.6% of male participants and 16.9% of female participants were overweight (according their BMIs), totalling 19.9% of all participants. 18% of male participants and 7% of female participants were overweight (according to their BMIs), totalling 11% of all participants. Males reported significantly higher figures of obesity and being overweight ($P=0.03$ and $P<0.001$, respectively).

Furthermore, 26.4% of participants described themselves as overweight, with no significant difference between genders. 53.3% stated that they were trying to lose

weight (42.3% of males and 58.9% of females. This figure varied significantly across genders ($p < 0.001$).

Other significant factors include three risky behaviours indirectly related to weight loss: fasting, taking dietary pills, and vomiting or using laxatives in order to lose weight. 98 participants (21.2%) identified as having fasted to lose weight in the past thirty days. Thirty-eight participants, or 8.2%, identified as having taken diet pills to achieve a similar effect. Thirty participants (6.5%) admitted to vomiting or using laxatives to lose weight in the past thirty days.

Dietary habits

The study's survey measures four dietary behaviours: fruit juice intake, fresh fruit intake, vegetable intake, and fizzy drink consumption. Questions about these behaviours asked participants to recall what they had consumed within the seven days prior to completing survey.

32.3% of participants reported that they did not drink fruit juice at all over the course of the past seven days. 26.9% did not eat any fresh fruits (females were less likely to consume fruits when compared to males, 32% and 16% respectively). 15.2% of participants reported that they had not eaten any vegetables over the course of the past seven days. The highest reported risky behaviour among the dietary habits is the consumption of fizzy drinks, 42% of the participants consumed fizzy drinks more than 4-6 times per week. The data demonstrates a significant difference ($P < 0.001$) between males, 53.9% of whom consumed more than 4-6 fizzy drinks, than females, where only 36% demonstrated the same risky behaviour.

Physical activity

The recommended level of physical activity is defined by the CDC as “any kind of physical activity that increases the heart rate and makes the breath hard some of the time for a total of at least sixty minutes per day for 5 or more days a week”[115]. 91% of participants did not meet that level, without any significant difference between genders.

The survey assessed other indicators of physical activity, such as, enrolment in physical education classes or participation on a sports team. 69.4% of participants reported that they did not participate in any physical education classes during the previous seven days (35% of males and 86.8% of females). Similarly, 73.9% of participants reported that they do not play on any sports team, (49.3% of males and 86.2% of females). Both results varied significantly ($P < 0.001$) across genders.

The survey also used hours spent watching television and hours spent using the computer as indicators of inactivity. 32% of participants reported watching more than three hours per day of television. 51.2% of participants reported using the computer for more than three hours per day (44.7 of males and 54.5% of females).

Table 8 Demographic characteristics of participants and response rate by gender, region, institution type and education level, (N=468) and total response rate 66.8%.

Characteristic	Frequency (n)	Per cent (%)	Response Rate (%)	Denominator N
Sex				
Female	309	66.03	88.29	350
Male	159	33.97	45.43	350
Missing	0	0		
Nationality				
Saudi	403	86.11	--	--
Other	61	13.03	--	--
Missing	4	0.85	--	--
Region				
Makah	166	35.47	83	200
AL Riyadh	248	52.99	82	300
Eastern Region	54	11.54	27	200
Missing	0	0		
Institution type				
Private	193	41.24	55.14	350
Public	275	58.76	78.57	350
Missing	0	0		
Education Level				
High School	396	84.62	67.17	600
Middle School	7	1.5		
University	65	13.89	65	100

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Missing	0	0		
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Age(Years)

13-19	401	85.68	--	--
20-24	54	11.53	--	--
25-29	6	1.28	--	--
Missing	7	0.27	--	--

Table 9 Engagement in risky health behaviours by gender (N=468).

Engaging in risky health behaviour (Variables)	Summary				Response Per Gender	
	Total responses (N)	Positive responses n (%)	Confidence interval for positives (95%)	Association between Gender & risky behaviour (chi2 test of significance)	Male Positive / Total M (%)	Female Positive / Total F (%)
Smoking						
Tried smoking at least once in lifetime	447	178 (39.8)	(35.2 - 44.5)	(P<0.05)	46.4	36.4
Smoked a whole cigarette before age 13 years	447	26 (5.8)	(38.3 - 8.4)	(P<0.001)	13.0	2.0
Current cigarette use (during 30 days before survey)	452	66 (14.6)	(11.4 - 18.2)	(P<0.001)	26.1	8.5
Smoked more than 10 cigarettes/day (during 30 days before survey)	444	14 (3.1)	(1.7 - 5.2)	(P<0.001)	5.8	1.7
Purchased cigarettes at a store or gas station (during 30 days before survey)	438	45 (10.3)	(7.6 - 1.3)	(P<0.001)	17.3	6.6
Smoked cigarettes on school property (during 30 days before survey)	433	39 (9.0)	(6.5 - 1.2)	(P<0.001)	21.5	2.5
Lifetime daily cigarette use	444	40 (9.0)	(6.5 - 1.2)	(P<0.001)	16.1	5.4
Did not try to quit smoking (during 12 months before survey)	438	31 (7.1)	(4.9 - 9.9)	(P<0.001)	10.3	5.5
Current smokeless tobacco use (during 30 days before survey)	448	23 (5.1)	(3.3 - 7.6)	(P<0.001)	13.0	1.0
Used smokeless tobacco on school property (during 30 days before survey)	445	20 (4.5)	(2.8 - 6.9)	(P<0.001)	12.6	0.3
Smoked shisha (during 30 days before survey)	449	80 (17.8)	(14.4 - 21.7)	(P>0.05)	21.4	15.9
Body weight						
Overweight (BMI = 25–29.9)	346	69 (19.9)	(15.9 - 24.5)	(P<0.05)	25.6	16.9
Obese (BMI ≥ 30)	346	38 (11.0)	(7.9 - 14.8)	(P<0.001)	18.1	7.1
Described themselves as overweight	459	121 (26.4)	(22.4 - 30.6)	(P>0.05)	23.2	28.0
Trying to lose weight	460	245 (53.3)	(48.6 - 57.9)	(P<0.001)	42.3	58.9
Fasted to control weight (During the 30 days before the survey)	462	98 (21.2)	(17.6 - 25.2)	(P>0.05)	19.2	22.2
Took diet pills to control weight (during 30 days before survey)	461	38 (8.2)	(5.9 - 11.1)	(P>0.05)	7.69	8.52
Vomited or used laxatives to control weight (during 30 days before survey)	461	30 (6.5)	(4.4 - 9.1)	(P>0.05)	6.9	5.8

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Engaging in risky health behaviour (Variables)	Summary				Response Per Gender	
	Total responses (N)	Positive responses n (%)	Confidence interval for positives (95%)	Association between Gender & risky behaviour (chi2 test of significance)	Male Positive / Total M (%)	Female Positive / Total F (%)
Dietary habits (during past 7 days)						
Did not drink 100% fruit juice	461	149 (32.3)	(28.0 - 36.8)	(P>0.05)	29.9	33.5
Did not eat fruit	461	124 (26.9)	(22.9 - 31.2)	(P<0.001)	16.1	32.4
Did not eat other vegetables	460	70 (15.2)	(12.0 - 18.8)	(P>0.05)	11.7	17.0
Drink Fizzy drinks at least 4-6 times	460	193 (42.0)	(37.4 - 46.6)	(P<0.001)	53.9	36.0
Physical activity						
Did not meet recommended levels of physical activity	460	420 (91.3)	(88.3 - 93.7)	(P>0.05)	88.96	92.48
Not enrolled in physical education class	458	318 (69.4)	(65.0 - 73.6)	(P<0.001)	35.06	86.84
Did not play on at least one sports team	457	338 (74.0)	(69.7 - 77.9)	(P<0.001)	49.34	86.23
Watched television 3hrs or more per day <small>(During the 12 months before the survey)</small>	457	147 (32.2)	(27.9 - 36.7)	(P>0.05)	33.55	31.48
Use computer ≥ 3hr per average school day <small>(During the 12 months before the survey)</small>	455	233 (51.2)	(46.5 - 55.9)	(P<0.05)	44.7	54.5

7.2.3 Regional variation:

Of the three regions included in this study, the Makah and Al Riyadh regions both achieved similarly high response rates (83% and 82%, respectively), while the Eastern region reported a low response rate of 27%.

Comparing the data across regions reveals certain discrepancies. For example, while figures of obesity and overweight respondents are 11% and 19.9%, respectively, across all participants, the figures of obesity is highest in the Makah region, at 12%, and the figures of being overweight is highest in the Al Riyadh region, at 26%.

Regional differences in risky behaviours reported were significant for five behaviours: enrolment in a physical education class, playing on sport teams, smoking shisha, current cigarette smoking, and smoking a cigarette at least once in their lifetime. Physical activity-related behaviour was reported more often in the Eastern region, while smoking-related behaviour was higher in the Makah region. (Table10)

7.2.4 Differences between institutional types:

The reported risky behaviours that differ across institution type closely resemble those behaviours that differed across region. Students from public school differed from students from private school in five categories: enrolment in physical education class, playing in sport teams, smoking shisha, current cigarette smoking, and lifetime cigarette use (which indicates participants who

have tried to smoke at least once in their lifetimes). Smoking-related behaviours were reported more often in private schools, while physical activity indicators were more prevalent in public schools. (Table10)

Table 10 Differences in BMI and risky behaviours between regions and institution type.

Variable	Region			
	Makah	Al-Riyadh	Eastern Region	Total
n	166	248	54	468
BMI				
Underweight (BMI ≤ 18.4)				
n	29	22	6	57
%	23.77	11.46	18.75	16.47
Normal (BMI 18.5–24.9)				
n	65	100	17	182
%	53.28	52.08	53.13	52.6
Overweight (BMI 25–29.9)				
n	13	50	6	69
%	10.66	26.04	18.75	19.94
Obese (BMI ≥ 30)				
n	15	20	3	38
%	12.3	10.42	9.38	10.98
Risky Behaviour				
Lifetime cigarettes use				

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n	77	90	11	178
%	49.36	37.34	22	39.82
Current cigarettes use				
n	23	42	1	66
%	14.56	17.43	1.89	14.6
Smoking Shisha				
n	42	37	1	80
%	26.58	15.48	1.92	17.82
Did not play at least in one sport team				
n	124	171	50	345
%	74.7	69.3	92.6	74
Not enrolled in physical education class				
n	116	156	52	324
%	69.9	63.1	96.3	69.4

7.3 Online Study Results

This study aims to assess the use of Facebook fan page for collecting health behaviour data. It provides data about Facebook participants and their reported health behaviour.

7.3.1 Participants:

This study reached all participants through its Facebook fan page. Participants were approached in one of two ways: either with fan page posts with an added external link to the survey or through Facebook advertisements which link to the fan page. Both the fan page and the Facebook advertisements were designed to target Saudi youth on Facebook. Figure 6 shows a screen capture of the advertisement.

7.3.2 Fan page statistics:

According to Facebook Insights (software that records and analyses fan page activity, including number of likes, the page's reach, and details of fans' ages, locations and preferred languages) the page had 4,432 fans, and the most prevalent age group was 18-24 years old (Figure 7).

78.6% of the population reached lived in Saudi Arabia. The five most-reached regions were Jeddah/Makkah, Riyadh, Dammam, Madinah and Jazan (Figure 8). Other participants lived in Tabuk, Taif , Khobar and Abha and Cairo—the only city not in Saudi Arabia. Arabic was found to be the most preferred language (Figure 9).

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Advert Preview [Edit](#)

View on site · Create a similar advert

Targeting [Edit](#)

This advert targets 2,578,520 people:

- who live in Saudi Arabia
- 21 years old and younger
- who are not already connected to Saudi Young Health Behavior | السلوك الصحي للشباب السعودي

Suggested bid: £0.04–0.12 GBP

Figure 6 A Screen capture of Facebook ad.

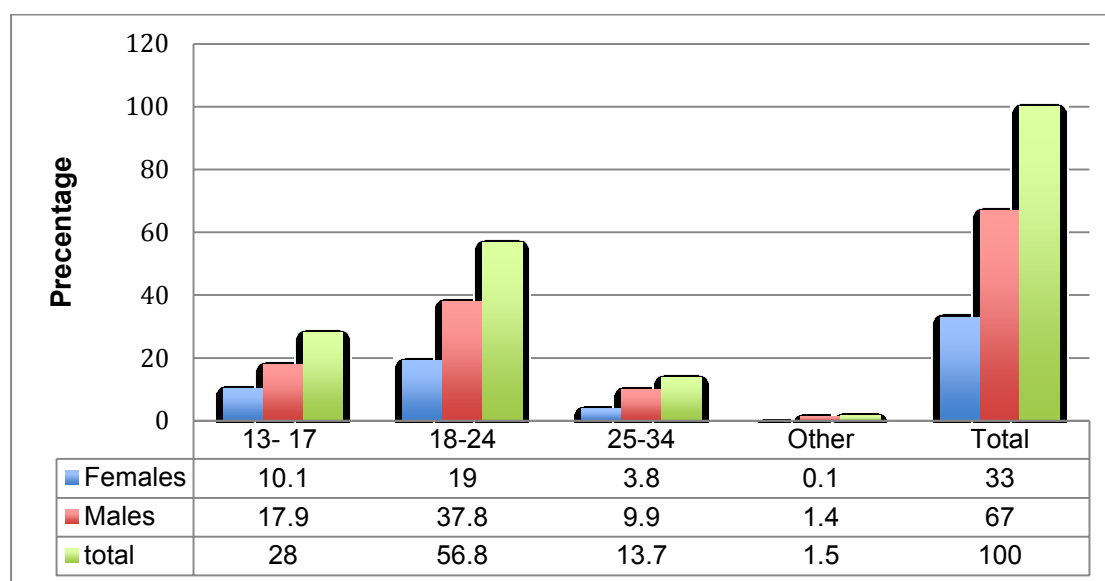


Figure 7 Facebook page fans by age group and gender (N = 4432).

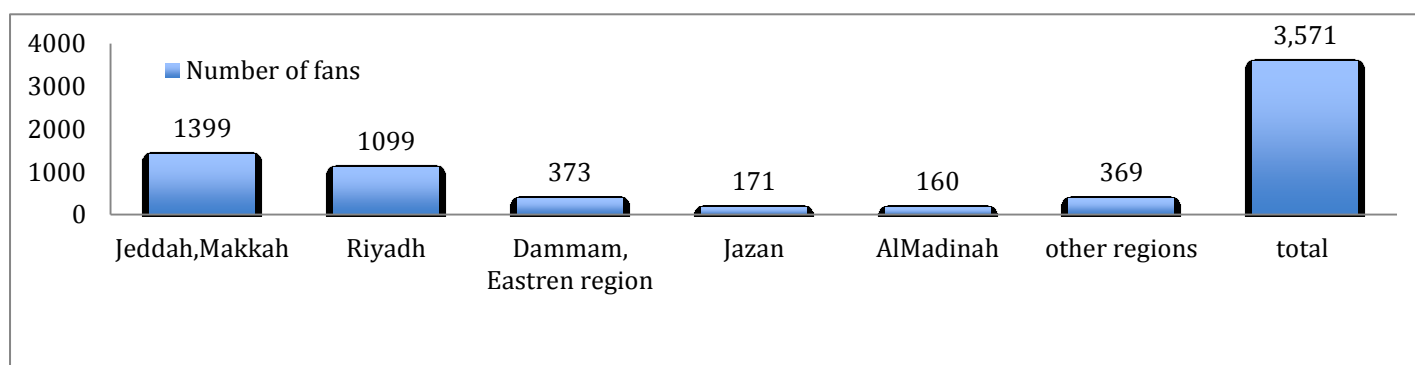


Figure 8 Saudi Arabian cities accessing the Facebook fan page.

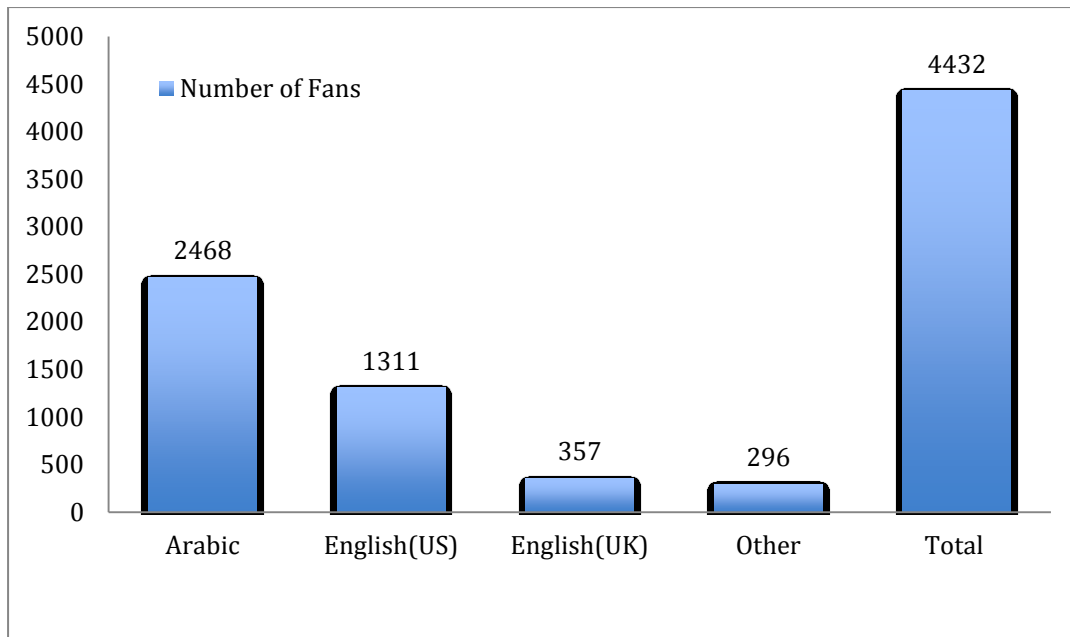


Figure 9 Preferred languages of fans accessing Facebook fan page

7.3.3 Risky health behaviours:

This section will discuss the proportions of the reported risky health behaviour in further details. Table 11 presents a summary of all risky health behaviours of a total (N= 430). The total participant number was 430 but yet completion rate was 81% per question and per person. Therefore the number of participants for each question was provided.

Smoking

The survey considered 11 behaviours related to smoking. The most reported behaviour was attempting to smoke at least once in the course of a participant's lifetime, which 41.2% of participants reported to be true. 16.3% of participants reported having smoked shisha in the span of thirty days prior to the survey. All other reported smoking behaviours showed significant variation between male and female respondents, with more males reporting smoking behaviours. The one other exception is responses for smoking a smokeless tobacco, which showed no variance across genders. In total, 14.8% of respondents were current smokers, 10.3% had purchased cigarettes from store or gas station, 12.5% were daily cigarettes users, and 10.7% had smoked on school property. The other reported behaviours are shown in Table 11.

Body weight

Body weight figures were estimated based on self reported height and weight. 22.3% of participants were overweight (23.5% of all males participants and 18.1% of all female participants) and 15.8% were obese (18.9% of all male

participants and 12.4% of all females participants). 27.7% of participants describe themselves as overweight, with no significant difference between gender, and 44.3% identified as trying to lose weight (34.1% of all males and 55% of all females) with a significant level of $p < 0.001$. The other three reported risky behaviours related to weight loss were fasting, taking diet pills, and vomiting or using laxatives to lose weight, which were reported at 16.1%, 4.8% and 2.3% respectively.

Dietary habits

This study measured four dietary behaviours: fruit juice intake, intake of fresh fruits, vegetable intake, and fizzy drink consumption. The behaviours were reported by recalling dietary activity over the course of the seven days prior to the survey. 41.3% of participants reported that they had not drunk fruit juice, 26.9% had not eaten fruits, and 17.3% reported that they had not eaten vegetables. The highest reported risky behaviour among the dietary habits was fizzy drinks consumption. 40% of participants drank fizzy drinks more than 4-6 times a week, with a significant difference between males (52.6% of all male participants) and females (27% of all female participants).

Physical activity

The recommended level of physical activity is defined by the CDC as “any kind of physical activity that increases the heart rate and makes the breath hard some of the time for a total of at least sixty minutes per day for 5 or more days a week”. 86.9% of participants did not meet that recommended level, and there was no significant variance across genders.

78.7% of participants reported that they had not enrolled in any physical education classes during the seven days prior to the survey (67.9% of males and 90.1% of females ($p < 0.001$)). Similarly, 80% of participants reported that they do not play on a sports team (68.3% of males and 92.2% of females ($p < 0.001$)). 39.3% of participants reported watching more than three hours of television per day. 73.3% of participants reported using a computer for more than three hours per day (69.8% of males, 76.8% of females ($p > 0.05$)).

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Table 11 Engagement in risky health behaviours by gender.

Engaging in risky health behaviour (Variables)	Responses by question	Positive Response Yes (%)	Confidence interval for positives [95%]	Association by gender and risky behaviour (Chi2 test of significance)	Male		Female	
					Male Positives	Male Positives /Total M (%)	Female Positives	Female positives/Total F (%)
Smoking								
Tried smoking at least once in lifetime	371	153 (41.2)	[36.2- 46.2]	(P<0.05)	199	55.8	171	24.0
Smoked a whole cigarette before age 13 years	353	36 (10.2)	[7.0 - 13.4]	(P<0.001)	193	13.0	159	6.3
Current cigarette use (during 30 days before survey)	359	53 (14.8)	[11.1 - 18.5]	(P<0.001)	195	22.1	163	5.5
Smoked more than 10 cigarettes/day (during 30 days before survey)	349	28 (8.0)	[5.2 - 10.9]	(P<0.001)	191	13.6	157	0.6
Purchased cigarettes at a store or gas station(during 30 days before survey)	348	45 (10.3)	[7.6 - 1.3]	(P<0.001)	190	19.5	157	0
Smoked cigarettes on school property (during 30 days before survey)	345	37 (10.7)	[7.4 - 14]	(P<0.001)	187	18.2	157	1.9
Lifetime daily cigarette use	345	43 (12.5)	[9.0 - 16]	(P<0.001)	187	21.9	157	1.3
Did not try to quit smoking (during 12 months before survey)	344	33 (9.6)	[6.5 - 12.7]	(P<0.001)	187	13.9	156	4.5
Current smokeless tobacco use (during 30 days before survey)	330	13(3.9)	[1.8 - 6.0]	Not significant (P>0.05)	172	5.2	175	2.3
Used smokeless tobacco on school property (during 30 days before survey)	330	13(3.9)	[1.8 - 6.0]	Not significant (P>0.05)	172	5.2	175	2.3
Smoked shisha (during 30 days before survey)	344	56 (16.3)	[12.4 - 20.2]	(P<0.05)	185	21.6	158	10.1
Body weight								
Overweight	346	69 (19.9)	[15.9 - 24.5]	(P<0.05)	121	-25.6	225	-16.9
Obese	346	38 (11.0)	[7.9 - 14.8]	(P<0.001)	121	-18.2	225	-7.1
Described themselves as overweight	354	98 (27.7)	[23 - 32.4]	Not significant (P>0.05)	184	23.4	169	32.0

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Trying to lose weight	352	156 (44.3)	[39.1 -49.5]	(P<0.001)	182	34.1	93	55.0
Fasted to control weight (During the 30 days before the survey)	354	57 (16.1)	[12.3 - 19.9]	Not significant (P>0.05)	183	12.6	170	20
Took diet pills to control weight (during 30 days before survey)	352	17 (4.8)	[2.6 - 7.1]	Not significant (P>0.05)	183	4.9	168	4.8
Vomited or used laxatives to control weight (during 30 days before survey)	354	8 (2.3)	[0.7 - 3.8]	Not significant (P>0.05)	183	2.2	170	2.4
Dietary habits (during past 7 days)								
Did not drink 100% fruit juice	334	138 (41.3)	[36 - 46.6]	Not significant (P>0.05)	170	35.9	162	46.9
Did not eat fruit	335	124 (26.9)	[22.9 - 31.2]	(P<0.001)	170	32.9	164	32.3
Did not eat other vegetables	335	58 (17.3)	[13.2 - 21.4]	Not significant (P>0.05)	170	18.8	164	15.9
Drink Fizzy drinks at least 4-6 times	335	134 (40.0)	[34.7 - 45.3]	(P<0.001)	171	52.6	163	27.0
Physical activity								
Did not meet recommended levels of physical activity	320	278 (86.9)	[88.3 - 93.7]	Not significant (P>0.05)	164	88.4	155	85.2
Not enrolled in physical education class	314	247 (78.7)	[74.1 - 83.2]	(P<0.001)	162	67.9	151	90.1
Did not play on at least one sports team	315	252 (80.0)	[75.6 - 84.4]	(P<0.001)	161	68.3	153	92.2
Watched television 3hrs or more per day (During the 12 months before the survey)	320	116(36.3)	[31.0 - 41.5]	Not significant (P>0.05)	162	33.3	157	38.9
Use computer ≥ 3hr per average school day (During the 12 months before the survey)	318	233 (73.3)	[68.4 - 78.2]	Not significant (P>0.05)	162	69.8	155	76.8

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Engaging in risky health behaviour (Variables)	Responses by question	Positive Response Yes (%)	Confidence interval for positives [95%]	Association by gender and risky behaviour (Chi2 test of significance)	Male		Female	
					Male Positives	Male Positives/Total M (%)	Female Positives	Female positives/Total F (%)
Smoking								
Tried smoking at least once in lifetime	371	153 (41.2)	[36.2-46.2]	(P<0.05)	199	55.8	171	24.0
Smoked a whole cigarette before age 13 years	353	36 (10.2)	[7.0 - 13.4]	(P<0.001)	193	13.0	159	6.3
Current cigarette use (during 30 days before survey)	359	53 (14.8)	[11.1 - 18.5]	(P<0.001)	195	22.1	163	5.5
Smoked more than 10 cigarettes/day (during 30 days before survey)	349	28 (8.0)	[5.2 - 10.9]	(P<0.001)	191	13.6	157	0.6
Purchased cigarettes at a store or gas station(during 30 days before survey)	348	45 (10.3)	[7.6 - 1.3]	(P<0.001)	190	19.5	157	0
Smoked cigarettes on school property (during 30 days before survey)	345	37 (10.7)	[7.4 - 14]	(P<0.001)	187	18.2	157	1.9
Lifetime daily cigarette use	345	43 (12.5)	[9.0 - 16]	(P<0.001)	187	21.9	157	1.3
Did not try to quit smoking (during 12 months before survey)	344	33 (9.6)	[6.5 - 12.7]	(P<0.001)	187	13.9	156	4.5
Current smokeless tobacco use (during 30 days before survey)	330	13(3.9)	[1.8 - 6.0]	Not significant (P>0.05)	172	5.2	175	2.3
Used smokeless tobacco on school property (during 30 days before survey)	330	13(3.9)	[1.8 - 6.0]	Not significant (P>0.05)	172	5.2	175	2.3
Smoked shisha (during 30 days before survey)	344	56 (16.3)	[12.4 - 20.2]	(P<0.05)	185	21.6	158	10.1
Body weight								
Overweight	346	69 (19.9)	[15.9 - 24.5]	(P<0.05)	121	-25.6	225	-16.9
Obese	346	38 (11.0)	[7.9 - 14.8]	(P<0.001)	121	-18.2	225	-7.1
Described themselves as overweight	354	98 (27.7)	[23 - 32.4]	Not significant (P>0.05)	184	23.4	169	32.0
Trying to lose weight	352	156	[39.1 -49.5]	(P<0.001)	182	34.1	93	55.0

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		(44.3)]					
Fasted to control weight (During the 30 days before the survey)	354	57 (16.1)	[12.3 - 19.9]	Not significant (P>0.05)	183	12.6	170	20
Took diet pills to control weight (during 30 days before survey)	352	17 (4.8)	[2.6 - 7.1]	Not significant (P>0.05)	183	4.9	168	4.8
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Did not drink 100% fruit juice	334	138 (41.3)	[36 - 46.6]	Not significant (P>0.05)	170	35.9	162	46.9
Did not eat fruit	335	124 (26.9)	[22.9 - 31.2]	(P<0.001)	170	32.9	164	32.3
Did not eat other vegetables	335	58 (17.3)	[13.2 - 21.4]	Not significant (P>0.05)	170	18.8	164	15.9
Drink Fizzy drinks at least 4-6 times	335	134 (40.0)	[34.7 - 45.3]	(P<0.001)	171	52.6	163	27.0
Physical activity								
Did not meet recommended levels of physical activity	320	278 (86.9)	[88.3 - 93.7]	Not significant (P>0.05)	164	88.4	155	85.2
Not enrolled in physical education class	314	247 (78.7)	[74.1 - 83.2]	(P<0.001)	162	67.9	151	90.1
Did not play on at least one sports team	315	252 (80.0)	[75.6 - 84.4]	(P<0.001)	161	68.3	153	92.2
Watched television 3hrs or more per day (During the 12 months before the survey)	320	116(36.3)	[31.0 - 41.5]	Not significant (P>0.05)	162	33.3	157	38.9
Use computer ≥ 3hr per average school day (During the 12 months before the survey)	318	233 (73.3)	[68.4 - 78.2]	Not significant (P>0.05)	162	69.8	155	76.8

7.3.4 Differences between institutional types:

A chi-square analysis found that significant difference between institution types was only found in two smoking-related behaviours: ‘smoking more than ten cigarettes per day’ reported more often in private schools and ‘Shisha smoking’ in public schools. across the reporting of risky health behaviours. (Table 12)

Table 12 Risky behaviours with significant differences between institutional types.

Smoked more than 10 cigarettes/day				
	Total responses (n)	Positive responses (n)	Positive responses (%)	Chi2 test
Private	270	21	7.8	(P<0.05)
Public	69	5	7.2	
Missing	91	--	--	--
Total	430	26	6	--
Smoked Shisha				
	Total responses (n)	Positive responses (n)	Positive responses (%)	Chi2 test
Private	264	35	13.3	(P<0.05)
Public	70	18	25.7	
Missing	96	--	--	--
Total	430	53	12.3	--

7.4 Comparative Analysis

This analysis aims to explore the difference between two data collection modes—in particular, for health behaviour surveys—and to determine if the

chosen mode would bias the results of the survey in matters of reporting risky behaviours or responding to sensitive questions.

This analysis will first examine the results from the two modes in terms of demographic characteristics for all participants. It will then examine the differences in demographics by mode. Lastly, it will explore the figures of risky behaviours that has been reported for the total participant pool, followed by differences between modes.

The total study sample size was 898 participants: 468 PAP and 430 SNS. The dominant groups surveyed were female and from private educational institutions, with the majority of participants Saudi nationals aged 13 to 19 years old. Details of each group by mode are presented in table 13.

7.4.1 Demographic characteristics of study sample:

The reported demographic data included variables of gender, nationality, institution type, education level, and age. Differences existed in each element—the SNS survey reached more males than females, while the PAP survey reached more females than males. The SNS reached more non-Saudis than did the PAP survey, and private school participants responded at a greater rate to the SNS survey than to PAP survey. The distribution of level of educational was wider for the SNS mode than PAP, and similar to the age distribution.(Table 13)

Table 13 Demographic characteristics of total participants.

Characteristic	Study Sample (898)		PAP (468)		SNS (430)	
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
Gender						
Female	506	56.35	309	66.03	197	45.81
Male	392	43.65	159	33.97	233	54.19
Nationality						
Saudi	709	78.95	403	86.85	306	72.86
Other	175	19.49	61	13.15	114	27.14
Missing	14	1.5	4	0.85	10	2.3
Institution type						
Private	529	58.91	193	41.24	336	80
Public	359	39.98	275	58.76	84	20
Missing	10	1.11	0	0	10	2.3
Education Level						
High School	573	63.8	396	84.62	177	42.24
Middle School	14	1.6	7	1.5	7	1.5
University	236	26.3	65	13.89	171	40.81
Missing	75	8.3	0	0	75	17.44
Age (Years)						
13-19	628	69.93	401	86.98	227	54.83
20-24	178	19.82	54	11.71	124	29.95
>25	69	7.68	6	1.3	63	15.22
Missing	23	2.5	7	1.4	16	3.7

7.4.2 Reported risky behaviours:

Risky behaviours will be presented as follows: the most-reported behaviours among each section (smoking, body weight, dietary behaviours, and physical activity) followed by behaviours that presented a statistically significant difference among different modes of data collection for each section.

Smoking

Smoking was the top risky behaviour reported, with 40% of respondents confirming that they had smoked before; 15% are current smokers, and 17% smoke shisha. There was no statistically significant difference between modes, except for a question about quitting, where 7% in the PAP survey and 10% in the SNS, with a p-value of 0.02, responded that they had not attempted to quit in the twelve months before the survey.

Body weight

Forty-nine per cent of participants reported that they were trying to lose weight; 37% described themselves as overweight, and 19% fasted to control their weight. Reporting vomiting as means to lose weight came in statistically significant, 7% of PAP respondents and 2% of SNS respondents confirmed in the positive to this question; 53% of PAP and 44% of SNS respondents reported trying to lose weight.

Dietary habits

Under dietary habits, the most frequently reported risky behaviour was drinking fizzy drinks; 41% of participants answered in the positive to this question, followed by a response rate in the positive of 36% for those who have not drunk fruit juice in the last seven days, which was statistically significant between modes with a p-value of 0.01.

Physical activity

The lack of physical activity metric was the highest of all risky behaviours. Of all participants, 94% did not meet the recommended level of physical activity, and 76% did not play in any sport team (statistically significant between modes with a p-value of 0.05). A full 73% were not enrolled in physical education class—significant between modes (p-value=0.00)—60% watched television or used the computer for three or more hours per day, with a statistically significant difference between PAP and SNS survey groups (p-value=0.00).

The proportions of reported risky behaviours and the odds ratio of the mode effect are presented in table 14.

7.5 Differences between modes application:

Number of dropouts

A respondent is considered a dropout if one question is missed, followed by an unanswered question towards the end of the survey. There was great difference between the SNS (25%) and PAP (2%) respondent dropout rate. Multiple reasons for dropout error in survey research exist: anonymity allows

respondents to quit at any time without the knowledge of the researcher, for instance. Survey takers also may drop out if the questions are too personal, sensitive, or long, or if the wording is confusing or unclear.

Response rate

The response rate is an important indicator for survey quality, indicating the number of respondents or the return rate [119]. This study calculated the PAP response rate (59%) by dividing the number of questionnaires returned and answered by the number sent to the institution. The SNS response rate (10%) was the number of answered questionnaires divided by the number of Facebook fans reached.

Completion rate

Completion rate is a measure that can be an evaluation measure of the participant's survey acceptability. There are two types; the first is the completion rate per unit or question, which is the rate of answered responses over unanswered responses for each question. The average completion rate per question and per person was the same, and was 96% for the PAP survey and 81% for the SNS survey.

Timelines

The survey timelines is usually defined as the start of the survey process to the time of analysis. For both modes, the timeline is defined as starting on the date of applying to ethical approval to the time of analysis. For PAP it included the time it took to send and receive the questionnaire. However, it was not possible

to calculate the time each participant spent answering each questionnaire. While SurveyMonkey did provide the time spent on each survey, this study did not analyse this information because it is not comparable across modes. Both modes were carried out over five months period. Yet if we break down these timelines we will find that the majority of time spent for PNP was for collecting responses and entering data, while for SNS most of the time spent was gaining ethical approval.

Data preparation time

Data preparation time was calculated as the time after data collection until the time of analysis. For the PAP survey, the data was transcribed into electronic format, then cleaned and analysed over the course of a two-month period, with the majority of time spent transcribing. Preparation time for the SNS survey results took one month—mainly on analysis— since the online company provided a summary of respondent results.

Cost

The costs for the paper-based mode were calculated using the cost of production and materials, including the actual printing of the survey and postage to recipients in different regions. The cost of labour to process the questionnaires was not possible to calculate, since that process was carried on in association with the ministry of education in Saudi Arabia, where personnel from the research assistant department facilitated the process. In addition, the main researcher entered the data in Microsoft Access software, so that cost is also not included.

Costs for the SNS mode included the cost of the subscription to SurveyMonkey (the Web-based survey tool) and the amount of time spent on the Facebook Advertisement tool. This study was also not able to calculate the cost of labour per person of posting and creating the ads on the Facebook fan page.

Results show that the PNP mode was more costly in terms of preparing and collecting the material. It is also clear that the PNP survey will require additional labor to process the survey.

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Table 14 Most reported risky behaviours by mode of data collection.

Engaging in risky health behaviour (Variables)	Total response N	Positive response	%	Offline %	Online %	Online is the exposure			
						OR	95% CI	p Value	
Smoking									
Tried smoking at least once in lifetime	818	331	40%	40%	41%	0.9	0.7	1.2	0.68
Smoked a whole cigarette before age 13 years	800	62	8%	6%	10%	1.1	0.93	1.3	0.27
Current cigarette use (during 30 days before survey)	811	119	15%	15%	15%	1.0	0.68	1.5	0.95
Smoked more than 10 cigarettes/day (during 30 days before survey)	793	52	7%	5%	8%	1.1	0.88	1.5	0.32
Purchased cigarettes at a store or gas station(during 30 days before survey)	786	83	11%	5%	8%	0.9	0.71	1.1	0.36
Smoked cigarettes on school property (during 30 days before survey)	778	76	10%	9%	11%	1.2	0.76	1.9	0.42
Lifetime daily cigarette use	789	83	11%	9%	12%	0.7	0.44	1.1	0.12
Did not try to quit smoking (during 12 months before survey)	782	64	8%	7%	10%	1.3	1.05	1.7	0.02
Current smokeless tobacco use (during 30 days before survey)	778	36	5%	5%	4%	0.8	0.38	1.5	0.43
Used smokeless tobacco on school property (during 30 days before survey)	788	46	6%	4%	8%	1.7	0.96	3.2	0.07
Smoked shisha (during 30 days before survey)	793	136	17%	18%	16%	0.9	0.62	1.3	0.57
Body weight									
Overweight	714	153	21%	20%	23%	0.8	0.59	1.2	0.35
Obese	714	97	14%	11%	16%	0.6	0.42	1.0	0.05
Described themselves as overweight	813	219	37%	26%	28%	0.9	0.68	1.3	0.67
Trying to lose weight	812	401	49%	53%	44%	1.4	1.08	1.9	0.01
Fasted to control weight (During the 30 days before the survey)	816	155	19%	21%	16%	1.4	0.98	2.0	0.06
Took diet pills to control weight (during 30 days before survey)	813	55	7%	8%	5%	1.8	0.98	3.2	0.05
Vomited or used laxatives to control weight (during 30 days before survey)	815	38	5%	7%	2%	3.0	1.36	6.7	0.00

Engaging in risky health behaviour (Variables)	Total response N	positive response	%	Offline %	Online %	Online is the exposure			
						OR	95% CI	p Value	
Dietary habits (during past 7 days)									
Did not drink 100% fruit juice	796	287	36%	32%	41%	0.7	0.51	0.9	0.01
Did not eat fruit	796	234	29%	27%	33%	0.8	0.55	1.0	0.07
Did not eat other vegetables	795	128	16%	15%	17%	0.9	0.59	1.3	0.43
Drink Fizzy drinks at least 4-6 times	795	327	41%	42%	40%	0.9	0.73	1.0	0.13
Physical activity									
Did not meet recommended levels of physical activity	780	731	94%	95%	92%	1.7	0.94	3.0	0.08
Not enrolled in physical education class	772	565	73%	69%	79%	0.6	0.44	0.9	0.00
Did not play on at least one sports team	772	590	76%	74%	80%	0.7	0.50	1.0	0.05
Watched television 3hrs or more per day (During the 12 months before the survey)	773	466	60%	51%	73%	2.6	1.92	3.6	0.00
Use computer ≥ 3hr per average school day (During the 12 months before the survey)	773	466	60%	51%	73%	2.6	1.92	3.6	0.00

Table 15 Differences in mode application outcomes.

Outcome	PAP		SNS	
	n	%	n	%
Number of drop-outs	8	2	110	25
Response rate ^(a)	468	59	430	10
Completion rate ^(b)	Median	Average	Median	Average
-Per Question	98%	96%	80%	81%
-Per Person	100%	96%	97%	81%
Timeliness ^(c)	5 Months		5 Months	
-Ethical approval	1		2	
-Data collection	2		2	
-Entry and analysis	2		1	
Data preparation time ^(d)	2 Months		1 Month	
Cost	£400		£200	

(a) PAP=Number of questionnaires sent to institution / Number returned
 SNS=Number of Reached /Answered

(b) PAP: Calculated using Excel SNS: Automatically provided by survey software

(c) PAP: from applying for ethical approval to data analysis, SNS: From applying for ethical approval to data analysis.

(d) PAP: transcribed into electronic format; cleaned and analysed, SNS: online summaries provided by company - coded for ease of analysis

CHAPTER 8

Discussion

8 Discussion:

This chapter well summaries the main results of each phase of the study and strength and limitation of methodology and finally provide recommendations for future research. It will be structured as follows: first the results and limitations of the first phase (Offline study) will be discussed, followed by the second phase (online study) results and limitations, then it will discuss thoroughly the thesis and the comparative results of differences between two modes of collecting data and end up with recommendations for future work.

8.1 Overview of the study phases:

Phase one which is the offline study provided figures of risky health behaviours that have contributed to chronic diseases for young Saudis. And it also assesses the procedure of collecting health behaviour data by the traditional paper and pen surveys through schools and universities. The study sample came from three large provinces in Saudi Arabia, (Makah region, Al Riyadh region, and Eastern region), although the response rate from the Eastern region was comparatively lower than the response rate from the other two regions. The reason for this difference is unclear. Overall, the sample adequately represents Saudi youth, since it includes both genders and students from both private and public institutions.

Phase two which is the online study explored the feasibility of obtaining health behaviour data using a relatively new collection method. Facebook, which is a well-known social networking site and has been used for many diverse purposes,

but few have used it for health research and collecting survey data. The results have shown that Facebook allows researchers to reach populations that could not have been reached using traditional surveying methods. It has proved that online advertisements can reach a significant number of people with a minimal budget. Moreover, it indicates that we could use Facebook for broader purposes, such as providing information for general health promotion.

Phase three is comparison analysis that aims to explore the difference between two data collection modes—in particular, for health behaviour surveys—and to determine if the chosen mode would bias the results of the survey in matters of reporting risky behaviours or responding to sensitive questions. In addition also examines the effect of mode on data quality. The results shows that both modes

8.2 Summary of the results:

8.2.1 Health behaviour results from Online and Offline studies:

The Offline study shows that current smoking among the study population was 14.6% (26% of all males and 8.5% of all females), and the Online study shows it was 14.8% (22.1% of all males, 5.5% of all females). These figures are compatible with the range reported by a systematic literature review of smoking status in Saudi Arabia, which shows that the prevalence of smoking activity among adolescents ranges between 12% and 29.8%, with a median of 16.5%. Furthermore, the Global Youth Tobacco Survey (GYTS), a school survey developed by the WHO to measure smoking prevalence and indicators, reports current smoking prevalence among Saudi youth at 19.5% (31.2% for males and 8.9% for females). The result of this study regarding current smoking reports similar figures as have previously been reported. It is important to note, however,

that the GYTS only includes research participants aged 13 to 15 years. The GYTS survey also did not specify regions and type of educational institution, but instead analysed data across gender and city [35, 120].

Smoking shisha is an important risky health behaviour that has been under-reported among youth, especially females, in Saudi Arabia. 17.8% of the Offline study population (21.4% of all males and 15.9% of all females) and 16.3% (21.6% of all males, 10% of all females) of the Online study population reported currently smoking shisha. Moreover, the response rate for this specific question was 95%, which is higher than the response rate of other smoking-related questions. This may indicate that smoking shisha is socially more acceptable than smoking cigarettes. For males, the reported shisha smoking figure was higher than other reported prevalence figures 8.6%, 7.3% [33, 121].

Participants were classed obese or overweight based on their BMI (kg/m^2) as recommended by the WHO. People with a BMI greater than or equal to twenty five are defined as overweight and above twenty five is defined as obesity in this study.[122] 19.9% of the offline sample (25.6% of males and 16.89% of females) and 22.3% of the online sample (23.5% males, 18.1%) was overweight, 11% of the offline sample (18% of males and 7% of females) and 15.8% of the online sample (12.6% males, 12.4% females) was obese. Although the figures show that males are more overweight and obese than females, the body-related data is self-reported. Youth, especially females, tend to underestimate their weights and overestimate their heights[123]. This may be the cause of the differences between genders. A recent cross-sectional study, which evaluated the association between obesity measures and lifestyle factors, reported similar

figures where the prevalence of being obese or overweight was 43.6% for males and 34.8% for females [124].

Fizzy drink consumption represented the most frequently reported risky dietary behaviour. 41.9% of offline participants and 40% of online participants drank fizzy drinks more than 4-6 times per week. There was a significant difference between genders in both online and offline sample. For the offline participants, 53.9% of males reported drinking more than 4-6 fizzy drinks per week, while only 35.9% of females responded similarly. For online participants, 52.6% of male participants and 27% of female participants reported this behaviour.

The high total number of this behaviour may be a result of the fact that in Saudi Arabia, fizzy drink prices are lower than prices for juices or other healthier options, which may lead youth to prefer fizzy drinks over other options. It also indicates that there is a need for education to raise awareness about dietary behaviours and about how to control weight. This is particularly true because the results also show that a high percentage of the sample population have recently tried to lose weight through fasting and vomiting, which may also contribute to health problems later in life.

According to a systematic review looking at physical activity among Saudi population, few studies have investigated the epidemiology of physical activity in Saudi Arabia, and there is further need for studies that can provide information about the pattern of this behaviour [125]. However, more research is directed to this area in Saudi Arabia [124].

This study shows that physical inactivity is highly prevalent among the study population. The majority of the offline sample population (91%) and online sample population (86.9%) did not meet the commonly recommended level of physical activity. Furthermore, the figures of sedentary behaviours such as watching television, using a computer, or playing digital games is quite high. Moreover, 69.4% of offline participants and 78.7% of online participants reported that they had not enrolled in any physical education class during the last seven days before the survey. The numbers were high especially among female, this is a result of the regulation of physical education in female schools, where it is still prohibited.

8.2.2 Comparative analysis results:

From the demographic differences this study viewed, it is clear that the SNS survey method reached a wider geographical area and wider age range, with more male respondents, which is compatible with similar studies finding that male Saudis typically respond to online surveys at a greater rate than they do to telephone interviews.

Among all the reported risky behaviours, physical inactivity was reported at the highest rate: 94% of all participants from both survey modes did not meet the recommended level of physical activity. There exists a significant difference between modes—SNS participants showed slightly higher percentages of inactivity—and may be a reflection of the web sample, since they spend more time on technology and less time being active than PAP participants. It may also justify the positive responses of PAP participants to physical education questions in the survey, which may be influenced by the academic environment or the

teachers' presence at the time of answering the questions. The results also suggest that SNS is a suitable mode of survey if physical activity is the subject of interest, and that reaching a young participant for health promotion purposes through SNS surveys might be a beneficial strategy.

Smoking was found in a higher percentage of SNS participants, possibly due to the sensitivity of answering such a question: students in an academic environment may not answer this question truthfully, for instance. Shisha smoking is an exception, because such behaviour is more culturally acceptable in Saudi Arabia than is cigarette smoking.

For body weight questions and dietary habits there was no statistically significant difference by mode. Drinking fizzy drinks is a risky behaviour that is prevalent among Saudi youth, with a total of 94% of study participants reporting drinking fizzy drinks at least 4-6 times a week. Consumption of these drinks is considered a public health concern, since consumption is highly correlated with weight gain and cardiovascular diseases [126].

Although both survey modes resulted in similar results and figures, each mode has shown advantages and disadvantages. (Table17) Some researchers suggest combining survey modes to overcome other downsides. Yet our research concludes that conducting surveys via SNS is a new mode that has many advantages over the traditional PAP mode, especially in terms of participants' ability to access information and maintain anonymity, and researchers' ability to reduce cost and analyse data more easily. SNS surveys are limited by sampling issues and an inability to obtain an accurate response rate; these issues,

however, can be mitigated if the population is hard to reach and efforts are made to avoid biases by carrying out sampling strategies.

8.2.3 Summary of advantages and disadvantages of PAP vs. SNS:

The research methodology of each mode was evaluated according to certain criteria, with each criterion considered either an advantage or disadvantage for each mode.

The first research methodology criteria considered are access to information. It is easy to provide detailed information that is available at all times for participants when using the SNS, since creating a page requires providing information survey respondents might deem useful. On the other hand, it is difficult to provide follow-up information by PAP; it is only possible to explain the research objectives in the consent form or by having a participant ask a researcher (if present at the time of collecting data) any questions.

The second criteria are participant anonymity, or the anonymity perceived by participants in survey research. This is very important because it can affect the reliability of the results and truthfulness of responses. In the PAP mode, participants were reached in formal environments, such as schools, universities, or clinics, where research personnel collected the survey. This may affect the perception of anonymity, and could bias results. This happens as result of interviewer effect, where the presence of a teacher or collector may alter the honesty of responding because of lower perception of anonymity.

The third criterion considered is bias. There are many types of biases related to survey research, yet the most common and important biases to control for are sampling bias and self-reporting bias. Moreover, each mode in this research has its own types of bias, and efforts were made to eliminate them. Such as; for the SNS, responses were assured to not be linked to participant Facebook accounts to increase the perceived anonymity for participants. In addition, no incentives were offered to avoid fraud responses. Finally, the IP address of each survey was recorded to eliminate multiple responses, which is common bias among online surveys. For PAP surveys, instruction was given to survey collectors regarding the survey procedure, to assure that participants are not forced to participate and to make sure to eliminate interviewer bias.

Maintaining confidentiality was the fourth criteria; SNS has an advantage to PAP for this mode, since the data were held electronically without tracing participant information. This researcher sought to maintain both data and participant confidentiality, yet complete confidentiality is not guaranteed due to data collection methods and entry.

The fifth criteria to be considered is cost and, according to the results of this research, the SNS survey has a similar sample size to the PAP survey, but cost less money and took less time. In addition, ease of data analysis in SNS mode, since the data was stored electronically and exported to analysis software, makes it preferable to PAP. Lastly, the online survey company provided simple summary analysis that was helpful and easy to obtain.

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The last piece of criteria considered is the response rate, which is an important parameter for any survey research. It is easy to calculate the response rate in a PAP survey, but is more difficult in SNS surveys it not possible to accurately calculate the number of participants reached. PAP surveys have an advantage when compared to SNS surveys in terms of sample size and sampling issue, since randomness and an exact sample size is assured in PAP, as opposed to SNS, where there are many limitations.

Table 16 Summary of advantages and disadvantages of PAP vs. SNS.

Criteria	PAP	SNS
Access to information	✘	✓
Anonymity	✘	✓
Bias	✘	✘
Confidentiality	✘	✓
Cost	✘	✓
Data Analysis	✘	✓
Response Rate	✓	✘
Sample size and Sampling	✓	✘

✓ Advantage ✘ Disadvantage

8.2.4 Comparison to similar studies:

A study was conducted to recruit Canadian youth through Facebook, in which a similar methodology was used targeting users via Facebook ads, with similar results to the study undertaken in this thesis. Facebook is an effective tool for researchers to use to reach youth, and in the case of this study led to a wide distribution of participants with limited resources. In the Canadian study, 147

Facebook was not compared to any other mode [127]. This result is also consistent with Amon, 2014 systematic review, which included six studies that used Facebook as a recruitment tool resulting in wider reach of eligible participants [89]. However, all of them were using Facebook as an enhancement tool for a traditional method.

In the United States, responses to the YRBS questionnaire health behaviours using two modes were compared. The first using a web-survey that was accessed by school computers and the second mode was the traditional PAP. The results showed that the mode of questionnaire was associated in only 7 out of 74 behaviours. In conclusion, they found that results from both modes were almost equal.

A point of consideration is that the YRBS questionnaire study was conducted within a school setting, however the study settings for our thesis are different. However, the effect of mode was comparable with our findings, i.e. both studies suggest that the mode has no significant effect on reporting health behaviour for youth population [128].

8.3 Strengths and limitations:

This study is unique in terms of the new mode of collecting data and targeted population. Facebook was not assessed thoroughly for reaching young Saudis and collecting health behaviour data before this study. Each study phase has its own strengths; the Offline study is one of a few that explore risky health behaviours in Saudi Arabia's youth. It includes samples of male and female students ages 13-21 years from three different regions across the country. The

results provide an overview of the current status of risky health behaviours and focus on the differences between genders. It has explored the process of collecting health behaviour through schools and university and addressed related challenges.

And the Online study explored how feasible it is to reach Saudi youth through Facebook. Young Saudi's are considered as a hard group to reach with information, and a difficult group from whom to collect data. The study finds Facebook to have been an effective method of collecting high quality data from Saudi youth. It is also possible that this finding may be promising for future health research aimed at this population, especially when a research question tackles sensitive and culturally unacceptable behaviours such as sexual behaviour and drug use.

The comparative analysis of the two phases allowed us to compare a relatively new mode (SNS) to a traditional applicable mode of collecting data from young age groups (PAP). The comparison focused in important elements of health behaviour surveys; first is the mode effect on reporting health behaviour and second element is data quality measures.

The overall findings of the study provide a comprehensive understanding of using Facebook for health research. And proven the effectiveness of Facebook as a mode to collect health behaviour data when compared to conducting a PAP questionnaire. In addition, this study highlights the need for public health action regarding high levels of physical inactivity and smoking in Saudi Arabia.

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This study utilizes a questionnaire developed by the CDC, which was assessed by several methodological studies to assure the reliability and validity of the instrument. However it is important to point out that the questionnaire was designed for United State and cultural adaptability was a concern. The questionnaire was translated to Arabic language by two independent translators and it was piloted to assure clarity of the questions. In addition, it is not the only study that has used this reliable questionnaire; it was also translated to protégées in Brazil and to Thai in Indonesia. In Brazil, after assessing the translated version of the questionnaire by a committee of experts, it concluded that the Portuguese version of the 2007 YRBS showed idiomatic, semantic, conceptual and cultural equivalences [129, 130]. However it was not assessed for an Arabic speaking population or Saudis before and this is considered as a limitation.

Although health behaviours have strong relation to culture in this questionnaire the questions were general with no specification for certain type of food or exercise so it was relatively easily adaptable. However, It includes drug use questions, which was removed because of cultural barrier as the topic is considered a taboo especially in female schools in Saudi Arabia. In this study smoking questions was not very acceptable by the ethical committee in the ministry of education and they have asked to be removed in female school questionnaire, but after negotiation they agreed to be included. And to assure similarity between offline and online questionnaire, drug use questions was also removed from the online version.

There are limitations to the study that deserve mention. Firstly, all data were self-reported and this is considered an issue especially for height and weight

measures, which was self reported by young age participants and this might affect the reliability of the results. However, BMI calculated from self reported data are more feasible and less burdensome to collect from large population, and it was used for many large epidemiological studies, yet it raises an important issue regarding validity and this was a concern for some scholars who assessed the validity of self reported height and weight by comparison to technician-measured BMI. Stewart assessed the reported height and weight of 3373 people aged between 14-61 and concluded that self reported measures are remarkably accurate[131]. however, other scholars have conducted similar methodology and found out the participants tend to underreport their weight and over report height which results in overall underestimation of BMI measures, yet found a high correlation between self-reported measures and technician-measured BMI with no clinically significant difference[132-134].

In the Offline study the response rate was much higher among female students, because the education system in Saudi Arabia is segregated by gender, which essentially forms a cultural barrier, meaning the researcher (female) was unable to have direct access to all schools. This issue could be avoided in larger studies with higher budget and personnel. As there are a research assistance offices related to the MOE in each region, but offices are also segregated and male personnel is needed when male participants is targeted.

Another limitation that must be noted is that due to the study design, trends cannot be observed and relationships cannot be determined between different behaviours and gender and behaviour.

A limitation related to Facebook as data collection mode is that the sample is limited to Facebook users the response rate was impossible to calculate. In addition, Facebook and social network sites in general are organic tools that are continuously evolving. New social network platforms are frequently being generated, which may lead to changes in youth interests and preferences being influenced by market availability. This is a challenge that scholars must take into account when designing and interpreting social network research.

Sampling related limitation, is the fact that the sample taken from a Facebook survey is convenient, but we must consider the concept of generalizability due to Facebook's reach being limited to people with Internet access. Such constraints may affect input from people of lower socioeconomic status, yet when comparing results to the randomly selected offline sample, there is little to no significant difference in reported behaviours. In addition, the SNS sample was geographically more representative and similar to the total population than the PAP sample.

A process limitation regarding the Online study is the fact that the researcher of this study spent a lot of time generating posts and managing the Facebook fan page, which was used to reach and attract young people to this study. Future research should consider this and allocate a sufficient amount of time and personnel to Facebook fan page management.

8.4 Implication for future research

The study points to three directions for future research.

- For the Saudi population sexual behaviour research is very limited especially for unmarried young people. This topic is almost taboo, however using social network sites to reach young people for researching socially unacceptable matters, such as sexual behaviour, needs to be investigated to discover if such an approach would yield a response via SNS research.
- The results of this study indicated that there were no major differences in reporting risky behaviours among “young age groups” in Saudi Arabia from one method to another (PAP vs SNS). Yet the preference of the young age group regarding the mode of reaching and participating in future research must be investigated in order to increase the participation rate in SNS research.
- The figures of physical inactivity were high in both modes of data collection, yet it was slightly higher among SNS participants. This could encourage researchers to investigate the potential effectiveness of health promotion and physical activity intervention through SNS.

8.5 Implication for youth health care in Saudi Arabia

The existence of Risky health behaviours amongst ‘young age groups’ is preventable if efforts for promoting healthy living and greater awareness are effective. However, there are limited health promotion programs in Saudi Arabia directed at this age group, which has specific health needs that differ from those of the general population. Although this need is realized by some health authorities in Saudi Arabia, efforts are limited toward fulfilling this need [135]. SNS and Facebook in particular was proven by this study to be effective tools.

Saudi Arabia health care services must utilize this powerful tool in reaching this age group to help establish baseline statistics and subsequently provide health services such as health education and promotions.

Risky health behaviours, sedentary lifestyles amongst other issues not addressed early on in life will lead to complications not only for individuals, but for the nation as a whole, in terms of health burden and the cost of providing specialist services. Addressing such issues, educating adolescents will be critical to help improve the health of the nation, after all the youth of today will become the adults of tomorrow.

Based on the findings of this study, the following recommendations are made for future research:

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Appendices

Appendix A: Table of the eight area of focus in feasibility study.

Appendices : Appendix A: Table of the eight area of focus in feasibility study.

Area of focus	The feasibility study asks ...	Sample outcomes of interest
Acceptability	To what extent is a new idea, program, process or measure judged as suitable, satisfying, or attractive to program deliverers? To program recipients?	<ul style="list-style-type: none"> • Satisfaction • Intent to continue use • Perceived appropriateness
Demand	To what extent is a new idea, program, process, or measure likely to be used (i.e., how much demand is likely to exist?)	<ul style="list-style-type: none"> • Fit within organizational culture • Perceived positive or negative effects on organization • Actual use • Expressed interest or intention to use • Perceived demand
Implementation	To what extent can a new idea, program, process, or measure be successfully delivered to intended participants in some defined, but not fully controlled, context?	<ul style="list-style-type: none"> • Degree of execution • Success or failure of execution • Amount, type of resources needed to implement
Practicality	To what extent can an idea, program, process, or measure be carried out with intended participants using existing means, resources, and circumstances and without outside intervention?	<ul style="list-style-type: none"> • Factors affecting implementation ease or difficulty • Efficiency, speed, or quality of implementation • Positive/negative effects on target participants • Ability of participants to carry out intervention activities • Cost analysis
Adaptation	To what extent does an existing idea, program, process, or measure perform when changes are made for a new format or with a different population?	<ul style="list-style-type: none"> • Degree to which similar outcomes are obtained in new format • Process outcomes comparison between intervention use in two populations
Integration	To what extent can a new idea, program, process, or measure be integrated within an existing system?	<ul style="list-style-type: none"> • Perceived fit with infrastructure • Perceived sustainability
Expansion	To what extent can a previously tested program, process, approach, or system be expanded to provide a new program or service?	<ul style="list-style-type: none"> • Costs to organization and policy bodies • Fit with organizational goals and culture • Positive or negative effects on organization • Disruption due to expansion component
Limited efficacy	Does the a new idea, program, process, or measure show promise of being successful with the intended population, even in a highly controlled setting?	<ul style="list-style-type: none"> • Intended effects of program or process on key intermediate variables • Effect-size estimation • Maintenance of changes from initial change

Appendix B: Published work based on chapter 5

Issue 12 » Virtual Citizen

Advancing Health Research Through Online Social Networking

Fahdah Alshaikh, Imperial College London

The past decade has seen technology advance so rapidly, it's almost difficult for industries and manufacturers to keep up. However, this technological shift has revolutionised the practice of medicine and healthcare with new treatments and medical devices launching at an ever-increasing rate. Alongside the development of new therapies, the recent explosion of internet-based communication and education tools has enabled practitioners and researchers to interact with patients in new and innovative ways. This has allowed the medical community to disseminate information, receive real-time feedback and collect data critical for scientific research.

Exploring and exploiting the opportunities made possible by new technology is essential in all aspects of research. The internet is particularly notable in terms of its ability to reach a wide audience in a unique, interactive and efficient way. For example, Social Network Sites (SNS) allow people all over the world, particularly in the younger age range, to communicate with one another. This intrinsic ability to reach out to young people, with the potential to collect data, has been little utilised in health research.

SNS have gained a lot of attention from consumers and advertisers, including health organisations, in the recent past. However, whilst SNS is recognised as a powerful tool for communication; the question is raised, 'How effective can SNS be in engaging and reaching youth for health research and health surveys?'

Case Study: SNS for Recruitment – 100 000 donors in 100 days

17-24 year olds account for 40% of new blood donors in the UK each year. But the number of young donors registering has been falling steadily. In response to this decline the NHS launched an initiative to recruit 100 000 blood donations in just 100 days.

Their strategy focussed on a continually updated online and social media presence that appealed to young people and their desire to be seen to be making a difference. They harnessed existing donor communities' social network sites, (Facebook, twitter, YouTube), encouraging them to tweet personalised campaign messages, upload photos and be part of the appeal.

A total of 16,211 tweets were created using #100k100days, 1,815 posts were shared on Facebook and the campaign video viewed 1,346 times. Total spend was just 40p per thousand people reached. Through this innovative social networking approach the NHS exceeded its target and secured 120,000 new donors.

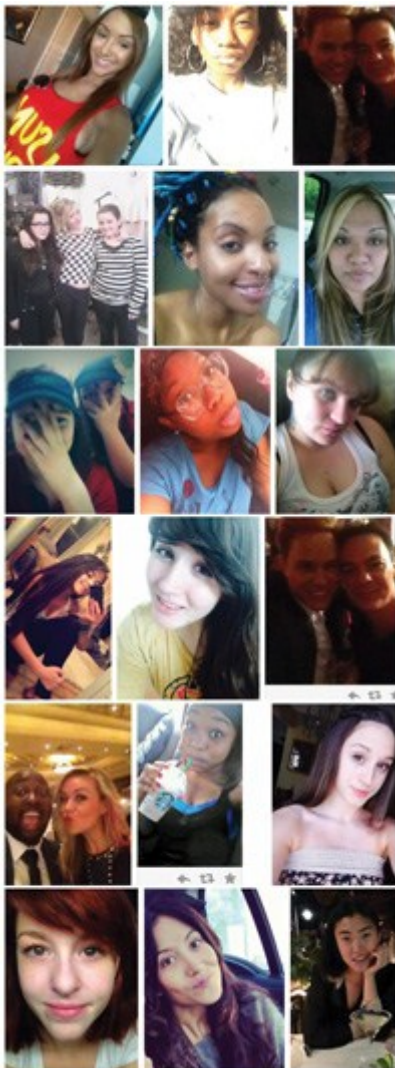
eHealth

Since its emergence, the internet has grown to be an invaluable tool in healthcare. Demand from consumers for information about health and well-being has led to the establishment of a range of online regulated healthcare organisations whose aim is to provide accurate and clinically valid information. Methods of delivery of such information often include a range of media including short videos or images depicting conditions and treatments.

Demand from consumers for information about health and well-being has led to the establishment of a range of online regulated healthcare organisations whose aim is to provide accurate and clinically valid information.

Online healthcare technologies also provide an opportunity for active communication between patients and health professionals, either via private messages (email) or publicly through forms and fan pages. For example, SNS users may spread health information and advertise surveys about health care by updating their status or by showing participation on their profiles. Another key feature of SNS is its ability to allow community interaction. Family members of patients can be involved, ideas can be shared and people can support one

another. On the other hand, as the community is virtual, no geographical barriers apply. One such example of online patient interaction is Patient Opinion, a website developed by the Nottingham Healthcare NHS Trust¹, which provides an online forum for patients to share information on their health problems and questions about treatments with other patients, as well as qualified medical personnel.



The #nomakeupselfie campaign for breast cancer garnered thousands of enthusiastic followers raising awareness of the disease.

Social Surveys

Allied to the dissemination of health information, and the facilitation of interaction

between patients and the healthcare industry (and other patients), online technology can also play a role in health research.

Healthcare organisations undertaking survey-type research usually collaborate with a research institutions, as the latter are specialists in setting up; running studies; analysing data and reporting findings. For example, research surveys typically require health researchers to communicate with participants and send them a survey to be completed and returned by a set date. This mode of communication is predominantly 'one way' as participant feedback may be missed due to difficulties in reaching consumers or issues with response rates. Also any additional participant feedback may not be deemed useful for research purposes, and is hence disregarded.

However, using SNS as a mode of communication between researchers and participants allows participants to communicate with one another and with the community, generating more widespread interest. Participants are able to answer surveys anonymously as responses are unidentifiable, which in turn will encourage more truthful responses. Participant feedback is instantaneous, updated quickly, and easily processed and analysed. The researcher also has the opportunity to monitor the whole process in real time, quickly correcting any anomalies.

One of the key advantages of SNS surveys is their ability to reach a worldwide audience, and target specific groups easily e.g. for gender, age range, or ethnic origin. Researchers are able to filter results and exclude those responses that don't meet inclusion criteria e.g. exclude responses by participants outside of

specified age range. SNS surveys may also be adaptive, i.e., if participants choose gender 'male' then they are not asked any female related questions e.g. 'Are you pregnant?'. Essentially this form of data collection allows secure and adaptive interaction between all parties involved.

SNS surveys may also be adaptive, i.e., if participants choose gender 'male' then they are not asked any female related questions e.g. 'Are you pregnant?'

From an economic perspective, cost, survey duration, resource availability and appropriateness of survey mode need to be taken into account. SNS surveys may be comparatively less costly to undertake when compared with traditional paper-based surveys especially if one is interested in comparing responses between large regions or even countries.

**Case Study: SNS for Health Status and Intervention
– Teen Sexual Health Information**

One study assessed the relationship between on-line social network usage and HIV risk behaviours, knowledge about HIV, and STI testing among urban, homeless, youth in Los Angeles. They found that social network usage was associated with an increased knowledge of HIV/STI prevention and an increased likelihood of having previously been tested for STIs.

Developing sexual health services and interventions on online social networks could reduce sexual risk behaviours. These online SNS provide a safe venue to discuss sensitive issues that are often not communicated in conventional face-to-face discussions. Since 79% of homeless youth use SNS almost every week, this may be an important platform to target an at-risk audience that are often the hardest to reach.

Challenges

It is critical for health providers and researchers to understand the potential that SNS holds for enhancing health communication in order to harness and subsequently apply this technology effectively.

The most important aspect of SNS is the 'start up' stage; devising an appropriate survey; setting up the site; initial advertising; generating and maintaining interest thereafter. Hence it is essential to meticulously plan each stage with clearly defined inclusion criteria, to use accurate and reputable information sources for site content and ideas to generate discussion amongst participants. Furthermore, all surveys whether electronic or paper-based need to consider the nature and level of detail of information to be collated, to avoid capturing any participants' identifiable information unnecessarily. This will be one of the toughest challenges facing SNS-based health research, and will require rigorous ethics approval and deliberate attention to consent, confidentiality, and security².

Finally, SNS-based surveys are limited to ICT literate people with a SNS account, and are particularly appropriate when targeting a younger generation. It is perhaps better to use paper-based questionnaires if targeting an older audience not as fluent with ICT. However, as the number of people using electronic media increases, this mode becomes more and more appropriate and should be considered by researchers when designing future survey-type studies.

Fahdah Alshaikh is a doctoral researcher at Imperial College London interested in the use of Social Network Sites in research and health promotion.

Appendix C: Published work based on chapter 4 (systematic review)

Available online: <http://www.jmir.org/2014/7/e171/>

Review

Social Network Sites as a Mode to Collect Health Data: A Systematic Review

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Abstract

Background: To date, health research literature has focused on social network sites (SNS) either as tools to deliver health care, to study the effect of these networks on behavior, or to analyze Web health content. Less is known about the effectiveness of these sites as a method for collecting data for health research and the means to use such powerful tools in health research.

Objective: The objective of this study was to systematically review the available literature and explore the use of SNS as a mode of collecting data for health research. The review aims to answer four questions: Does health research employ SNS as method for collecting data? Is data quality affected by the mode of data collection? What types of participants were reached by SNS? What are the strengths and limitations of SNS?

Methods: The literature was reviewed systematically in March 2013 by searching the databases MEDLINE, Embase, and PsycINFO, using the Ovid and PubMed interface from 1996 to the third week of March 2013. The search results were examined by 2 reviewers, and exclusion, inclusion, and quality assessment were carried out based on a pre-set protocol.

Results: Ten studies met the inclusion criteria and results were analyzed descriptively to answer the review questions. There were 4 main results. (1) SNS have been used as a data collection tool by health researchers; all but one of the included studies were cross-sectional and quantitative. (2) Data quality indicators that were reported include response rate, cost, timeliness, missing data/completion rate, and validity. However, comparison was carried out only for response rate and cost as it was unclear how other reported indicators were measured. (3) The most targeted population were females and younger people. (4) All studies stated that SNS is an effective recruitment method but that it may introduce a sampling bias.

Conclusions: SNS has a role in health research, but we need to ascertain how to use it effectively without affecting the quality of research. The field of SNS is growing rapidly, and it is necessary to take advantage of the strengths of this tool and to avoid its limitations by effective research design. This review provides an important insight for scholars who plan to conduct research using SNS.

(J Med Internet Res 2014;16(7):e171) doi:10.2196/jmir.3050

KEYWORDS

social network; social media; internet; systematic review; young people; health education; health behaviours

Introduction

Overview

Since their introduction, social network sites (SNS) have attracted individuals, businesses, social organizations, and lately health organizations and providers. There are millions of users, each with a different purpose for using these networks.

The purpose of this review is to focus on those networks that are defined as "Web-based services that allow individuals to construct a public or semi-public profile within a bounded system, articulate a list of other users with whom they share a connection, and view and traverse their list of connections and those made by others within the system" [1].

Social network sites and social media include all types of online social platforms that allow participants to share interests and opinions and many other social interactions. The use of these platforms is becoming dominant among all Internet usage purposes, and today Web content often has the feature to share or link to SNS. It seems that the importance of a topic is linked to its presence in SNS [2].

Social networking is not just about being on a website. It comprises a community that shares and interacts. It is a powerful community that has shifted the concept of media and is rapidly and extensively penetrating society [3].

Social Network Sites in Health Research

For researchers, SNS is an environment where sharing information, knowledge, interest, and opinion is meaningful and fun, which makes it ideal for conducting research [2]. The promise that SNS held for health has been explored and discussed in previous publications. SNS may play a role for health in two ways: (1) the presence of health organizations on SNS makes them more approachable and accessible, and (2) SNS may be an effective way of helping patients with chronic diseases manage their health conditions. The importance of SNS is reflected by increasing efforts within health sectors and organizations to embrace SNS [3,4].

However, efforts towards using SNS are still in their infancy and more inventive interventions and other ways of benefiting from SNS are yet to be explored and discussed [3]. One of the many possible uses of SNS for health is using this powerful platform to collect data and recruit for research studies.

Potential of Social Network Sites for Data Collection

Interest in online social networks has been increasing over the past few years as a result of the huge adoption of this technology all over the world.

The literature shows that SNS has been used by researchers as a source of information about user characteristics, patterns of friending, and usage behavior [5]. These social networks have become a modern source for information and data gathering. They have evolved into a dynamic and accurate source of gathering information because they contain a feature not found in traditional media: active and two-way participation [6].

SNS are also extraordinary marketing tools, able to reach almost any type of person, which changes communication from

"one-to-one" to "many-to-many" [7]. Finally, they have become sources of collecting timely information, converting data into profitable results at a faster rate. They contain great opportunities for future research in public health because they can be a great way to reach hidden and hard-to-reach groups [8]. Yet there is still relatively little direction on how SNS can be used in health research and whether they can provide valid and reliable data.

Research Objectives

The aim of this study was to systematically review the available literature and explore the use of SNS as a mode of collecting data for health research. The review aims to answer four questions: (1) Does health research employ SNS as mode of collecting data? (2) Is data quality affected by the mode of data collection? (3) What types of participants were reached by SNS? (4) What are the strengths and limitations of SNS?

Methods

Systematic Review

The literature was reviewed systematically by searching bibliographic databases, MEDLINE, Embase, and PsycINFO, in March 2013 using the Ovid and PubMed interface for the period 1996 to the third week of March 2013, using the following keyword combinations: (Online Social Networks or Online Social Sites or Social Media) AND (Health). In addition, a manual search was undertaken, searching the reference list of all included studies.

The review was conducted by 2 reviewers independently. Search results were extracted to an Endnote database, inclusion and exclusion processes were recorded, and all abstracts and titles were reviewed. The initial selection criteria were (1) Intervention: The review focuses specifically on using SNS as a mode of collecting data, rather than as a social intervention (eg, support group), (2) Time and place: Studies produced at any time and place will be included in the search strategy, (3) Study participants: can include community or patients, and (4) Outcomes: included studies must contain outcomes related to the data collection mode, for example, response rate, completeness, missing data, timeliness, cost, and perception of privacy and anonymity. There were no language restrictions to ensure that as many studies as possible were assessed for relevance to the review.

Studies were excluded if they examined SNS participant interaction rather than SNS as a mode of collecting data, if they did not involve SNS, or if the article was a general discussion paper that did not present data or methods. All included studies had to specify the use of SNS as a tool to collect self-reported health data.

The review focused on the quality of data, the strengths and limitations of the mode, and reported strategies that facilitate the data collection. After inclusion based on title and abstract, full articles were retrieved and data extracted with a predesigned extraction form that included a checklist to assess the quality of each included study. The checklist was developed by the Centre for Reviews and Dissemination (CRD) [9]. Studies that

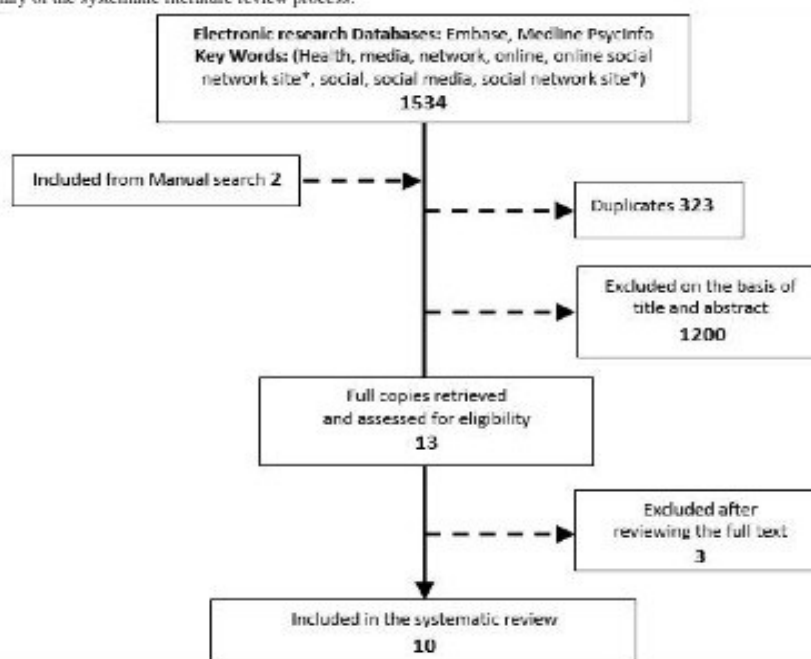
scored 5 out of 7 or below were considered as low quality, and above 5 were considered as high quality.

Data Analysis

The wide variety of methodologies and outcomes of included studies limited the possibility to carry out meta-analyses. For example, study populations were different and for the studies with similar populations, they had different methods. A descriptive qualitative analysis was carried out to answer the four research questions.

The PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) checklist was followed in this systematic review [10]. The checklist items are essential for transparent reporting of a systematic review, and the author covered most of these items except items related to meta-analysis, which was not applicable for this review (Multimedia Appendix 1).

Figure 1. Summary of the systematic literature review process.



Results

Overview

A total of 1534 citations were identified using the search strategy from the electronic databases and search results combined with articles identified by searching manually with duplicates removed; 1213 citation titles and abstracts were reviewed.

A full text assessment was undertaken on the 13 papers that appeared to meet the inclusion criteria based on title and abstract. Three of these were excluded: two not employing SNS directly to collect data and one discussion paper with no results. Ten papers were reviewed and assessed. Table 1 depicts the search results from each database, and Figure 1 illustrates the review process.

Included Studies

All included studies were cross-sectional and primarily used self-reported data (Multimedia Appendix 2). While the majority

of studies undertook quantitative analysis, one study was based on qualitative focus group data. All included studies are defined as high quality after they were assessed by the CDR checklist (Multimedia Appendix 3).

Table 1. Database search results.

Database	Database provider	Years searched	Number of citations retrieved (n=1536)
MEDLINE	OVID	1996 to March week 1, 2013	403
PsycInfo	OVID	1996 to March week 2, 2013	142
Embase	OVID	1996 to March week 3 2013	609
MEDLINE	Pubmed	1996 to March week 3, 2013	380
Manual search	-		2

Does Health Research Use Social Network Sites as Mode of Collecting Data?

Overview

The large number of search results indicate that health research is using SNS in many forms, with the majority of studies investigating the effect of SNS use on health seeking behavior and knowledge. However, there are a limited number of studies that focus on SNS as a tool for research recruitment or data collection; only 10 studies of 1213 looked at this potential.

Type of Collected Data

Nine of the included studies collected survey data through SNS, while Levine (2011) conducted an online focus group within a SNS [11]. Fenner (2012) used SNS for recruitment, rather than only for data collection [12]. In summary, most of the included studies collected quantitative data, and only one, Levine (2011) collected qualitative data through MySpace and explored possibilities to increase response rates [11]. It is more convenient to collect quantitative data rather than qualitative through SNS, as the latter may require more resources.

Data Collection

As this review is looking at SNS as mode to collect health research data, all included studies reached their participants through SNS; however, different approaches were undertaken. Heather (2009) distributed an invitation for an online survey on 8 SNS related to pregnancy and baby health. This approach resulted in 288 valid surveys in a 2-month period [13].

Levine (2011) conducted a focus group by forming a MySpace profile embedded within a chat room and sending invitations to members to join their network; 738 people joined the study's network. Participant selection was based on reviewing SNS profiles, inviting specific participants that met the inclusion criteria [11]. Although this methodology produced an accurate set of qualitative data, it required several staff members to aid with the recruitment process.

Woolley (2012) was interested in monitoring the impact of a specific Facebook health fan page, "Get Up And Do Something (GUADS)", on participant health seeking actions and behavior. The study used the fan page to collect data by inviting all fans to participate in an online survey [14]. Although the study reported the use of multiple recruitment methods, no further explanation was given as to the recruitment process.

Four of the included studies used Facebook ads, an online advertising affiliate program, which is a powerful targeted advertisement method. Fenner (2012) assessed the feasibility of recruiting young females using this method. In total, 278 participants were recruited, 139 chose to participate in the online

survey, and the remaining 139 opted to physically attend the research center [12]. Ramo (2012), Lohse (2013), and Lord (2011) also used Facebook ads to advertise an online survey to their target populations [15-17].

In addition to Facebook ads, two other applications within Facebook were used by health researchers: Facebook Event (a new feature on Facebook where the plugin gives the fan page administrator the ability to add details about upcoming events, eg, Event Name, Location, and Date) and Facebook Poll (a page widget that gives the fan page administrator the ability to add "poll questions" with a voting system and closing date) [18,19]. Finally, Shindel (2012) investigated the association of high risk for sexual dysfunction of women who have sex with women (WSW). Individuals were invited to participate by emailing the entire member list of online social networks catering to WSW [18].

Is Data Quality Affected by the Mode of Data Collection?

Overview

In order to address this question, we looked at data quality indicators such as response rate, completion time, dropout rate, timeliness, missing data, and cost. A comparison was undertaken where appropriate, as studies differed substantially in methodology and population. However, none of the included studies looked at the quality of data in depth or performed any type of analysis regarding quality. Response rate, cost, timeliness, and missing data were reported in some studies.

Response Rate

Response rate is defined as the "Number of participants who completed a questionnaire" divided by the "Total number of participants who were asked to participate" [20]. The highest response rate 27% (N=2583) was reported by Lord (2011). The survey had been advertised on Facebook for 2 weeks and targeted a young population with no strict inclusion criteria [17].

The lowest response rate, 2.2% (N=738) reported by Levine (2011), resulted from the recruitment method that was used. Participants were invited to a synchronous online focus group (during a specified time). Later changing to asynchronous (ie, no specified time) caused a slight increase to 7.2% (N=250) [11].

The collection of qualitative data is challenging because it requires more effort and staff time as reported by the study authors; in some cases, calculating the response rate was not possible [14]. To summarize (Table 2), the reported response rates ranged between 2% to 27%, with an average of 12%.

Table 2. Reported response rates of included studies.

Reference	Study ID	Response rate, %	Participated/Reached
[17]	Lord, 2011	26.67	689/2583
[19]	Cucchetti, 2012	22.80	2414/10584
[16]	Lohse, 2013	17.42	18/465
[14]	Woolley, 2012	11.19	90/804
[15]	Ramo, 2012	10.69	1548/14808
[12]	Fenner, 2012	6.93	551/7940
[11]	Levine, 2011	2.17(synchronous) 7.20 (asynchronous)	16/738 18/250

Cost and Timeliness

Four studies used Facebook in their recruitment strategy; three were able to report on the cost and timeliness of data collection (Table 3) [12,15,16].

The criteria used by the authors in targeting specific participants will inadvertently affect the number of participant responses. Strasser (2012) set out to recruit 100 participants and closed the survey as soon as this target was met [21]. Evidently, time was not a key factor and the recruitment process would have continued as required.

However, cost is an implication that must be considered. Studies may have a limited budget and could recruit only as many participants as possible within a specific timeframe. Ramo (2012) reported the lowest cost per participant: \$4.28 over a 13-month period yielding 1548 participants who were young smokers [15]. Lohse (2013) and Fenner (2012) targeted females within specific age ranges, which could account for the higher costs reported [12,16].

Nevertheless the highest reported cost \$20.14 was considered favorable over the cost of traditional methods of recruiting as reported by Fenner (2012) [12].

Table 3. Reported cost and timeliness of included studies.

Reference	Study ID	Duration (days)	Participants	Response per day	Cost (\$US)		
					Per participant	Per click	Total
[15]	Ramo, 2012	390	1548	4	4.28	0.45	6628.24
[16]	Lohse, 2013	19	62	3	9.26	1.28	596.71
[12]	Fenner, 2012	150	278	2	20.14	0.67	5598.92
[21]	Strasser, 2012	16	100	1.6	–	–	–

Other Quality Indicators

Fenner (2012) was the only author to report on missing data. For the demographic questions, this did not exceed 5%, and for remaining questions, this value was less than 8%. The author considered this a positive indicator on the quality of data [12].

Lohse (2013) reported that the completion rate of the survey was 93.5%, which is indicative of good data quality [16]. The validity of the data was reported by Lord (2011) as 76%; however, no further explanation was provided as to how this was assessed [16].

What Types of Participants Were Reached by Social Networking Sites?

Although SNS is a tool that can be widely used to recruit participants, it may be more effective for certain groups; for example, if targeting an aging population, one has to take into account that this group may not be as computer literate and therefore less likely to use SNS. The types of participant more suited to SNS (Table 4) would be a younger population and those that are "hard to reach", for example, a homosexual population.

Table 4. Types of participants targeted by SNS.

Reference	Study ID	Participant type	Target age, years
[13]	Heather, 2009	Pregnant women	>18
[12]	Fenner, 2012	Female	16-25
[16]	Lohse, 2013	Female	18-45
[18]	Shindel, 2012	WSW	>18
[21]	Strasser, 2012	MSM	No targeted age
[11]	Levine, 2011	Youth	16-24
[17]	Lord, 2011	Youth	18-25
[15]	Ramo, 2012	Young smokers	18-25
[14]	Woolley, 2012	Community	>18
[19]	Cucchetti, 2012	Community	No targeted age

What Are the Strengths and Limitations of Social Networking Sites?

One of the most reported strengths of SNS is that it is an effective recruitment method. Four studies stated that and successfully reached young age groups [15], females [12], low-income females [16], and MSM [21]. All these populations were defined by researchers as a hard-to-reach groups. Facebook in particular was considered by Ramo (2012) as a successful mechanism to reach and recruit a young age group in smoking-related health research, which is normally a challenge [15]. In addition, Levine (2011), Fenner (2012), and Ramo (2012) reported that SNS proved to be much more cost effective over other traditional methods of recruiting in health research [11,12,15]. SNS can also provide representative and valid data. Fenner (2012) indicated that the SNS sample yielded demographically representative data, and Lord (2011) stated SNS provided a rich pool of qualitative and quantitative valid data [12,17].

Another strength of SNS is that using online focus groups can be an easy and simple process if conducted asynchronously through SNS, which allows one to capture the exact language of participants to analyze [11]. Finally, an important strength of SNS for health surveys and research is the potential for sharing and invitation within the network, enabling surveys to be diffused rapidly between SNS participants [19].

The predominant limitation of SNS for collecting data was that it may introduce self-selection bias, and when there is a self-selection bias usually there is a sample bias and representative and generalizability issues. Strasser (2012) has also stated that self-reported data may affect the reliability and validity of results [21].

Discussion

Principal Findings

This comprehensive review addressed our original research questions and found a gap in the literature for evaluating the effectiveness of SNS as a tool in health research. The findings demonstrate that SNS is considered a research tool that can reach wide audiences and simplify the data collection process

for health research, especially quantitative data, along with a wide range distribution of surveys reaching many participants through SNS.

SNS is a powerful tool that can provide a wealth of information about research participants and has the potential to capture good quality data, as some of the included studies have shown. However, SNS self-reported data may introduce self-selection bias, sampling bias, or other generalizability/reliability issues. This aspect was not fully investigated in the included studies of this review, which therefore indicates the need for future research or systematic reviews to focus on these issues.

In this review, Facebook was used in 8 out of 10 of the included studies, which indicates its strong potential as a tool for conducting health research. Many features within Facebook empower the research process, for example, Facebook ads, polls, events, and insights. The potential of Facebook needs to be highlighted especially in health research where validity is of utmost importance for research results. Hence, further studies assessing its potential in health research are needed.

Strengths and Limitations

A number of strengths were highlighted in this review. First, it was an overview of the existence of SNS use in health research literature illustrating the strengths and limitations of this method in data collection. Second, it was a comprehensive and explicit review with broad inclusion criteria that led to a review of 1213 studies, highlighting the gap in the literature regarding the use of SNS as a tool and its effect on data quality.

A limitation of this review is the heterogeneity of the included studies. Although all used SNS to collect data, their individual objectives, populations, and outcomes are unique. Analyses were found to be primarily descriptive.

Systematic Review Outcomes

SNS can be suitable for health research and was claimed to be an effective tool to collect data, but more research is required to look more closely at its effectiveness as a tool. Comparative research that compares SNS with other data collection modes would be valuable in highlighting differences between the quality of data obtained, costs incurred, and samples obtained. This review indicates that the quality of collected data was not

assessed thoroughly; although for surveys and online questionnaires, it led to an acceptable level of validity. Yet, SNS use for data collection proved to be more successful when young age groups were targeted. Finally, Facebook SNS was used in a number of included studies in this review and highlighted that it is a powerful tool that provides multiple features that can be used to improve online health research.

Conclusions

This review concludes that SNS has a niche in health research, but we need to ascertain how to use it effectively without affecting the quality of research. The field of SNS is growing rapidly and researchers need to take advantage of the strengths of this tool and to avoid its limitations by employing effective research design.

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Authors' Contributions

FA developed the concept for the research and the paper. FA and FR collected data and analysis. FA, SR, AM, and FR finalized the text.

Conflicts of Interest

None declared.

Multimedia Appendix 1

PRISMA Checklist.

[PDF File (Adobe PDF File). 229KB - [jmir_v16i7e171_app1.pdf](#)]

Multimedia Appendix 2

Summary of included studies.

[PDF File (Adobe PDF File). 52KB - [jmir_v16i7e171_app2.pdf](#)]

Multimedia Appendix 3

Quality assessment of included studies.

[PDF File (Adobe PDF File). 33KB - [jmir_v16i7e171_app3.pdf](#)]

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Appendix D: PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	

Appendices : Appendix D: PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	

Appendix E: Questionnaires

- The YRBS Questionnaire
- The modified and translated version of YRBS

The YRBS Questionnaire

2011 State and Local Youth Risk Behavior Survey

This survey is about health behavior. It has been developed so you can tell us what you do that may affect your health. The information you give will be used to improve health education for young people like yourself.

DO NOT write your name on this survey. The answers you give will be kept private. No one will know what you write. Answer the questions based on what you really do.

Completing the survey is voluntary. Whether or not you answer the questions will not affect your grade in this class. If you are not comfortable answering a question, just leave it blank.

The questions that ask about your background will be used only to describe the types of students completing this survey. The information will not be used to find out your name. No names will ever be reported.

Make sure to read every question. Fill in the ovals completely. When you are finished, follow the instructions of the person giving you the survey.

Thank you very much for your help.

DIRECTIONS

- Use a #2 pencil only.
- Make dark marks.
- Fill in a response like this: A B C D
- If you change your answer, erase your old answer completely.

1. How old are you?
 - A. 12 years old or younger
 - B. 13 years old
 - C. 14 years old
 - D. 15 years old
 - E. 16 years old
 - F. 17 years old
 - G. 18 years old or older
2. What is your sex?
 - A. Female
 - B. Male
3. In what grade are you?
 - A. 9th grade
 - B. 10th grade
 - C. 11th grade
 - D. 12th grade
 - E. Ungraded or other grade
4. Are you Hispanic or Latino?
 - A. Yes
 - B. No
5. What is your race? **(Select one or more responses.)**
 - A. American Indian or Alaska Native
 - B. Asian
 - C. Black or African American
 - D. Native Hawaiian or Other Pacific Islander
 - E. White

Appendices : Appendix E: Questionnaires

6. How tall are you without your shoes on?
 Directions: Write your height in the shaded blank boxes. Fill in the matching oval below each number.

Example

Height	
Feet	Inches
5	7
<input type="radio"/> 3	<input type="radio"/> 0
<input type="radio"/> 4	<input type="radio"/> 1
<input type="radio"/> 6	<input type="radio"/> 2
<input type="radio"/> 7	<input type="radio"/> 3
	<input type="radio"/> 4
	<input type="radio"/> 5
	<input type="radio"/> 6
	<input type="radio"/> 8
	<input type="radio"/> 9
	<input type="radio"/> 10
	<input type="radio"/> 11

Height	
Feet	Inches
<input type="radio"/> 3	<input type="radio"/> 0
<input type="radio"/> 4	<input type="radio"/> 1
<input type="radio"/> 5	<input type="radio"/> 2
<input type="radio"/> 6	<input type="radio"/> 3
<input type="radio"/> 7	<input type="radio"/> 4
	<input type="radio"/> 5
	<input type="radio"/> 6
	<input type="radio"/> 7
	<input type="radio"/> 8
	<input type="radio"/> 9
	<input type="radio"/> 10
	<input type="radio"/> 11

7. How much do you weigh without your shoes on?
 Directions: Write your weight in the shaded blank boxes. Fill in the matching oval below each number.

Example

Weight		
Pounds		
1	5	2
<input type="radio"/> 0	<input type="radio"/> 0	<input type="radio"/> 0
<input type="radio"/> 2	<input type="radio"/> 1	<input type="radio"/> 1
<input type="radio"/> 3	<input type="radio"/> 2	<input type="radio"/> 2
	<input type="radio"/> 3	<input type="radio"/> 3
	<input type="radio"/> 4	<input type="radio"/> 4
	<input type="radio"/> 5	<input type="radio"/> 5
	<input type="radio"/> 6	<input type="radio"/> 6
	<input type="radio"/> 7	<input type="radio"/> 7
	<input type="radio"/> 8	<input type="radio"/> 8
	<input type="radio"/> 9	<input type="radio"/> 9

Weight		
Pounds		
<input type="radio"/> 0	<input type="radio"/> 0	<input type="radio"/> 0
<input type="radio"/> 1	<input type="radio"/> 1	<input type="radio"/> 1
<input type="radio"/> 2	<input type="radio"/> 2	<input type="radio"/> 2
<input type="radio"/> 3	<input type="radio"/> 3	<input type="radio"/> 3
	<input type="radio"/> 4	<input type="radio"/> 4
	<input type="radio"/> 5	<input type="radio"/> 5
	<input type="radio"/> 6	<input type="radio"/> 6
	<input type="radio"/> 7	<input type="radio"/> 7
	<input type="radio"/> 8	<input type="radio"/> 8
	<input type="radio"/> 9	<input type="radio"/> 9

The next 4 questions ask about safety.

8. **When you rode a bicycle** during the past 12 months, how often did you wear a helmet?
- A. I did not ride a bicycle during the past 12 months
 - B. Never wore a helmet
 - C. Rarely wore a helmet
 - D. Sometimes wore a helmet
 - E. Most of the time wore a helmet
 - F. Always wore a helmet
9. How often do you wear a seat belt when **riding** in a car driven by someone else?
- A. Never
 - B. Rarely
 - C. Sometimes
 - D. Most of the time
 - E. Always
10. During the past 30 days, how many times did you **ride** in a car or other vehicle **driven by someone who had been drinking alcohol**?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or more times
11. During the past 30 days, how many times did you **drive** a car or other vehicle **when you had been drinking alcohol**?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or more times

The next 10 questions ask about violence-related behaviors.

12. During the past 30 days, on how many days did you carry **a weapon** such as a gun, knife, or club?
- A. 0 days
 - B. 1 day
 - C. 2 or 3 days
 - D. 4 or 5 days
 - E. 6 or more days

13. During the past 30 days, on how many days did you carry **a gun**?
- A. 0 days
 - B. 1 day
 - C. 2 or 3 days
 - D. 4 or 5 days
 - E. 6 or more days
14. During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club **on school property**?
- A. 0 days
 - B. 1 day
 - C. 2 or 3 days
 - D. 4 or 5 days
 - E. 6 or more days
15. During the past 30 days, on how many days did you **not** go to school because you felt you would be unsafe at school or on your way to or from school?
- A. 0 days
 - B. 1 day
 - C. 2 or 3 days
 - D. 4 or 5 days
 - E. 6 or more days
16. During the past 12 months, how many times has someone threatened or injured you with a weapon such as a gun, knife, or club **on school property**?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or 7 times
 - F. 8 or 9 times
 - G. 10 or 11 times
 - H. 12 or more times
17. During the past 12 months, how many times were you in a physical fight?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or 7 times
 - F. 8 or 9 times
 - G. 10 or 11 times
 - H. 12 or more times

18. During the past 12 months, how many times were you in a physical fight in which you were injured and had to be treated by a doctor or nurse?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or more times
19. During the past 12 months, how many times were you in a physical fight **on school property**?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or 7 times
 - F. 8 or 9 times
 - G. 10 or 11 times
 - H. 12 or more times
20. During the past 12 months, did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?
- A. Yes
 - B. No
21. Have you ever been physically forced to have sexual intercourse when you did not want to?
- A. Yes
 - B. No

The 2 next questions ask about bullying. Bullying is when 1 or more students tease, threaten, spread rumors about, hit, shove, or hurt another student over and over again. It is not bullying when 2 students of about the same strength or power argue or fight or tease each other in a friendly way.

22. During the past 12 months, have you ever been bullied **on school property**?
- A. Yes
 - B. No
23. During the past 12 months, have you ever been **electronically** bullied? (Include being bullied through e-mail, chat rooms, instant messaging, Web sites, or texting.)
- A. Yes
 - B. No

The next 5 questions ask about sad feelings and attempted suicide. Sometimes people feel so depressed about the future that they may consider attempting suicide, that is, taking some action to end their own life.

24. During the past 12 months, did you ever feel so sad or hopeless almost every day for **two weeks or more in a row** that you stopped doing some usual activities?
- A. Yes
 - B. No
25. During the past 12 months, did you ever **seriously** consider attempting suicide?
- A. Yes
 - B. No
26. During the past 12 months, did you make a plan about how you would attempt suicide?
- A. Yes
 - B. No
27. During the past 12 months, how many times did you actually attempt suicide?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or more times
28. **If you attempted suicide** during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?
- A. **I did not attempt suicide** during the past 12 months
 - B. Yes
 - C. No

The next 11 questions ask about tobacco use.

29. Have you ever tried cigarette smoking, even one or two puffs?
- A. Yes
 - B. No

30. How old were you when you smoked a whole cigarette for the first time?
- A. I have never smoked a whole cigarette
 - B. 8 years old or younger
 - C. 9 or 10 years old
 - D. 11 or 12 years old
 - E. 13 or 14 years old
 - F. 15 or 16 years old
 - G. 17 years old or older
31. During the past 30 days, on how many days did you smoke cigarettes?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days
32. During the past 30 days, on the days you smoked, how many cigarettes did you smoke **per day**?
- A. I did not smoke cigarettes during the past 30 days
 - B. Less than 1 cigarette per day
 - C. 1 cigarette per day
 - D. 2 to 5 cigarettes per day
 - E. 6 to 10 cigarettes per day
 - F. 11 to 20 cigarettes per day
 - G. More than 20 cigarettes per day
33. During the past 30 days, how did you **usually** get your own cigarettes? (Select only **one** response.)
- A. I did not smoke cigarettes during the past 30 days
 - B. I bought them in a store such as a convenience store, supermarket, discount store, or gas station
 - C. I bought them from a vending machine
 - D. I gave someone else money to buy them for me
 - E. I borrowed (or bummed) them from someone else
 - F. A person 18 years old or older gave them to me
 - G. I took them from a store or family member
 - H. I got them some other way

34. During the past 30 days, on how many days did you smoke cigarettes **on school property**?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days
35. Have you ever smoked cigarettes daily, that is, at least one cigarette every day for 30 days?
- A. Yes
 - B. No
36. During the past 12 months, did you ever try **to quit** smoking cigarettes?
- A. I did not smoke during the past 12 months
 - B. Yes
 - C. No
37. During the past 30 days, on how many days did you use **chewing tobacco, snuff, or dip**, such as Redman, Levi Garrett, Beechnut, Skoal, Skoal Bandits, or Copenhagen?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days
38. During the past 30 days, on how many days did you use **chewing tobacco, snuff, or dip on school property**?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

39. During the past 30 days, on how many days did you smoke **cigars, cigarillos, or little cigars?**
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

The next 6 questions ask about drinking alcohol. This includes drinking beer, wine, wine coolers, and liquor such as rum, gin, vodka, or whiskey. For these questions, drinking alcohol does not include drinking a few sips of wine for religious purposes.

40. During your life, on how many days have you had at least one drink of alcohol?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 9 days
 - D. 10 to 19 days
 - E. 20 to 39 days
 - F. 40 to 99 days
 - G. 100 or more days
41. How old were you when you had your first drink of alcohol other than a few sips?
- A. I have never had a drink of alcohol other than a few sips
 - B. 8 years old or younger
 - C. 9 or 10 years old
 - D. 11 or 12 years old
 - E. 13 or 14 years old
 - F. 15 or 16 years old
 - G. 17 years old or older
42. During the past 30 days, on how many days did you have at least one drink of alcohol?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

43. During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 to 5 days
 - E. 6 to 9 days
 - F. 10 to 19 days
 - G. 20 or more days
44. During the past 30 days, how did you **usually** get the alcohol you drank?
- A. I did not drink alcohol during the past 30 days
 - B. I bought it in a store such as a liquor store, convenience store, supermarket, discount store, or gas station
 - C. I bought it at a restaurant, bar, or club
 - D. I bought it at a public event such as a concert or sporting event
 - E. I gave someone else money to buy it for me
 - F. Someone gave it to me
 - G. I took it from a store or family member
 - H. I got it some other way
45. During the past 30 days, on how many days did you have at least one drink of alcohol **on school property**?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

The next 4 questions ask about marijuana use. Marijuana also is called grass or pot.

46. During your life, how many times have you used marijuana?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 to 99 times
 - G. 100 or more times

Appendices : Appendix E: Questionnaires

47. How old were you when you tried marijuana for the first time?
- A. I have never tried marijuana
 - B. 8 years old or younger
 - C. 9 or 10 years old
 - D. 11 or 12 years old
 - E. 13 or 14 years old
 - F. 15 or 16 years old
 - G. 17 years old or older
48. During the past 30 days, how many times did you use marijuana?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
49. During the past 30 days, how many times did you use marijuana **on school property**?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times

The next 10 questions ask about other drugs.

50. During your life, how many times have you used **any** form of cocaine, including powder, crack, or freebase?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
51. During the past 30 days, how many times did you use **any** form of cocaine, including powder, crack, or freebase?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times

52. During your life, how many times have you sniffed glue, breathed the contents of aerosol spray cans, or inhaled any paints or sprays to get high?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
53. During your life, how many times have you used **heroin** (also called smack, junk, or China White)?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
54. During your life, how many times have you used **methamphetamines** (also called speed, crystal, crank, or ice)?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
55. During your life, how many times have you used **ecstasy** (also called MDMA)?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
56. During your life, how many times have you taken **steroid pills or shots** without a doctor's prescription?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times

57. During your life, how many times have you taken a **prescription drug** (such as OxyContin, Percocet, Vicodin, codeine, Adderall, Ritalin, or Xanax) without a doctor's prescription?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
58. During your life, how many times have you used a needle to inject any **illegal drug** into your body?
- A. 0 times
 - B. 1 time
 - C. 2 or more times
59. During the past 12 months, has anyone offered, sold, or given you an illegal drug **on school property**?
- A. Yes
 - B. No

The next 7 questions ask about sexual behavior.

60. Have you ever had sexual intercourse?
- A. Yes
 - B. No
61. How old were you when you had sexual intercourse for the first time?
- A. I have never had sexual intercourse
 - B. 11 years old or younger
 - C. 12 years old
 - D. 13 years old
 - E. 14 years old
 - F. 15 years old
 - G. 16 years old
 - H. 17 years old or older

62. During your life, with how many people have you had sexual intercourse?
- A. I have never had sexual intercourse
 - B. 1 person
 - C. 2 people
 - D. 3 people
 - E. 4 people
 - F. 5 people
 - G. 6 or more people
63. During the past 3 months, with how many people did you have sexual intercourse?
- A. I have never had sexual intercourse
 - B. I have had sexual intercourse, but not during the past 3 months
 - C. 1 person
 - D. 2 people
 - E. 3 people
 - F. 4 people
 - G. 5 people
 - H. 6 or more people
64. Did you drink alcohol or use drugs before you had sexual intercourse the **last time**?
- A. I have never had sexual intercourse
 - B. Yes
 - C. No
65. The **last time** you had sexual intercourse, did you or your partner use a condom?
- A. I have never had sexual intercourse
 - B. Yes
 - C. No
66. The **last time** you had sexual intercourse, what **one** method did you or your partner use to **prevent pregnancy**? (Select only **one** response.)
- A. I have never had sexual intercourse
 - B. No method was used to prevent pregnancy
 - C. Birth control pills
 - D. Condoms
 - E. Depo-Provera (or any injectable birth control), Nuva Ring (or any birth control ring), Implanon (or any implant), or any IUD
 - F. Withdrawal
 - G. Some other method
 - H. Not sure

The next 5 questions ask about body weight.

67. How do **you** describe your weight?
- A. Very underweight
 - B. Slightly underweight
 - C. About the right weight
 - D. Slightly overweight
 - E. Very overweight
68. Which of the following are you trying to do about your weight?
- A. **Lose** weight
 - B. **Gain** weight
 - C. **Stay** the same weight
 - D. I am **not trying to do anything** about my weight
69. During the past 30 days, did you **go without eating for 24 hours or more** (also called fasting) to lose weight or to keep from gaining weight?
- A. Yes
 - B. No
70. During the past 30 days, did you **take any diet pills, powders, or liquids** without a doctor's advice to lose weight or to keep from gaining weight? (Do **not** include meal replacement products such as Slim Fast.)
- A. Yes
 - B. No
71. During the past 30 days, did you **vomit or take laxatives** to lose weight or to keep from gaining weight?
- A. Yes
 - B. No

Appendices : Appendix E: Questionnaires

The next 7 questions ask about food you ate or drank during the past 7 days. Think about all the meals and snacks you had from the time you got up until you went to bed. Be sure to include food you ate at home, at school, at restaurants, or anywhere else.

72. During the past 7 days, how many times did you drink **100% fruit juices** such as orange juice, apple juice, or grape juice? (Do **not** count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks.)
- A. I did not drink 100% fruit juice during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
73. During the past 7 days, how many times did you eat **fruit**? (Do **not** count fruit juice.)
- A. I did not eat fruit during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
74. During the past 7 days, how many times did you eat **green salad**?
- A. I did not eat green salad during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
75. During the past 7 days, how many times did you eat **potatoes**? (Do **not** count french fries, fried potatoes, or potato chips.)
- A. I did not eat potatoes during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day

76. During the past 7 days, how many times did you eat **carrots**?
- A. I did not eat carrots during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
77. During the past 7 days, how many times did you eat **other vegetables**? (Do **not** count green salad, potatoes, or carrots.)
- A. I did not eat other vegetables during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
78. During the past 7 days, how many times did you drink a **can, bottle, or glass of soda or pop**, such as Coke, Pepsi, or Sprite? (Do **not** count diet soda or diet pop.)
- A. I did not drink soda or pop during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day

The next 5 questions ask about physical activity.

79. During the past 7 days, on how many days were you physically active for a total of **at least 60 minutes per day**? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.)
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
 - G. 6 days
 - H. 7 days

80. On an average school day, how many hours do you watch TV?
- A. I do not watch TV on an average school day
 - B. Less than 1 hour per day
 - C. 1 hour per day
 - D. 2 hours per day
 - E. 3 hours per day
 - F. 4 hours per day
 - G. 5 or more hours per day
81. On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? (Include activities such as Xbox, PlayStation, Nintendo DS, iPod touch, Facebook, and the Internet.)
- A. I do not play video or computer games or use a computer for something that is not school work
 - B. Less than 1 hour per day
 - C. 1 hour per day
 - D. 2 hours per day
 - E. 3 hours per day
 - F. 4 hours per day
 - G. 5 or more hours per day
82. In an average week when you are in school, on how many days do you go to physical education (PE) classes?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
83. During the past 12 months, on how many sports teams did you play? (Count any teams run by your school or community groups.)
- A. 0 teams
 - B. 1 team
 - C. 2 teams
 - D. 3 or more teams

The next 3 questions ask about other health-related topics.

84. Have you ever been taught about AIDS or HIV infection in school?
- A. Yes
 - B. No
 - C. Not sure

85. Has a doctor or nurse ever told you that you have asthma?
- A. Yes
 - B. No
 - C. Not sure
86. Do you still have asthma?
- A. I have never had asthma
 - B. Yes
 - C. No
 - D. Not sure

**This is the end of the survey.
Thank you very much for your help.**

2.Modified YRBS (English/Arabic)

ENGLISH

Young Health Behaviour Survey

This survey is about health behaviour. It has been developed so you can tell us what you do that may affect your health. The information you give will be used in a PhD project.

DO NOT write your name on this survey. The answers you give will be kept private. Please answer the questions based on what you really do.

Completing the survey is voluntary. If you are not comfortable answering a question, just leave it blank.

The questions that ask about your background will be used to describe the types of students completing this survey. The information will not be used to find out your name. No names will ever be reported.

Make sure to read every question and give one answer for each.

This won't take more than **10 minutes** of your time.

Thank you very much for your help

1. How old are you? ____
2. What grade are you? ____

3. Gender: Male Female
4. How tall are you? _____
5. How much do you weigh? _____

The next 11 questions ask about tobacco use.

6. Have you ever tried cigarette smoking, even one or two puffs?
 - A. Yes
 - B. No

7. How old were you when you smoked a whole cigarette for the first time?
 - A. I have never smoked a whole cigarette
 - B. 8 years old or younger
 - C. 9 or 10 years old
 - D. 11 or 12 years old
 - E. 13 or 14 years old
 - F. 15 or 16 years old
 - G. 17 years old or older

8. During the past 30 days, on how many days did you smoke cigarettes?
 - A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days

G. All 30 days

9. During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?

A. I did not smoke cigarettes during the past 30 days

B. Less than 1 cigarette per day

C. 1 cigarette per day

D. 2 to 5 cigarettes per day

E. 6 to 10 cigarettes per day

F. 11 to 20 cigarettes per day

G. More than 20 cigarettes per day

10. During the past 30 days, how did you usually get your own cigarettes? (Select only one response.)

A. I did not smoke cigarettes during the past 30 days

B. I bought them in a store such as a convenience store, supermarket, discount store, or gas station.

C. I bought them from a vending machine

D. I gave someone else money to buy them for me

E. I borrowed (or bummed) them from someone else

F. A person 18 years old or older gave them to me

G. I took them from a store or family member

H. I got them some other way

11. During the past 30 days, on how many days did you smoke cigarettes on school property?

- A. 0 days
- B. 1 or 2 days
- C. 3 to 5 days
- D. 6 to 9 days
- E. 10 to 19 days
- F. 20 to 29 days
- G. All 30 days

12. Have you ever smoked cigarettes daily, that is, at least one cigarette every day for 30 days?

- A. Yes
- B. No

13. During the past 12 months, did you ever try to quit smoking cigarettes?

- A. I did not smoke during the past 12 months
- B. Yes
- C. No

14. During the past 30 days, on how many days did you use chewing tobacco, snuff, or dip, such as Toombak, Redman, Levi Garrett, Beechnut, Skoal, Skoal Bandits, or Copenhagen? Or other type _____.

- A. 0 days
- B. 1 or 2 days
- C. 3 to 5 days
- D. 6 to 9 days
- E. 10 to 19 days

F. 20 to 29 days

G. All 30 days

15. During the past 30 days, on how many days did you use chewing tobacco, snuff (Toombak), or dip on school property?

A. 0 days

B. 1 or 2 days

C. 3 to 5 days

D. 6 to 9 days

E. 10 to 19 days

F. 20 to 29 days

G. All 30 days

16. During the past 30 days, on how many days did you smoke Shesha/Argela/Maasil/Hooka?

A. 0 days

B. 1 or 2 days

C. 3 to 5 days

D. 6 to 9 days

E. 10 to 19 days

F. 20 to 29 days

G. All 30 days

The next 5 questions ask about body weight.

17. How do you describe your weight?

- A. Very underweight
- B. Slightly underweight
- C. About the right weight
- D. Slightly overweight
- E. Very overweight

18. Which of the following are you trying to do about your weight?

- A. Lose weight
- B. Gain weight
- C. Stay the same weight
- D. I am not trying to do anything about my weight

19. During the past 30 days, did you go without eating for 24 hours or more (also called fasting) to lose weight or to keep from gaining weight?

- E. Yes
- F. No

20. During the past 30 days, did you take any diet pills, powders, or liquids without a doctor's advice to lose weight or to keep from gaining weight? (Do not include meal replacement products such as Slim Fast.)

- A. Yes
- B. No

21. During the past 30 days, did you vomit or take laxatives to lose weight or to keep from gaining weight?

A. Yes

B. No

The next 7 questions ask about food you ate or drank during the past 7 days. Think about all the meals and snacks you had from the time you got up until you went to bed. Be sure to include food you ate at home, at school, at restaurants, or anywhere else.

22. During the past 7 days, how many times did you drink 100% fruit juices such as orange juice, apple juice, or grape juice? (Do not count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks.)

A. I did not drink 100% fruit juice during the past 7 days

B. 1 to 3 times during the past 7 days

C. 4 to 6 times during the past 7 days

D. 1 time per day

E. 2 times per day

F. 3 times per day

G. 4 or more times per day

23. During the past 7 days, how many times did you eat **fruit**? (Do not count fruit juice.)

A. I did not eat fruit during the past 7 days

- B. 1 to 3 times during the past 7 days
- C. 4 to 6 times during the past 7 days
- D. 1 time per day
- E. 2 times per day
- F. 3 times per day
- G. 4 or more times per day

24. During the past 7 days, how many times did you eat **green salad**?

- A. I did not eat green salad during the past 7 days
- B. 1 to 3 times during the past 7 days
- C. 4 to 6 times during the past 7 days
- D. 1 time per day
- E. 2 times per day
- F. 3 times per day
- G. 4 or more times per day

25. During the past 7 days, how many times did you eat **vegetables**?

- A. I did not eat other vegetables during the past 7 days
- B. 1 to 3 times during the past 7 days
- C. 4 to 6 times during the past 7 days
- D. 1 time per day
- E. 2 times per day
- F. 3 times per day
- G. 4 or more times per day

26. During the past 7 days, how many times did you drink a can, bottle, or glass of soda or pop, such as **Coke**, **Pepsi**, or **7up**? (Do not count diet soda or diet pop.)

- A. I did not drink soda or pop during the past 7 days
- B. 1 to 3 times during the past 7 days
- C. 4 to 6 times during the past 7 days
- D. 1 time per day
- E. 2 times per day
- F. 3 times per day
- G. 4 or more times per day

The next 5 questions ask about physical activity.

27. During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.)

- A. 0 days
- B. 1 day
- C. 2 days
- D. 3 days
- E. 4 days
- F. 5 days
- G. 6 days
- H. 7 days

28. On an average week day, how many hours do you **watch TV**?

- A. I do not watch TV on an average school day
- B. Less than 1 hour per day
- C. 1 hour per day
- D. 2 hours per day
- E. 3 hours per day
- F. 4 hours per day
- G. 5 or more hours per day

29. On an average week day, how many hours do you **play video or computer games** or use a computer for something that is not school work? (Include activities such as Xbox, PlayStation, Nintendo DS, iPod touch, Facebook, and the Internet.)

- A. I do not play video or computer games or use a computer for something that is not school work
- B. Less than 1 hour per day
- C. 1 hour per day
- D. 2 hours per day
- E. 3 hours per day
- F. 4 hours per day
- G. 5 or more hours per day

30. In an average week when you are in school/College, on how many days do you go to physical education (PE) classes?

- A. 0 days
- B. 1 day
- C. 2 days

D. 3 days

E. 4 days

F. 5 days

31. During the past 12 months, on how many sports teams did you play? (Count any teams run by your school or community groups.)

A. 0 teams

B. 1 team

C. 2 teams

D. 3 or more teams

32. Do you have a Facebook Account?

A. Yes

B. No

This is the end of the survey.

Thank you very much for your help.

بسم الله الرحمن الرحيم

R J S

السلام عليكم ورحمة الله وبركاته:

- نأمل منكم تعبئة هذا الاستبيان لبحث رسالة دكتوراه تهدف لمعرفة السلوكيات الصحية للشباب السعودي.
- ليس من الضروري كتابة اسمك , مع العلم أن جميع الإجابات ستبقى في سرية تامة .
- إكمال الاستبيان هو عمل تطوعي وإذا لم ترد الاجابه على سؤال معين فقط اتركه فارغاً.
- نأمل منكم أن تكون جميع الإجابات من واقع ماتقوم به فعلا لكي يحقق هذا الاستبيان الهدف المراد منه.
- هذا الاستبيان لن يستغرق أكثر من 10 دقائق .

شكرا جزيلاً على تعاونكم

إذا أردت التواصل ومعرفة نتائج هذه الدراسة تفضل بزيارة صفحتنا على الفيسبوك:

<http://www.facebook.com/SYHBS>

1

الجزء الأول: معلومات شخصية (ضع علامة ✓ أو أملأ الفراغ)

الجنس:	<input type="radio"/> أنثى	<input type="radio"/> ذكر
أجنسيه:	<input type="radio"/> سعودية	<input type="radio"/> غير ذلك _____
المرحلة الدراسية:	<input type="radio"/> متوسط	<input type="radio"/> ثانوي
	<input type="radio"/> جامعي	<input type="radio"/> غير ذلك _____
العمر:	_____	
الطول:	(سنتيمتر) _____	
الوزن:	(كيلو جرام) _____	

الجزء الثاني: الأسئلة التالية ستكون عن التدخين. الرجاء اختيار اجابة واحد. (ضع علامة ✓)

هل حاولت تدخين السجائر من قبل، حتى لو كانت محاولة بسيطة كلفته او نقتين؟	<input type="radio"/> نعم	<input type="radio"/> لا
كم كان عمرك عندما قمت بتدخين سيجارة كاملة للمرة الأولى؟	<input type="radio"/> لم أدخن سيجارة كاملة من قبل. <input type="radio"/> ٨ سنوات أو أقل <input type="radio"/> ٩ - ١٠ سنة <input type="radio"/> ١١ - ١٢ سنة <input type="radio"/> ١٣ - ١٤ سنة <input type="radio"/> ١٥ - ١٦ سنة <input type="radio"/> ١٧ سنة فما فوق	
خلال ٣٠ يوماً الماضية ، كم عدد الايام التي قمت فيها بتدخين السجائر ؟	<input type="radio"/> ولا يوم <input type="radio"/> ١ - ٢ أيام <input type="radio"/> ٣ - ٥ أيام <input type="radio"/> ٦ - ٩ أيام <input type="radio"/> ١٠ - ١٩ يوماً <input type="radio"/> ٢٠ - ٢٩ يوماً <input type="radio"/> كل ٣٠ يوماً	
خلال ٣٠ يوماً الماضية ، كم سيجارة استلمت في اليوم الواحد؟	<input type="radio"/> لم أكن أدخن خلال الأيام ال ٣٠ الماضية <input type="radio"/> أقل من سيجارة واحدة <input type="radio"/> سيجارة <input type="radio"/> ٢ - ٥ سجائر <input type="radio"/> ٦ - ١٠ سجائر <input type="radio"/> ١١ - ٢٠ سيجارة <input type="radio"/> أكثر من ٢٠ سيجارة	

2

يتبع

Appendices : Appendix E: Questionnaires

استبيان السلوك الصحي للشباب السعودي

<p>خلال ٣٠ يوماً الماضية، كيف حصلت على السجائر الخاصة بك؟ (اختر اجابه واحده فقط)</p> <p><input type="radio"/> من أحد المحلات مثل السوبر ماركت ومحطات الوقود</p> <p><input type="radio"/> أقل من سيجاره واحده</p> <p><input type="radio"/> آلة البيع المخصصه لبيع السجائر</p> <p><input type="radio"/> كتفت شخص اخر بشرائها لي</p> <p><input type="radio"/> أعطها لي شخص في عمر ١٨ سنة أو أكثر</p> <p><input type="radio"/> أخذتها من أحد أفراد العائلة</p> <p><input type="radio"/> حصلت عليها بطريقة اخرى. أذكرها _____</p>
<p>خلال ٣٠ يوماً الماضية، ماهي عدد الأيام التي قمت بالتخمين بها في المدرسة/الجامعة؟</p> <p><input type="radio"/> لم أكن أدخل خلال الأيام ال ٣٠ الماضية</p> <p><input type="radio"/> ٢-١ يوم</p> <p><input type="radio"/> ٣-٥ أيام</p> <p><input type="radio"/> ٦-٩ أيام</p> <p><input type="radio"/> ١٠-١٩ يوماً</p> <p><input type="radio"/> ٢٠-٢٩ يوماً</p> <p><input type="radio"/> كل ٣٠ يوماً</p>
<p>هل قمت بالتخمين يوماً (على الأقل سيجارة واحدة في كل يوم) خلال الشهر الماضي؟</p> <p><input type="radio"/> نعم <input type="radio"/> لا</p>
<p>خلال ١٢ شهراً الماضية، هل قمت بأي محاولات للإقلاع عن التدخين؟</p> <p><input type="radio"/> لا <input type="radio"/> أحياناً <input type="radio"/> نعم</p>
<p>خلال ٣٠ يوماً الماضية، ما هي عدد الأيام التي قمت فيها باستخدام التبغ المضغ ، ترميك أو نوع آخر انكره : _____</p> <p><input type="radio"/> ولا يوم</p> <p><input type="radio"/> ٢-١ يوم</p> <p><input type="radio"/> ٣-٥ أيام</p> <p><input type="radio"/> ٦-٩ أيام</p> <p><input type="radio"/> ١٠-١٩ يوماً</p> <p><input type="radio"/> ٢٠-٢٩ يوماً</p> <p><input type="radio"/> كل ٣٠ يوماً</p>
<p>خلال ٣٠ يوماً الماضية، ما هي عدد الأيام التي قمت فيها باستخدام التبغ المضغ في المدرسة/الجامعة؟</p> <p><input type="radio"/> ولا يوم</p> <p><input type="radio"/> ٢-١ يوم</p> <p><input type="radio"/> ٣-٥ أيام</p> <p><input type="radio"/> ٦-٩ أيام</p> <p><input type="radio"/> ١٠-١٩ يوماً</p> <p><input type="radio"/> ٢٠-٢٩ يوماً</p> <p><input type="radio"/> كل ٣٠ يوماً</p>
<p>خلال ال ٣٠ يوماً الماضية، كم يوماً دخنت الشيشة أو الأرجيلة؟</p> <p><input type="radio"/> ولا يوم</p> <p><input type="radio"/> ٢-١ يوم</p> <p><input type="radio"/> ٣-٥ أيام</p> <p><input type="radio"/> ٦-٩ أيام</p> <p><input type="radio"/> ١٠-١٩ يوماً</p> <p><input type="radio"/> ٢٠-٢٩ يوماً</p> <p><input type="radio"/> كل ٣٠ يوماً</p>

يتبع

3

استبيان السلوك الصحي للشباب السعودي

الجزء الثالث: الأسئلة التالية عن وزن الجسم. الرجاء اختيار اجابه واحده. (ضع علامة ✓)

<p>كيف يمكنك أن تصف وزنك؟</p> <p><input type="radio"/> نحيف جداً</p> <p><input type="radio"/> نحيف</p> <p><input type="radio"/> قريب من الوزن المثالي</p> <p><input type="radio"/> أعاني من وزن زائد</p> <p><input type="radio"/> سمته مفرطه</p>
<p>أي من الخيارات التالية تحاول القيام بها حبال وزنك؟</p> <p><input type="radio"/> فقدان الوزن</p> <p><input type="radio"/> كسب الوزن</p> <p><input type="radio"/> المحافظة على نفس الوزن</p> <p><input type="radio"/> لا أسعى لفعل أي شي حبال وزني</p>
<p>خلال ٣٠ يوماً الماضية هل بقيت دون أكل لمدة ٢٤ ساعة أو أكثر لانقاص وزنك أو للحفاظ عليه؟</p> <p><input type="radio"/> نعم <input type="radio"/> لا</p>
<p>خلال ٣٠ يوماً الماضية، هل قمت باستخدام حبوب للحمية أو أنوية تساعد على انقاص الوزن دون استشارة طبيب؟ (لا تشمل المنتجات البديلة للوجبات والتي تصنف كمكملات غذائية مثل Slim Fast)</p> <p><input type="radio"/> نعم <input type="radio"/> لا</p>
<p>خلال ٣٠ يوماً الماضية، هل قمت بالتقيء عمداً أو أخذت حبوب مسهلة لإنقاص وزنك؟</p> <p><input type="radio"/> نعم <input type="radio"/> لا</p>

الجزء الرابع: الأسئلة التالية عن طريقة التغذية والطعام المستهلك خلال الاسبوع السابق . حاول جاهداً أن تتذكر جميع الأصناف التي قمت بتناولها خلال المدرسة، الجامعة، المطاعم والمنزل.. الرجاء اختيار اجابه واحده. (ضع علامة ✓)

<p>خلال ال ٧ أيام الماضية، كم مرة شربت عصير الفواكه الطبيعي بنسبة ١٠٠٪ مثل عصير البرتقال، عصير التفاح، أو عصير العنب؟ (ذلك لا يتضمن مشروبات الطاقة أو ما أضيف إليها نكهات الفواكه)</p> <p><input type="radio"/> لم أشرب عصير الفواكه في الاسبوع السابق</p> <p><input type="radio"/> ٣-١ مرات في الاسبوع</p> <p><input type="radio"/> ٤-٦ مرات في الاسبوع</p> <p><input type="radio"/> مره في اليوم الواحد</p> <p><input type="radio"/> مرتين في اليوم الواحد</p> <p><input type="radio"/> ٣ مرات في اليوم الواحد</p> <p><input type="radio"/> ٤ مرات في اليوم الواحد</p>
<p>خلال ٧ أيام الماضية، كم مره تناولت الفاكهة؟ (لا تشمل عصير الفاكهة).</p> <p><input type="radio"/> لم أتناول الفاكهة في الاسبوع السابق</p> <p><input type="radio"/> ٣-١ مرات في الاسبوع</p> <p><input type="radio"/> ٤-٦ مرات في الاسبوع</p> <p><input type="radio"/> مره في اليوم الواحد</p> <p><input type="radio"/> مرتين في اليوم الواحد</p> <p><input type="radio"/> ٣ مرات في اليوم الواحد</p> <p><input type="radio"/> ٤ مرات في اليوم الواحد</p>

يتبع

4

خلال ٧ أيام الماضية ، كم مرة تناولت الخضروات؟

لم أتناول الخضار في الاسبوع السابق

٣-١ مرات في الاسبوع

٦-٤ مرات في الاسبوع

مره في اليوم الواحد

مرتين في اليوم الواحد

٣ مرات في اليوم الواحد

٤ مرات في اليوم الواحد

خلال ٧ أيام الماضية ، كم مرة شربت زجاجة الصودا أو المشروبات الغازية مثل كوكاكولا وبيبيسي ، أوسفن اب ؟
(لا تشمل مشروبات الفايتر)

لم أتناول مشروبات غازية في الاسبوع السابق

٣-١ مرات في الاسبوع

٦-٤ مرات في الاسبوع

مره في اليوم الواحد

مرتين في اليوم الواحد

٣ مرات في اليوم الواحد

٤ مرات في اليوم الواحد

الجزء الخامس: الأسئلة التالية عن النشاط البدني..الرجاء اختيار اجابة واحده. (ضع علامة ✓)

خلال ٧ أيام الماضية ، كم يوما مارست الرياضة لمدة لا تقل عن ستين دقيقة؟ (يشمل الوقت الذي قضيته في أي نوع من النشاط البدني والذي يؤدي إلى زيادة معدل ضربات القلب وصعوبة التنفس في بعض الأوقات).

لم أمارس الرياضة خلال الاسبوع

يوم

يومان

٣ أيام

٤ أيام

٥ أيام

٦ أيام

٧ أيام

كم عدد ايام حضورك في حصص اللياقة البدنيه سواء كان في المدرسة أو الجامعة ؟

ولا يوم

يوم واحد

يومان

٣ أيام

٤ أيام

٥ أيام

خلال ١٢ شهرا الماضية ، كم عدد المجموعات الرياضيه التي انضممت اليها؟ (فريق كرة قدم أو أي نشاط رياضي آخر)

ولا فريق

فريق واحد

فريقان

٣ فرق أو أكثر

يتبع

ماهي متوسط عدد ساعات مشاهدة التلفاز في اليوم الواحد؟ (خلال ايام الاسبوع)

لا أشاهد التلفاز في وسط أيام الاسبوع

أقل من ساعة

ساعة

ساعتين

٣ساعات

٤ ساعات في اليوم

٥ ساعات وأكثر في اليوم

ماهي متوسط عدد ساعات مشاهدة الفيديو واستخدام ألعاب الكمبيوتر أو استخدام الكمبيوتر في غير أنشطة المدرسة المطلوبة في اليوم الواحد؟ (مثل إكس بوكس، بلاي ستيشن، فينتندو، أي يود أو شبكة الإنترنت).

لا أستخدم ألعاب الكمبيوتر في غير أنشطة المدرسة

أقل من ساعة

ساعة

ساعتين

٣ساعات

٤ ساعات في اليوم

٥ ساعات وأكثر في اليوم

لديك حساب في شبكة التواصل الاجتماعي (فيسبوك /Facebook)

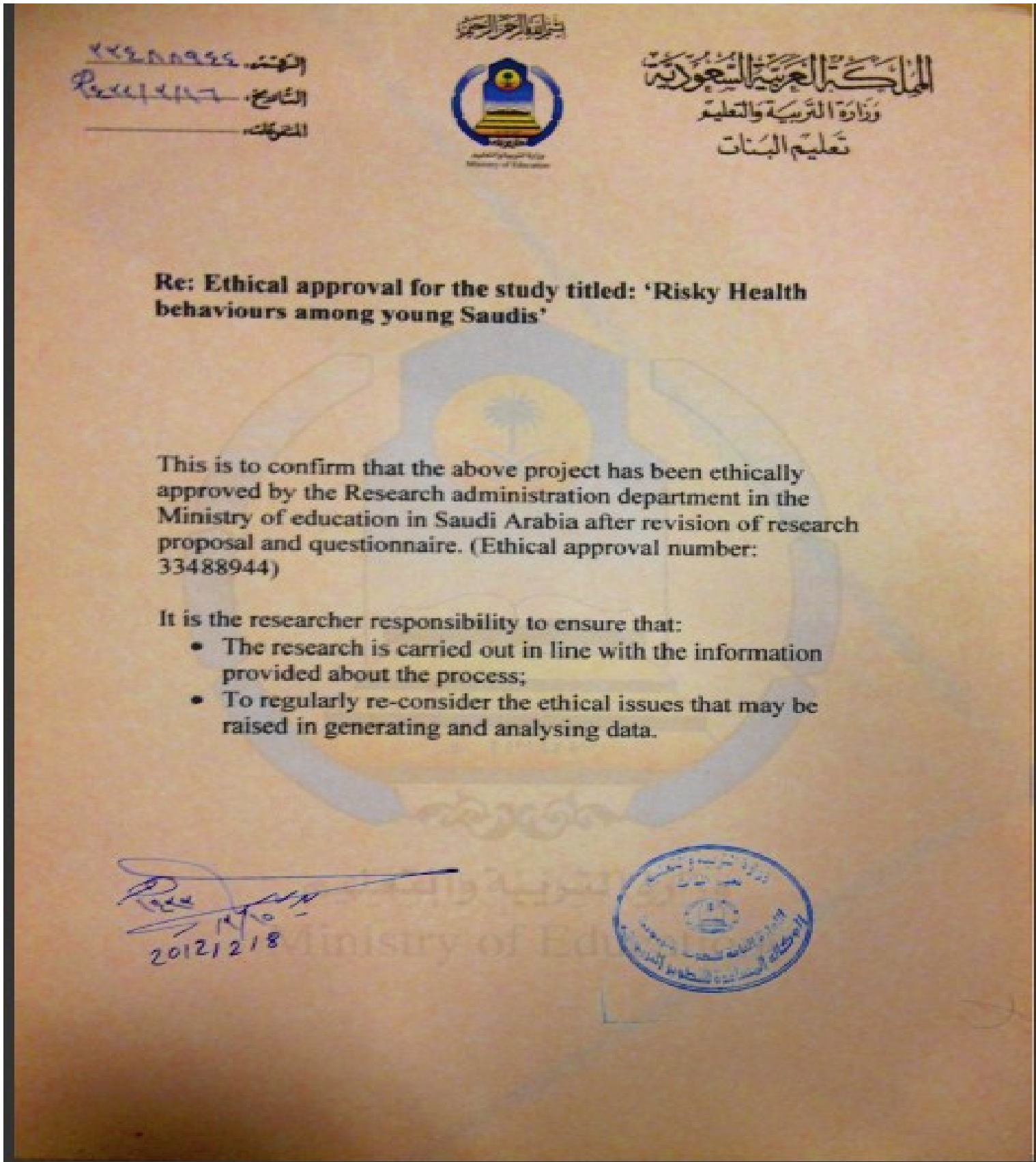
نعم

لا

انتهى
شكرا جزيلاً لتعبئة الاستبيان

Appendix F: Offline study ethical approval

Obtained from the research centre in the Ministry of Education (MOE) in Saudi Arabia.



Appendix G: Online study ethical approval

Obtained from Imperial college research ethic committee.

**Imperial College
London**

Imperial College Research Ethics Committee

Imperial College London
510D, 5th Floor, Lab Block
Charing Cross Hospital
Fulham Palace Road
London
W6 8RF
Tel: +44 (0)203 311 0208 Fax: +44 (0) 203 311 0203

researchethicscommittee@imperial.ac.uk

Professor Salman Rawaf
Director of the WHO Collaborating Centre
311 The Reynolds Building
St Dunstons Road
London
W6 8PR

26th September 2013

Dear Professor Rawaf,

Study Title: Social network sites as a means to collect health behaviour data for young people; a comparative-descriptive cross sectional study.

ICREC reference: ICREC_13_4_7

The above study was reviewed by the Imperial College Research Ethics Committee held on 9th July 2013.

Following the review of your amended documents submitted on the 3rd September 2013, the Joint Research Compliance Office would like to grant full approval to the study on the basis described in the email reply and the revised document:

Documents

The documents reviewed were:

- ICREC application form
- Survey V1 24 June 2013
- Approval letters Saudi Arabia (plus translated copies)

Yours sincerely,



Gary Roper,
Head of Regulatory Compliance,
Imperial College London