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REHABILITATION ARCHITECTURE
AS THE KEY TO EXTENDED
AUTONOMOUS LIVING IN EARLY STAGE DEMENTIA



Matt Kotwas Master Thesis

Eindhoven University of Technology

Graduation studio: "Stimulating Healthy Environments"

Exploring the opportunities for smart health architecture in real life projects.

REHABILITATION ARCHITECTURE AS THE KEY TO EXTENDED AUTONOMOUS LIVING IN EARLY STAGE DEMENTIA

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Abstract

Following an analysis of dementia symptoms and the increasing strain that will come from an ageing population and under-staffed healthcare, this thesis establishes an architectural framework to support residents in maintaining their autonomy and preventing the progression of early stage dementia. Looking closely at the manifestations of dementia, the paper outlines how the disease impacts people on a biological and social level. Alongside this explanation is the concurrent problem of an ageing population and the increasing strain this will place on the Dutch healthcare system.

Therefore, the main aim of the paper is to investigate how dementia affects people and will do so increasingly with an ageing population. With this fact established, the later stages of the thesis will propose architectural solutions to these problems, through smart architecture. The aim of this approach is to mitigate the effects and progression of the disease and offer a solution for the healthcare system that will save money and stress in the long term.

The architecture offers a pallet of solutions drawn from varied approaches, including clinical research, case studies, and a wider body of scientific literature relevant to the rehabilitation subject and data collection methods for the proposed architectural translation.

Section I-6 outline the problem and effects of dementia and the ageing population. Section 7 onwards describes design principles based on an integration of the case studies and collected data. These attempt to resolve the problem by applying data usage to assist in implemented smart technologies in various ways.

In summary, this thesis proposes a framework for evaluating a range of possible rehabilitation solutions, based upon available statistics and scientific research, presenting potential outcomes, material selection, and alternative design that can promote and support the residents' daily rehabilitation and autonomy.

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Introduction 1.1

My research has been structured around this leading question:

> "How can the integration of smart building techniques forestall the progression of early stage dementia and maintain the autonomy of those afflicted?

residents who face early symptoms quent maintenance of autonomy. of dementia. The research's importhe symptoms and daily problems experienced by the sufferers of dementia. This extensive part of the thesis emphasizes the significance of the existing research, the types of effects experienced by dementia sufferers and the process of integrating various medical case studies as a means of showcasing rehabilitative potential.

By investigating the impacts of dementia, with a focus on the early stages, this enabled me to move forward and analyse particular case studiess. With this, I was able to clarify the relationship between symptoms and possible resolutions.

The constant underlying ap- Resolutions focally aim at increased proach in this thesis is to analyse cognitive functioning/slowing nuarchitectural solutions to those erodegeneration and the subse-

tance is centred on understanding One central problem that leads to a self-perpetuating vicious cycle is that of data collection. Data is central to forming solutions on the effects of dementia, but much data collection is limited due to privacy infringements. The purpose of my approach is to offer solutions through smart architecture based on existing evidence I will outline, but at the same time, I also want to provide a means of adding to the of these architectural implementations. One benefit of smart architecture is its ability to collect useful data on its environment and inhab-

When early stage dementia residents are living with these architectural designs, this will help provide data on how designs are affecting their symptoms and well-being, thus deepening the existing body of literature on dementia.

The suggested methodology is a contemplative approach to integrate regular data usage combined with medical facts and architectural solutions. The complete picture of methods used needs to address the challenge of abandoned trust in the rehabilitation of dementia patients. The judgment of the success for the proposed methodology stated by total data as a secondary outcome Peter Reason indicates the diverse perspectives of both researchers and readers' beliefs:

П

"In the end, the most significant thing is that personal inquiry entails several processes. It involves the experience of the individual and their judgement. In that case, there is no set procedure that is sure to guarantee validity in knowledge or its accuracy, or the truth. They are just individuals at a precise time and place, working in all honesty or in a systematic way in a bid to capture all the opportunities offered to them, solve their day to day life issues and attain the awareness of the things that make them feel intrigued. This is should be the only basis of judging a human being. "(Reason., 1988 p. 231)

The thesis still faces some practical restraints due to its novelty, as the rehabilitative application of smart technologies concerning dementia rehabilitation has never yet been implemented. To make the increased independence of dementia sufferers a reality, a multi-disciplinary approach is imperative to overcome traditional constraints, to work into new territory and finish with a fair outcome based on contemporary studies and expert guidance.

1.2 Methodology and structure

stems from the needs of those solutions. who suffer from dementia, from early to late stages. Their needs are central because they motivate the architectural response that response that can act as a solution to overburdened healthcare and the diminished autonomy of those dementia sufferers in need of care.

The sequence which led me to my conclusions followed an investigation into the stages of dementia, using research papers and medical journals initially. Closer attention was paid to these stages of dementia through case studies, as they helped highlight specific cases, applications and the need for rehabilitation. Based on this, I arrived at the central problem statement that dementia cases are predicted to rise in the coming years as the ageing population increases and healthcare support will not be sufficient to help those affected, leading to over-worked healthcare professionals and under-nourished dementia sufferers.

Solutions to this problem aim to alleviate the suffering and boost the autonomy of those with early stage Research Papers dementia, whilst simultaneously alleviating some burden from the healthcare system in future. These solutions manifest in architectural designs, adapted from architects in the past and applied in a way that brings medicinal and social benefits for both those in dementia and those in positions of care for dementia sufferers. The purpose of smart technology application is to bring the additional benefit of data collection to the field of dementia, as data is still in short supply fered insight into the current state for dementia sufferers and smart of the medical world in regard to technologies will help improve the

The approach of this work information available to help reach

Case Studies

The purpose of case studies was to highlight individual cases to show personal examples of people suffering from dementia and specific cases of institutional approaches to dementia care. The case studies came from a process of a broad literary review on different stages of dementia and a review of architectural solutions, with smart technology applications. The main source Google Scholar used as a directory to find the required case studies and only collecting those from trusted academic sources. The order of collecting these case studies first focused on the stages of dementia to give an overview of characteristics for those with the conditions. This led me to understand which type of smart technologies would be relevant. Thus, the secondary stage of collecting case studies was themed on finding architectural designs that would be relevant to the different stages of dementia, with a most pronounced focus on the 'early stage' dementia.

My collection of relevant research papers was born out of an extensive literature review using Google Scholar, and particularly, the academic platforms: Istor and Elsevier. The direction of research followed from a broader overview of dementia stages and influencing factors on developing dementia, such as age, sleep routines and quality of life (among others). This involved fewer case-specific examples and ofdementia stages and the overarch-

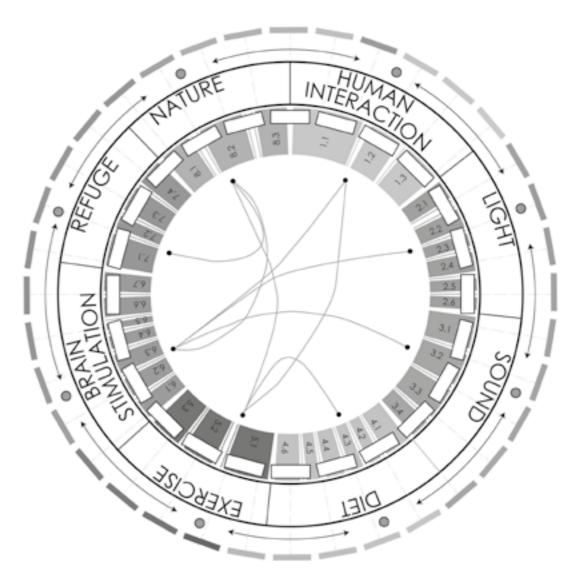
ing social impacts that the disease is causing today. These papers provided the medical background necessary to introduce the architectural solutions in the final stages of the thesis. Architectural solutions also came from a literary review using the same research platforms and were additionally led by investigating the references and influences of those who have worked in the field of smart architecture and medical focused architecture before.

Design Solutions

Design solutions were inspired by specific examples of applied architectural designs and overarching literature, such as research papers, that helped explain the application and function of smart technologies. The specific examples and explanatory papers acted as the framework for my own architectural solutions. Specific examples studied include the application of kinetic facades, as used in the Al Bahr Towers in the UAE and published in the Qscience Connect Journal, and also from the Ernst Giselbrecht + Partner project in the Kiefer Technic Showroom in Austria.

Further specific inspiration came from the application of nature into architectural design, as per the work of Landscape artist Paul de Kort, responsible for introducing nature sounds and environments to Amsterdam's Schipol Airport. Additional research on the integration of nature into architecture came from studying Singapore airport, where they created large indoor biomes that have been shown to reduce stress and promote calm through indoor natural habitats.

My architectural solutions to dementia are spread across eight key areas that I decided on based on my initial literature review and these eight focus points are highlighted later in this work but include: Human interaction, light, sound, brain stimulation, nature and more.



Rehabilitation Environment - example diagram

Research Methods 1.3

and the second, research into design with dementia and target a feasible

ple suffering from dementia. This

ed a solution, the first problem was: 'how to meet the needs of people With the problem outlined and the focus on early stages was chosen because I see prevention as a better method of long-term resolution 1.

The solution that that could marry 2. tion. I could see from my research that this field of Rehabilitation oftechnology and architectural soluaim from the research papers on de- as the architectural breakdown of

The research methods can mentia that highlighted the decrease the Rehabilitation Environment. be summarised in two central stag- in the autonomy of early-stage dees. The first is the primary research mentia suffers, and the increasing The final step was making adjustutilization of smart-technologies to for rehabilitation. The first bulk of reduce the burden on the labour the research was an initial analysis force and add to data collection for to outline the problems associated a long-term benefit to healthcare.

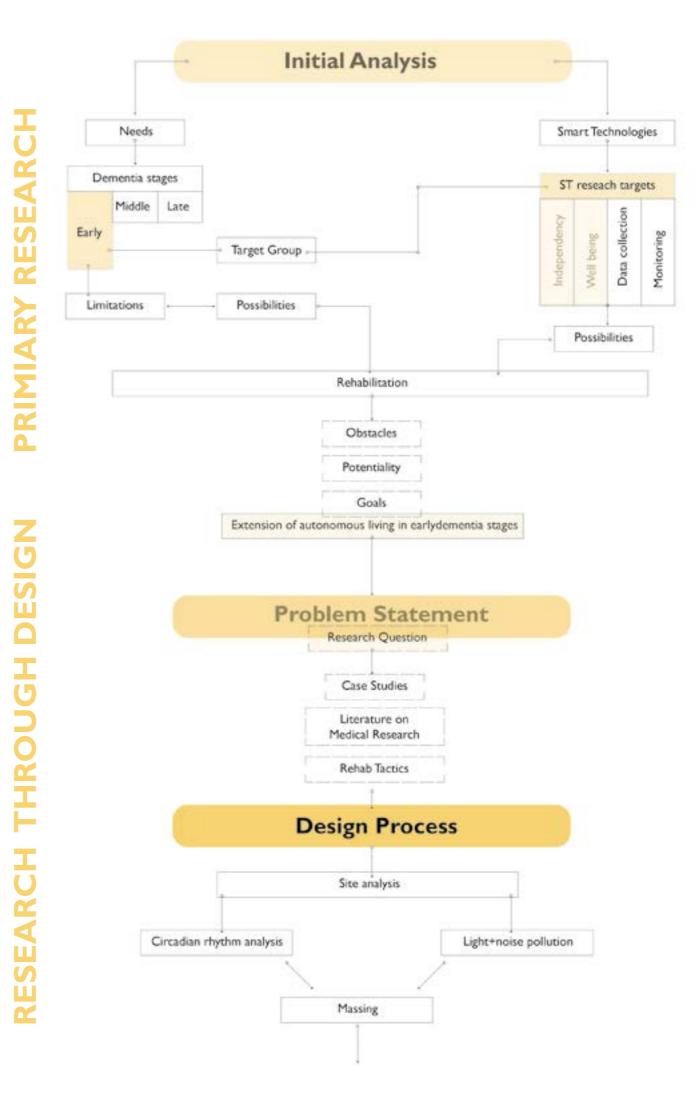
solution. The second research stage With the motivation clearly outwas a focus on a Rehabilitation Envi- lined: 'to increase autonomous living ronment, through design solutions. for those with early-stage dementia through the use of smart-technolo-The first stage sought to find some gy', I had a firm grounding to begin key characteristics for those peo- considering design solutions. These solutions came from a combinawas based on their needs. Simul- tion of site analysis, a focus on the taneous to this, my initial analysis relevance of circadian rhythms in involved research into the current dementia sufferers, the problem of status of smart technologies that noise pollution and massing. Togethcould be relevant to dementia. er these things became the core ingredients that would influence Both of these investigations need- my Rehabilitation Environment.

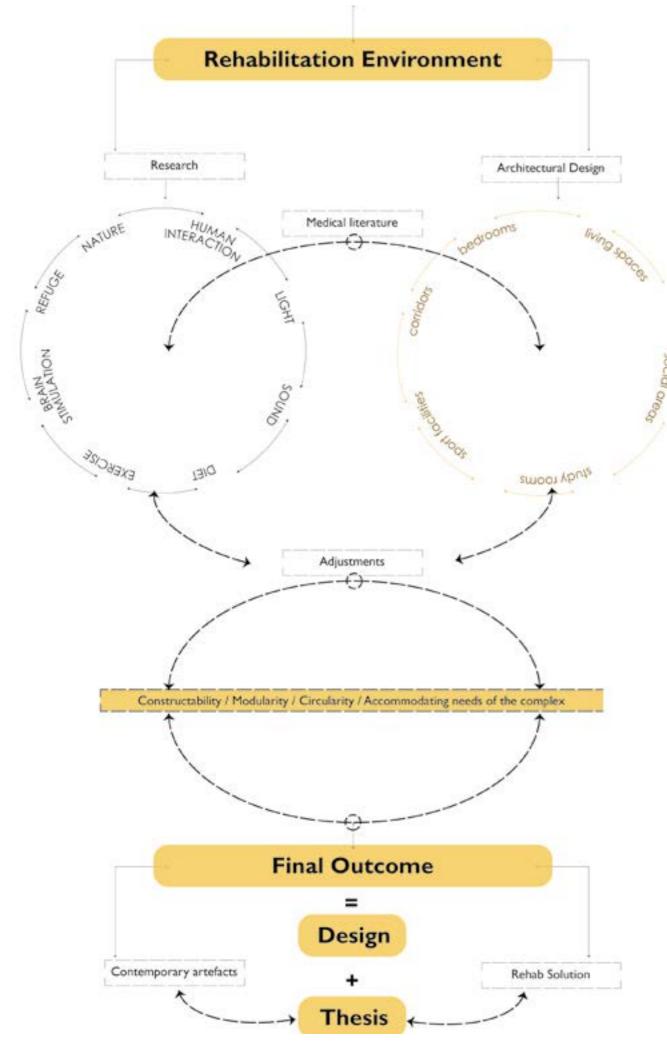
suffering from dementia, with a fo- aim clearly in mind, the Rehabilitacus on early stages?' The choice of tion Environment was approached through two key processes:

- Research of the key factors and early-stage dementia can still that influence dementia progresbe treated to prevent it from pro- sion and experience. Thing such as gressing. Focusing on the late stages diet, exercise and nature are among offers no long term solution to the a few that were repeatedly found in increasing burden on healthcare. research papers and medicinal jour-The second problem that needed nals on dementia. The eight factors solving for smart technologies was: were chosen from research papers how to integrate smart technolo- and journals based on their influence gies into early-stage dementia care? on dementia and their ability to be reconciled with smart-technologies.
- Architectural design that these two notions was Rehabilita- could manage the symptoms of dementia well and prevent their progression. These design solufered grounds for integrating smart tions were equally influenced by research papers, medical literature tions to the problems faced by and became divided into six catethose with early-stage dementia. gories, of which a few are: living The rehabilitation aimed to extend spaces, corridors and social areas. autonomous living. I arrived at this The total six factors can be seen

ments for practicality and feasibility. Based on both the architectural breakdown and the dementia research, the outcome had to make adjustments for the following: circularity, modularity, constructability and accommodating complex needs.

With these adjustments met, I arrived at the outcome with clear design solutions outlined and a pathway established for rehabilitation through architecture in the early-stages of dementia.





Chapter ONE References & more

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Fig.1.1 Kotwas, M [2021]

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Problem Statement and Goals

With the shrinking pool of informal caregivers and the expanding population with the disease, the main goal will be understanding how to maintain continuous care for people that have the disease, to maintain their autonomy and avoid an over-burdened healthcare system.

The term dementia is an age-related condition prevalent at the age of 65 and tends to multiply twice every five years for people past this age. The number of people 65 and above with the disease is increasing at an unsettling rate. As the prevalence of this disease is set to rise, the numbers are projected to reach approximately 2.3 million by the year 2036. The consequences will inevitably lead to an increased disability burden for providers and families, though sadly, these roles are already understaffed and staff are overworked. Coupled with this fact, the cost of long-term, often palliative care will increase respective to the

is heavy and will be heavier as time goes on. However, since the population is steadily ageing, the support The decreasing ratio shows that every informal caregiver is now caring for the most elderly people in Other research studies have provsociety. Assuming that the age of dementia risk does not rise to a higher age, i.e., 75 the prevalence rates are expected to rise over the years, as the ageing demographic changes. When it comes to cognitive impairment, the public health measures that have been implemented are plethoric in diversity and central to the protection of global mental health,

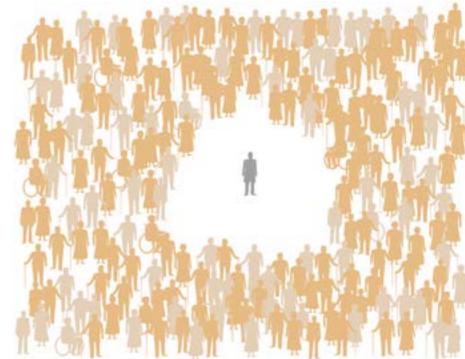


Fig.2.1 Shortage of medical professionals

there are comparatively few studies on this topic that acknowledge our ignorance and broad inconsistency regarding the actions put in place to tackle these diverse societies and their effectiveness. In the sector increased prevalence of the disease. of public health, a Peer-Reviewed Open-Access Journal (PLoS medi-The demand for informal caregivers cine's) issue explores the likelihood of dealing with the reversible aspects in diverse cultural, primarily socioeconomic surroundings. To for the elderly has been decreasing, many people's surprise, there is no as proven in the past two decades. single approach that seems to work in this case.

> en that this particular matter also helps in the advancement of genetics with relation to the disease. This emphasizes the heterogeneity of all the threat aspects for different human beings and populations. In this case, a person's genetics plays a vital duty in defining the possible risk for suffering from neurodegenerative disorders, precisely for those at a familiar hazard of contracting the disease.

This chapter will explain the various reasons as to why there is an increment in the number of individuals affected by the disease and analyse the shortage of medical professions, the impact of Dutch health care, and the potential solutions meant to help with this disorder. This analysis will revolve around a series of studies conducted in the past. These studies have all reached a series of conclusions backed up with evidence that will enable and portray more research insights for architectural progression. Similar to the scientific body of work I will be analysing, my research study will have a conclusion aimed at shedding light on the ageing population and the manifest problems that accompany this disease.

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2.

PROBLEM STATEMENT AND GOALS

AGEING POPULATION INCREASING NUMBER OF CASES OF PEOPLE AFFECTED BY DEMENTIA **INCREASING SHORTAGE OF MEDICAL PROFESSIONS** IMPACT ON DUTCH HEALTH CARE POTENTIALITY FOR IMPROVEMENTS

Ageing population

Cognitive functions assume an important factor in deciding the prosperity and personal satisfaction of grown-ups, and I will look in particular at how these functions change and impact these individuals as they pass from midlife to more seasoned ages. Cognitive functions entail one's choices; namely, to work, resign, set aside income, scale up or down in property size and so on... Alzheimer's Disease or ADRD has a drastic impact on these decisions. The condition is described by a decrease in a psychological capacity that is potent enough to cause the deficiency of freedom in one's everyday work – defined as "a type of dementia that affects memory, thinking and behaviour. Symptoms eventually grow severe enough to interfere with daily tasks.". This ailment has wide-running, immediate, and cyclical consequences for the prosperity of the elderly, their families, and the costs of open

Roughly 4.2 million older adults lived with the disease in the Netherlands in 2010 and an excess of 135 million worldwide (Hurd et al., 2013). Since the occurrence of this disease rises particularly at ages greater than 75, and we are facing increasing ageing populations, particularly in The Netherlands, the fair prediction is that cases will also rise by 2050 and if we do not do something, we will miss our chance to forestall the negative effects of this increasingly prevalent condition. (Prince et al., 2013).

the human learning process, i.e., understanding/learning through education, and the hazard level associated with psychological degradation.

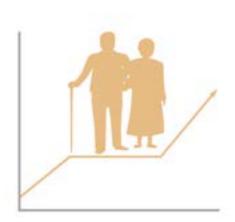




Fig.2.2 Increasing ageing population

Longer stretches of schooling have reliably been related to a reduced risk of psychological degradation in a broad scope of projects - such as Social Security. studies undertaken across mul-

Moreover, Social-economic status (SES) and racial/ethnic differences in instructive accomplishment, just as schooling's nature has been recognized as a likely foundation for the inconsistencies in the SES and racial/ethnic numbers rate and commonality. Lastly, recent years have shown increases in average degrees of instructive accomplishment in big league salary nations and this has been related to decreases in case occurrence and frequency (Larson et al., 2013), recommending that growing admittance Firstly, there is a vital link between to training may help decline the disease hazard population. These factors beg the question: how do long stretches of education decline one's processes to dementia?

Training related expansions in "intellectual save" is broadly referred to as a hypothesis for how education may diminish the disease-related hazard. The intellectual save tiple nations in recent years. hypothesis urgers that psychological difficulties related to education cause changes in neural structure (such as an increase in the number of neurons in related areas of the brain and greater associations among them) that permit one to mature the cerebrum more readily and resist degradation when pathologies amass. Even though the variable is the long periods of formal education, regularly utilized as a pointer of psychological save (likely because it is regularly gathered in numerous epidemiological investigations), different examinations propose that degree of intellectual incitement and intellectual test all through life, together with the qualities of a person's occupation, how they invest their recreation energy, regardless of whether one participates in "psychological

preparing" works out. The degree schooling levels between the ages lifetime hazard. The hopeful and expanding proof that maturing cerenew neurons and make up for the pathologies that are related to age through "long-lasting learning" and Notwithstanding AD and vascular psychological incitement will probably be a significant focal point of both future exploration and possible preventive mediations in a long time ahead (Lindenberger, 2014).

Outside of schooling education, it seems that there are a variety of ways for training the mind with the subsequent effect of improved well-being, perception and mental health in later life. In surveying the writing on the connection between training and the future, Hayward and Partners (2015) give a helpful, calculated model that features distinct and positive medical advantages. This model includes data concerning the benefits of certain well-being practices and medical services more significant and stronger informal communities, and intellectual abilities that advance a feeling of control and organization. Every one of these pathways has a likelihood

creased education levels in devel-Nonetheless, the disparities between these nations will most likely In general, the proof accumulatinfer disparities in dementia patterns. For example, there has been a critical expansion in the degree of educational accomplishment dissections, has prompted a vastly among elderly adults in the Netherlands in two decades, there won't be further growth in the coming narily brought about by a blend of years. This is primarily because neuropathology that arise from an

of social associations may all as- of 65-69 are similar to those of the sume a job in building or keeping up levels 25-29. The ailment patterns psychological save and diminishing have grown across nations that have different time patterns, especially in educational achievement. brums hold their pliancy to develop This gives more various pathways for patients. (Langa et al., 2018).

sickness as reasons for causing dementia, there is a likelihood of extra significant infection measures and obsessive pathways promoting psychological decreases that are not yet known. Boyle and Associates (2013) demonstrated that, shockingly, just around 40% of the late-life intellectual decline could be clarified by the known regular neuropathology of AD, vascular illness, and Lewy body sickness. This outcome unequivocally recommends that different elements and casual pathways should be distinguished and better comprehended to create effectual preventive intercessions and therapies that address the numerous and blended pathologies that are generally found in the cerebrums of the administrations and how they link elderly (Lange et al., 2004). For exto better positions and lifetime pay, ample, ongoing proof proposes that hyperphosphorylated transactive reaction DNA-restricting protein 43 (TDP-43), a neurotic protein previously distinguished in the minds of patients with frontotemporal deof being influential in promoting mentia and amyotrophic horizontal mental well-being and longer life. sclerosis, is additionally frequently present in those determined to Globally, there is a pattern of in- have AD. When present, it essentially expands the danger of contractoped and developing countries. ing the disease (James et al., 2016).

> ed during the previous population-based examinations, particularly those that have included mind improved agreement and psychological decrease. Dementia is ordi-



Fig.2.3 Learning leads to decreased risk of psycho-

intricate association of danger factors (both social and organic) across the existence course, likely including pathologies that are yet to be ultimately perceived. As examined in more detail underneath, an extra multifaceted nature related to new neuroimaging strategies is that the neuropathology prompting intellectual decay and dementia are regularly present a very long time preceding the beginning of psychological manifestations, further supporting the significance of a full life course point of view while distinguishing the cases and the likely preventive intercessions for late-life dementia.

Increasing number of cases of people affected by dementia

critical age for developing Alzheimcondition. Projections of the numpeople of older ages are more likely reach older ages, therefore, there is likely to be an increase in the nummore strain on healthcare and lead

Over the centuries, the disease has expanded drastically across the globe. This pattern has an antagonistic angle in that more established individuals' normal persistent illnesses are getting substantially more predominant. Statistics show a critical challenge for general well-being in Dutch society and is simply liable to increase as the population ages. For instance, there has been an enormous expansion in the conclusion of dementia on the Netherlands' demise testaments over the most recent ten years.

Nonetheless, it is imperative to isolate increases in death rates analysis, because developing attention to the illness increases because of changes in infection event or mortality. Disease transmission specialists have endeavoured to reveal a wide scope of danger and defensive elements. Backing and general well-being associations have additionally put forth attempts in the last thirty years to build familiarity

As life expectancy increases, build familiarity with the disease and A group of segments, way of life, the number of people reaching the its realized danger factors, among both people in general and rehearser's will also increase. Therefore, an ing doctors. Furthermore, these expansion of the age bracket of 65- endeavours have likely changed the tia. Unmistakable among these are 90 years has been correlated to a danger of dementia unobtrusively, if higher number of people with the at all. Society's interest in research ing hypertension and diabetes. should, in the end, be advocated by ber of patients should consolidate the progress made towards dimin- Since cardiovascular infection and this fact with increased dementia ishing the occurrence or possibly its frequency after age 90. Put simply, related handicap (Rabins, et.al, 2006).

to get dementia, there is an increas- There are valid justifications to ing number of people that now expect a decrease in an intellectual hindrance after some time because of the time patterns in ber of dementia cases as life expec- likely danger and defensive eletancy also increases and this will put ments for psychological debilitation. There are also a few patto higher prevalence of the disease. terns in cardiovascular factors that would propose a standard increase.

and clinical variables have been distinguished, which seem to modify the danger of getting demenvascular danger factors, includ-

cerebrovascular sickness add to the threat of dementia, and because there has been a remarkable decrease in stroke frequency over the most recent 50 years, some decay likewise in the danger of dementia may be expected. Then again, improved endurance after stroke, or an expanded commonness of subclinical vascular illness without unmistakable stroke, may bring about more people in the population with increased danger.



Fig.2.4 Rising dementia cases in the Netherlands

Innovative drugs and different treatments for cardiovascular infection presented since the mid-1990s (e.g., more extensive utilization of antihypertensive and statin prescriptions) may have led to a decrease in myocardial dead tissue and stroke in recent years. While the probability of treating hypertension and diabetes has expanded, so has the commonness of these two conditions. From 1994 to 2002, in African-Americans over age 65, the frequency of hypertension moved from 73.0% to 83.0%, and the predominance of diabetes rose from 26.0% to 36.0%. The expanded commonness of hypertension, diabetes, and corpulence may have added to an expanded danger for psychological decay and dementia, even though the negative effect on cerebrum soundness of diabetes and heftiness may not be clear for many years to

The extent of adults aged 65 years or more, with a secondary school certificate, increased from 53.0% in 1990 to 72.0% in 2003, though, those with a higher education expanded from 11.0% to 17.0% equivalent time-frame. More Prolonged peria decreased risk of dementia, likely through various causal pathways, remembering an immediate impact for mental health and capacity (i.e., the structure of "psychological save"), better well-being practices, and the overall well-being focal points of having more abundance and social open doors. The family unit total assets for those aged 65 years or more established expanding from \$119,000 in 1989 to \$196,000 in 2005 (inconsistent 2005 dollars).

"WORLDWIDE, AROUND 50 MIL-LION PEOPLE HAVE DEMENTIA, AND THERE ARE NEARLY 10 MILLION

NEW CASES EVERY YEAR."

Fig.2.5 Increase of dementia patients worldwide

Greater wealth and assets have been related to lower handicaps and physical debilitations. This can be attributed to the riscome(Langa, Foster, Larson, 2004). ing levels of dementia in recent years (Langa, Foster, Larson, 2004).

Furthermore, there has been a far and wide expansion in the Intelligence Quotient (IQ) score, known as the Flynn impact. The mean IQ score in the Netherlands was assessed to have risen ods of formal training are related to by 13.8% focuses from 1932 to 1978 (Ceci, 1991). Changes in ecological components, training, and financial states have been offered as potential clarifications; however, the exact instruments hidden in IQ's pattern stay obscure.

Rising shortage of medical professionals

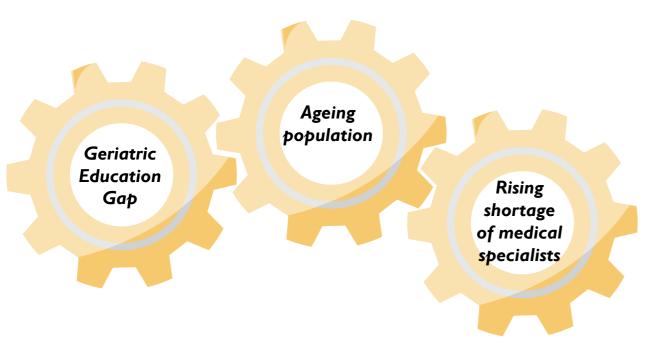


Fig.2.6 Relationship between ageing population and shortage of geriatric specialists

Most instances of dementia happen in later life. Hence, the medical care labour force Essential care workers in customthe population with those of the developing number

ers required by this population projections for the well-being labour force, with a report from 2014 cent from 2010 to 2025. (Langa, Foster, Larson, 2004). During disease, labourers in most medical care disciplines add to the consideration of every adult with demenpatient care preparation. The main regimens fields incorporate essential consideration suppliers, chosen clinically trained professionals, medand direct consideration labourers. about more established

Essential Care Providers

ary workplaces or medical services group settings are in the process of of fragile, more established adults. giving continuous, thorough consideration for adults with dementia Even though the kinds of labour- sickness and their families. These workers can be medical care proare known, the exact quantities of fessionals, doctor associates, or esindividuals in each control need- sential care doctors. More essential ed to meet future consideration care workers will be expected to needs are not clear. To fill that hole think about elderly adults in the in information, there is an ongoing Netherlands by 2025, contrasted creation of general organic market with today. The general population is expected to develop by 15.2 per-

the seven-to-ten-year course of the Medical care professionals are taught at the expert's or doctoral level to analyse and treat patients. It is assessed that solitary 8.6 percent tia. They can profit from specific of all such medical attendants are prepared in geriatrics or gerontology. This change, which was actualized in 2013, will bring about many more attendant professionals' beical attendants, social specialists, ing readied and confirmed to think ans (Prince, Guerchet, Prina, 2013).

grown-ups with dementia. The of extension interprofessional care models, for example, the patient-focused clinical home, will build interest for nurture specialists. Elderly adults represent 33% of the visits to doctor partners. However, less than I percent of the over 92,000 doctor aides in The Netherlands spend significant time in geriatrics (Bland, et.al, 1987).

Developing care models and the preparation of expanded quantities of medical attendant experts and doctor associates may ease the deficiency of essential care doctors. Furthermore, the patient-focused clinical home model grows the utilization of interprofessional groups in the essential care setting. The preparation where critical care doctors get to think about more elderly grown-ups with dementia is improving. Nonetheless, numerous doctors are not sufficient to give ideal care to elderly adults and their guardi-

Chosen Medical Specialists

At the moment, there is a shortage of geriatric professionals and this is being compounded by an increasing number of elderly people. Geriatricians are specialists in thinking those with dementia. They have effectively worked in interprofessional groups with essential care doctors and medical carers to build individuals' proficiency and nature with the infection. The certifying bodies for graduate clinical education and clinical board confirmation for geriatricians require explicit dementia preparation. In 2012 there were 7,147 insured Dutch geriatricians. As their administrations' interest builds on account of the maturing populace, it has been extended that upwards of 36,000 will be required by 2030, right around a fivefold increase (Prince, Guerchet, Prina, 2013).

This objective is not going to be met: The quantity of young doctors entering the workforce, 250-300 every year, 21 is not even adequate to supplant the geriatricians who are resigning or not re-establishing their confirmation. In 2012 there were just 1,554 affirmed geriatric therapists, 19 with 68 partnership programs in geriatric psychiatry preparing 65-70 colleagues every year. In a 2012 report, the Institute of Medicine (IOM) analysed the emotional wellness labour force needs for the developing population of elderly adults. The report inferred that the pace of particular suppliers entering the labour force is being overshadowed by the speed at which the population is developing. In 2012, learners involved just 54 percent of the modest number

of accessible cooperation positions in this control. A comparative lack exists for a wide range of experts that give psychological wellness care to elderly adults. (Kroneman,

about elderly adults, incorporating Nervous system specialists now offer specific assistance in assessing and overseeing elderly adults with dementia indications. The interest for nervous system specialists, which now surpasses the stockpile, will be extensively more significant by 2025 due to the populace's maturing. The American Academy of Neurology has distributed measures for excellent consideration of patients that address analysis and the board. The improvement of new indicative biomarkers and tests, just as of pharmacological medicines for dementia, will expand nervous system specialists' interest.

Enrolled nurses and licensed practical nurses

There are 2.8 million enrolled medical carers (counting attendant specialists) and 690,000 reasonable authorized attendants in The Netherlands nursing labour force. Licensed attendants make up the most prominent authorized labour force in the private health care offices. Generally, enrolled medical caretakers oversee interdisciplinary groups of useful authorized attendants and direct consideration labourers in these settings. From 2012 to 2022, work development for enlisted attendants is extended to be 19 percent, and for authorized reasonable medical caretakers, 25 percent, contrasted with 11 percent for all occupations.

One explanation behind this, better than expected development, is the expanding pace of stable conditions in the maturing Dutch populace. A public program to improve medical carers' preparation being taken care of by more elderly adults was set up at New York University in 1996. It trains general pioneers in gerontological nursing instruction, creates and disperses best practices, and advances nursing vocations under the watchful eye of elderly adults.

Since 2001 the American Association of Colleges of Nursing has worked cooperatively with different partners to create agreement-based capabilities for alumni of nursing programs with an end goal to improve the nature of care accessible to more established grown-ups, incorporating those with dementia. The affiliation has, as of late, centred on nurture staff advancement to improve geriatric nursing care. (Capezuti et al., 2012)

It is important for every social worker to feel motivated to work in their respective field. It is also imperative for people to understand that, at times, the behaviour of the patient is driven by how they are treated by their caregivers. Policymakers should work round the clock to ensure these caregivers get not only the right treatment for their work but motivation as well. Any kind of caregiver should enjoy the benefits offered by not only the government but also the private sectors. For the better health of dementia sufferers, everything involving the stakeholders should be put

OFFERING SOCIAL

WORK SERVICES **ENSURE INCREASES IN QUALITY**

PATIENTC

Social workers

and families in all settings are re-While the numbers of social working there is a stable working sysdeep-rooted and complex nature of range of symptoms, dealing with government should therefore look at ways to increase the number of people offering social work services in this country to ensure increase in quality patient care.

Social specialists, counsel people The Geriatric Social Work Initiative, financed by the John A. Hartford quired to adapt to ongoing, intense, Foundation and facilitated by the or terminal diseases. For instance, Gerontological Society of America, they give the case to the board and expects to expand social labourers' mediations to deliver boundaries skills to improve the consideration and approaches to medical care. and prosperity of elderly adults with dementia—and their families. ers have continued to rise over the This activity bolsters the foundapast few years (Carole Cox, 2007) tion of scholarly focus on geriatric they play an essential task in ensur- social work. Medical attendants and social specialists assume a signifitem for social workers. Given the cant job instructing families to help and care for their family members. the disease, with its multitudinous New models of care that incorporate clinical consideration and dementia patients is not easy. The long haul administrations and supports may make their work more productive. Regardless, adults with dementia will build the interest for enlisted medical attendants, authorized viable medical caretakers, and social labourers.



Fig.2.7 Social workers increase the quality of patient care

2.4 Potentiality for improvements

Even though there was less proof on how the presentation of staff movement and treatment to individuals living with dementia affected other staff's acts, it is obvious from the underlying discussions that while there is a mutual perspective of the significance of dementia-accommodating consideration, less consideration has been paid to how various methodologies improved patient results. By focusing on results as the reason for incorporation, it is important to search for knowledge gaps on the various assets and approaches for dementia-accommodating medical services for patients.

In particular, the components of intercessions should be pertinent to furnish ward staff with the mindfulness, authority, and assets to give customized care uphold from staff with the significant ability. Educational mediations should zero in on how staff can relate to the experience of being a patient living with dementia, joined with open doors for staff to share their encounters of tending to practices they find testing and obliging individual-focused practices inside ward schedules and needs.

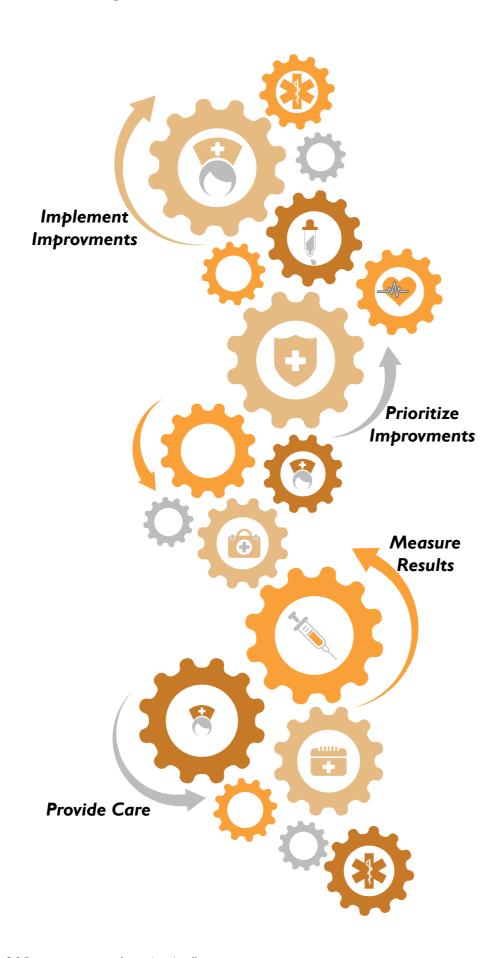


Fig.2.8 Future improvements for medicinal staff

Chapter TWO References & more

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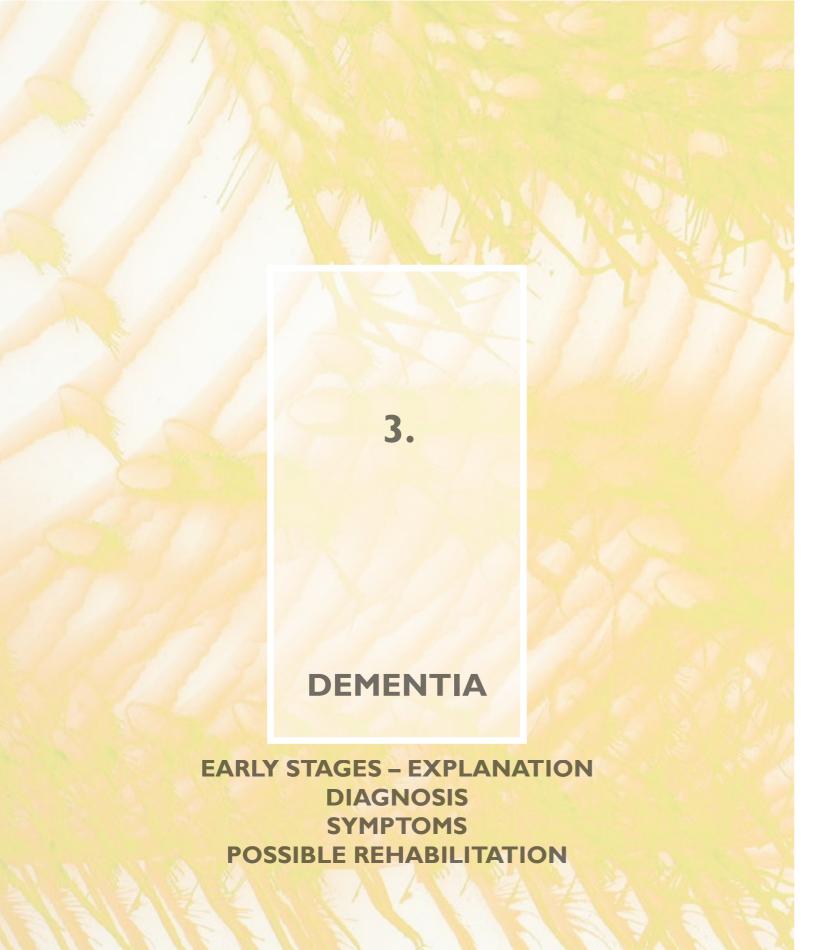
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Fig.2.7 Kotwas, M [2021]

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DEMENTIA

term that is used in reference to

memory loss, verbal communication, problem-solving skills, as well as other cognitive abilities that hinder a person's daily life activities. It is not a single disease; for instance, a heart disease. Although it entails numerous conditions, Alzheimer's disease is one of the popular kinds of disease. The symptoms continue to progress rapidly, and they include emotional problems, difficulty with speech, among others. A precise The treatment carries along a lot of diagnosis will state the individual's normal cognitive functioning changes and an even more significant cog- year 2020, the disease had affected nitive decline resulting from ageing. Many causative agents increase the risk, including diseases such as Par- ble increase compared to the numkinson's. This, therefore, means that bers seen in 2015, where 46 million it is important for physicians to look had this disorder. It is also said that into all the symptoms to get the right at least 10 percent of people fall ill diagnosis. For instance, their various at some point in their life, the main symptoms can categorize the subtypes; a neurodegenerative disorder will lead to this disease. There is a possibility that one or more types of the disease can be found within a single individual. The diagnosis of in developing countries and those this particular disease is based on the diseases' previous occurrence and medical imaging, mental testing. The risk factors can be reduced to vascular diseases, such as hypertension, obesity, and diabetes. However, the government has discouraged screening this disease for the gen-

but cholinesterase inhibitors such as donepezil are used to regulate this disorder's effects. The overall benefits for this might be minor, but they all help improve the lives of people who have this disease. There are many other measures to ensure these people are well taken care of, for instance, caregivers. icantly in developed countries due

Dementia is the These caregivers are given the nec- to a decrease in the risk factors. This essary training and information they need to take care of these people in a way that seeks to reduce the negative implications of symptoms i.e., helping to alleviate feelings of confusion by providing support and answers to patient's questions. The treatment for these kinds of disorders, particularly behavioural disorders, is not recommended, as there are minimal effects or benefits.

risks, extending as far as the risk of death. In research conducted for the about 50 million people from all over the world. This is a considerareason being ageing. (Alzheimer's Association, et.al, 2018). It's also worth mentioning that this figure is likely to be an underestimation given the lack of accurate diagnosis countries which still hold stigma towards professional medical practices. i.e., cultures that practise local medicine Three percent of individuals aged between 65-74 suffer from dementia, while 19% of people between the ages of 75-84 live with this disease. Half of this percentage eral public (Bradford, et.al, 2009). is comprised of people that are over 85 years. As a result, 1.9 million peo-The cure for dementia is unknown, ple died in 2015 due to complications arising from the disease, arise from the 0.8 million people who died in 1990. As the world population continues to increase, the risk factor of more people contracting the disease keeps on rising every day. However, for specific ages, this disease might be decreasing signif-

disease has been a substantial contributing factor to disability among the elderly (Brown, 2015). The budget for curbing the disease in the year 2015 was \$818 billion. The people who live with this disease are restrained to a greater degree, which raises concern on the issues affecting human rights. At times, and the peak of the symptoms, vicissitude people face a social stigma that may even lead to suicidal thoughts.

Early stages of dementia mild cognitive impairment

tal State Examination (MMSE test) challenges (Deb, et.al, 2007). will range from 20 to 25. The sympvidual is capable of taking care of early stages is loss of memory. symptoms at these latent stages in- tines are disrupted. clude difficulty remembering things, word-finding problems, and loss of organization skills.

This being the first stage, One way to assess their impairment the signs and symptoms may be is by asking them if they can hansubtle. The initial stages of demen- dle their finances without requiring tia are not noticeable, and only any help. Interestingly, this is high medical professionals can detect up the pecking order of challenges them. In these embryonic stages, they will face during the first stages. the symptoms will interfere with Another sign of early symptoms is the person's day-to-day activities that they will get lost in new places, in question. At these early stages, often repeat things, withdraw their a person's score on the Mini-Men- lives socially, and have personality

toms here vary depending on which When it comes to evaluating and dementia type. A person who has understanding this disease, it is crita more complicated life, house ical to consider how this person chores, or even work might have a was functioning in a range of 5-10 considerable challenge maneuvring years. For the standard type, the around this. Even though the indi- most prominent symptoms at the themselves, they might still forget For instance, for other kinds of some things, such as paying their Lewy strain, the personality changes bills on time. This may compel them are manifested as the initial sympto use reminders and alarms. The toms, making the normal daily rou-

Middle stages

As the disease continues to ravage the body cells, the primary symptoms continue to develop. The rate of decline is not the same for all people. Here the score for MMSE scores ranges from 6-7. People at this stage tend to lose any new information they have and struggle when solving real-life problems due to the impairment of their social judgement. In these more developed stages, individuals tend to function less outside their house and are not fit to be left alone. Only the simplest chores around the house are entrusted to them but nothing more significant than this. At times, they may require help with basic engagements such as personal hygiene and cleanliness.

EARLY STAGES

- Coming up with the right word or name.
- Remembering names when introduced to new people.
- Difficulty performing tasks in social or work settings.
- Forgetting material that was just read.
 - Losing or misplacing a valuable object.

Experiencing increased trouble with planning or organizing.

- Being forgetful of events or personal history.
 - Feeling moody or withdrawn, especially in socially or

MIDDLE STAGES

- mentally challenging situations.
- Being unable to recall information about themselves like their address or telephone number, and the high school or college they attended.
- Experiencing confusion about where they are or what day it is. Requiring help choosing proper clothing for the season or the occasion.
 - Having trouble controlling their bladder and bowels.
- Experiencing changes in sleep patterns, such as sleeping during the day and becoming restless at night.
- Showing an increased tendency to wander and become lost. Demonstrating personality and behavioral changes, including
- suspiciousness and delusions or compulsive, repetitive behavior I ike hand-wringing or tissue shredding.

LATER STAGES

- Require around-the-clock assistance with daily personal care.
 - •Lose awareness of recent experiences as well as of their surroundings.
- Experience changes in physical abilities, including walking, sitting and, eventually, swallowing • Have difficulty communicating.
- Become vulnerable to infections, especially pneumonia

Late stages

When the disease is at this stage, patients require help with literally anything around them, especially with their care. The symptoms at this stage tend to get worse, and it becomes supremely difficult for these people to maneuvre around without help. Patients at this stage need round the clock supervision to meet their basic needs. If left alone, the chances of causing harm to themselves are high. There is a vital lack of self-awareness such as tending to one's primal needs to hunger or excretion and basic safety principles that we would usually expect of a young child seem to disappear, such as an aversion to fire or heights. There are also changes in diet and eating habits as they are required to eat more thick liquids. People suffering from the disease also require help with the eating process as this is difficult with the later, more developed symptoms of dementia. This is to reduce the risk of choking as they eat, and also explains why doctors advise using these thickened liquids. Even though appetite might decline at this stage, it is essential for the body's proper functioning. At times, they will not want to get out of bed or might require some assistance to get them out of bed. A person here is not familiar with the people around them, and everyone looks new to them. They have considerable changes in the way they sleep or tend to have troubles falling asleep at night.



3.2 **Diagnosis**

All of the types of demen- Cognitive testing tia tend to have similar symptoms, misleading. At times, brain scanning brain biopsy is required to conclude the diagnosis. Elderly adults impairment through cognitive tests has not shown any positive outcomes. These types of screenings years. Symptoms tend to show for has similar symptoms. Other menphysicians thought that individuals ting ethnic background. complaining of memory loss did not pose symptoms of the ailment but These screenings can be done by rather, had depression. However, filling out a questionnaire or asking researchers came to the realization someone close to them to fill it out that the older people get, the more to indicate the everyday cognitive they complain of memory loss, functioning of the individual. These which is proven to be the disease's questionnaires tend to answer initial stages. (Zarit, et.al, 1987)

making the diagnosis of this disease These tests take between five to fifteen minutes to screen and come techniques enhance diagnosis, and up with a conclusive result (lackson, as in most cases, a post-mortem et.al, 2016). Mini-mental examination is concluded to be the best and common method to test and enundergo common screening to di- sure correct results. This test is useagnose the possibility of cognitive ful for helping diagnose the disease only when the obtained results are and early diagnosis even though it deduced alongside an evaluation. If there is any abnormality, a defi-The patient's capability to carry out their daily activities, their behaviour, are essential for people over 65 as well as personality, are used in these tests. MMSE is, however, not at least six months before a diag- the only cognitive test there is. Othnosis is made. For instance, delirium er types include the Montreal Cogis easily confused for dementia as it nitive Assessment and the Cognitive Abilities Screening Instrument. tal illnesses, including depression, The MoCA test is known to test have symptoms that look alike but cognitive impairment at mild levels are not connected to the disease. and is often more effective than the The evaluation of the symptoms MMSE. These cognitive tests may, at should include all these illnesses be- times, be dependent on a person's fore a conclusion is reached. Before, age, level of education not forget-

> questions concerning the day to day life. Though evidence showing the effectiveness of this questionnaire has not yet been proven, there are many types of questionnaires that have been helpful to doctors and carers, for instance, the Alzheimer's disease caregiver questionnaire.

Laboratory test

A regular blood test is also conducted to help rule out reasonable causes and other diseases that might be treated. The tests conducted include Vitamin B12, Folic acid, complete blood tally, electrolytes levels, calcium, functioning of the renal organs, and the enzymes in the liver.

ciency in vitamins or infections is often disoriented, wildly for older

Imaging

An MRI scan has been said to work wonders in such a situation. Magnetic resonance imaging does not pick up metabolic changes that arise due to the body's reactions, especially for those who do not show any neurological problems. An MRI can imply standard pressure hydrocephalus, which is a reversible cause. This can also lead to other types of dementia that would propose many different types of the disease. Studies have revealed that PET (Positron Emission Tomography) imaging is another efficient method that can be used to diagnose effectively, primarily for Alzheimer's disease. In a survey carried out, 66 participants explained that using a radiotracer gave a more accurate diagnosis than other patients with placid mental impairment. SPECT, is another useful type of imaging that can assess a cognitive dysfunction as they show the capability to diagnose the disease as a clinical test. This aptitude of SPECT to show the variation between the vascular causes of Alzheimer's disease seems to be more accurate and for the clinical differentiation exam (de Jager, et.al, 2003).

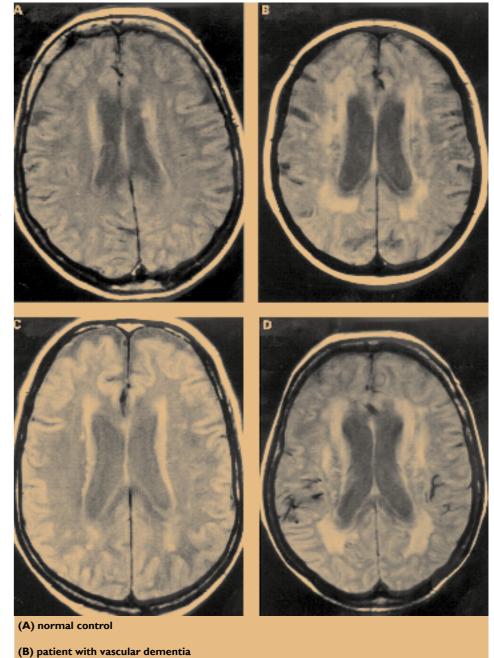


Fig.3.2 MRI comparing the brain of a normal person and people with dementia

(C) patient with pathologically confirmed dementia with Lewy bodies

(D) patient with pathologically confirmed Alzheimer's disease bodies

3.3 Symptoms

The direct conclusion that anyone experiencing memory issues has dementia is quite an extreme one. A study shows that an average human may have one or more signs that may occur and represent themselves as portraying signs of the ailment (C. E., ... & Lyketsos, C. 2017).

Apart from memory loss, the person may as well experience some deficiencies in:

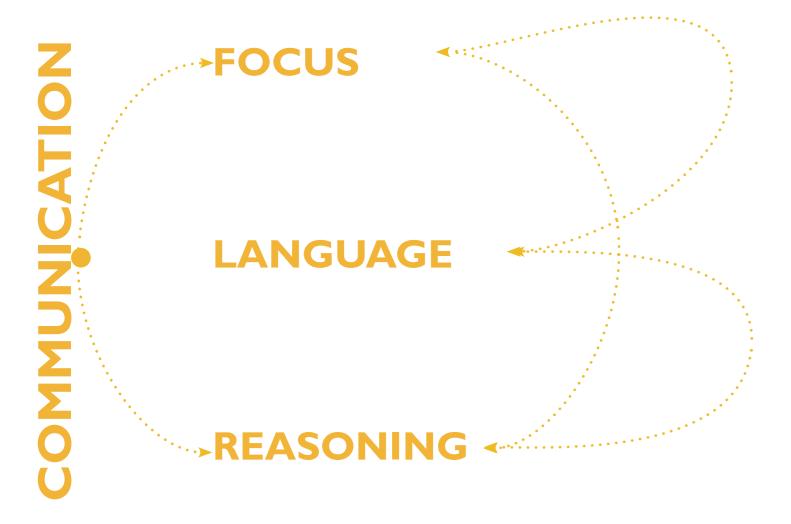


Fig.3.3 Problems dementia patients experience

Restrained short-term memory changes

Having memory issues can be an early sign. These changes are often subtle and are always characterized by short-term memory loss. You can get an older person who can vividly remember what transpired many years ago but cannot recall what they had for lunch.

Other signs of a short-term memory include forgetting where they left an item, failing to remember why they entered a given room or struggling to remember what they are to do on a given day.

Struggling with word choice

Another pertinent symptom is difficulty in expressing ideas. Anyone who has the disease will struggle to explain something or getting the correct words to communicate. The effects associated make communication more impaired, and with this, conversations are longer than usual to complete the exchange.

Boredom

Listlessness and apathy were always witnessed during the early days of dementia. Persons with symptoms may lose interest in leisure pursuit and activities. These people may not be able to go out anymore or carry out the fun and other activities they used to do. Such people may not show interest in having moments with family and friends, and they may appear to be flat, lacking responsivity.

Mood changes

Mood swings are also a common symptom. Those who have the ailment may not realize this by themselves but can see the changes in another person, thus portraying initial symptoms.

Misunderstanding

During the early stages, someone may become confused most of the time. The moment there is a lapse in memory, thinking, or judgment, that may lead to confusion since they cannot recall the appearances, get the exact words or intermingle with people as is expected.

Many reasons can bring about confusion in many scenarios. For instance, they may not be able to recall someone they have met before, misplace their car keys, or forget which day it was yesterday.

Struggling to follow storylines

Inability to follow storylines may be a symptom of the initial stages of the disease. Such people find it hard to get the right words for expression with difficulty remembering the meanings of various words they hear or struggle to follow programs or conversations.

Lack of sense of direction

Spatial orientation and sense of direction mostly begin to depreciate during the initial stages. This means the person may not be able to identify periodic trends or once-familiar landmarks. Such people also struggle to follow detailed instructions or a series of recommendations.

Being repetitive

This ailment can be characterized by repetition as loss of memory and other general behavioural changes. A person suffering from this condition may carry out daily tasks like shaving or take things excessively. Such people can repeat a single line or question throughout the conversation, even after mentioning it.

Difficulty to adjust to changes

Patients who portray the initial symptoms tend to forget what others say or not remember people. Such people can go to the store, only to forget why they went there and always take wrong routes on their way home.

As a result of this, they may long for some things but be afraid to try new involvements. With all these, the inability to adapt to changes is considered a distinct initial stage (Cerejeira, et.al, 2012).

Struggling to carry out regular duties

An indirect change in the ability to carry out regular duties can be a clear sign that the symptoms are increasing. This normally begins with the inability to carry out hard jobs like chequebook balancing and participating in more technical games. Apart from struggling to carry our regular duties, they may also have a hard time trying to follow new schedules or learning new things. (Cerejeira, et.al, 2012).

3.4 Possible remedies

ory abilities and establishes ways caused by it (Feldman, et.al, 2008). The objectives of cognitive rehabilterminology when referencing other non-medical interventions like exercise programs would interfere with the purpose of mental rehabilitation, reducing its concentration on the inherent scarcities brought (Clare, 2017).

On the other hand, a person's choice of semantics is critical as his or her choice of terms may interfere with care and health program design's morals. Rehabilitation is defined with well-established objectives and results that are indeed valued by health experts. Even though the practice differs, rehabilitation care's morals are always decided and always assigned in a strategic fashion.

The seeking of rehabilitative Currently, there is no known cure care dramatically diminishes as they for this condition except for the get into permanent care. Many re- adjustable types. During the early habilitative therapies have already stages of the disease, cholinesterase been periodically used in patients' inhibitors are often used. Mental care since mental rehabilitation is and behavioural interferences may no longer the routine diagnosis. It be useful for the start. According to is now diagnosed as a cognitive im- some evidence, education and care pairment that demeans the mem- to the patients and all the involved parties improve the results to ento recompense the complications hance the daily lifestyle; exercise programs are considered acceptable (Doody, et.al, 2001). The rehaitation are frequently reconsidered bilitation effects can be determined and revised as mental faculties re- by diagnosing anxiety, looking at duce. According to Linda Clare, a mood engagement, and monitoring medical expert, using rehabilitation depression cropping in the patients.

Struggling Restrained short-term memory changes Lack of sense of direction Difficulty to adjust Struggling repetitive

Mental rehabilitations

Mental rehabilitation include s some partial indication for reminiscence therapy, which consists of some positive aspects for quality life, cognitive, proper communication skills, as well as mood, which are the initial three in any particular home caring. Various advantages of mental reframing for concierges, uncertain signs for validation rehabilitation and tentative signs for cognitive exercises like cognitive individual's mental health. stimulation programs for persons

Special care and adult day-care units in nursing homes give specific care to persons living with the disease. Day-care centres provide supervisory care, recreation, food, and partial health care to members while also offering a break to caregivers. Home care is also eligible in providing one-on-one care and support in the home, enabling more personalized care that is required as the condition develops. Psychiatric doctors can have a massive duty in the

with minor symptoms (Iliffe, et.al, The sickness's effects include periodic communication interference due to changes in sympathetic and sensitive language and their capability to plan and resolve problems. Patients can always use agitation behaviours to communicate. Aggressively looking for the actual cause like physical illness, pain, or overstimulation can reduce anxiety. The Antecedent Behavioural Consequence (ABC) analysis of behaviour can also be an excellent, empathetic action tool. This involves checking at the antecedents, conduct, and consequences linked with the particular occurrence to identify the issue in addition to preventing further happenings which might come if the needs of that person are misunderstood. Some health institutions in London discovered that making use of designs, colours, images, and illumination assisted more patients to adapt to hospital environments. Video biographies and life story works have proven to be of great help also. (Waller, & Masterson, 2015). These adaptations to the care provided in these health institutes assisted patients in avoiding perplexity.



Fig.3.4 Symptoms and possible treatments for dementia

Medications

medications. However, medications can also be used in curing the mendoesn't reduce the actual process of the disease. Before prescribing any antipsychotic drug to the elderly, an evaluation must be done cause. For almost half of the people with DLB (Dementia with Lewy first dose. Such cases are associatadverse symptoms can pose a challenge in consideration to the age man, et.al, 2008).

While this alternative still has un- handle prolonged pain has intense, clear evidence, research shows that these medicines' efficacy and safety can relieve behavioural and psychological symptoms. This includes massage, aromatherapy, and omega-3 fatty acids. The fatty acids can be found in fish or plants even though they have been seen to have minimal benefits to people with moderate Alzheimer's disease. Acid supplements help improve other strains, like Alzheimer's disease. (Butler, et.al, 2018).

Pain

The disease has no proven curative People develop health conditions as they age. Most of the health complications associated with old age have tal plus behavioural signs but this a significant burden of pain; therefore, 25%-50% of older adults suffer from prolonged pain. More aged patients have a similar incidence of circumstances that have a likelito determine the behaviour's root hood of causing pain. Pain is always disregarded in slightly older adults. Even when they are diagnosed, it is bodies), there are severe and risky still inadequately treated, particularreactions to the drug, resulting in ly with patients, since they cannot some cases with fatalities after the express themselves and tell people their pain. Prolonged hurting can Diet ed with medication, the recovery bring about a decrease in ambulaand containment of the disease's tion, sleeplessness, moods of depression, and poor feeding habits.

and conditional behaviour (Feld- Although prolonged pain in patients living with the disease is not easy to tell, diagnose, and cure, failure to efficient, emotional, and quality of life implications for the vulnerable society. It is expected that a health physician might, at times, lack the proper time, assess and monitor pain for the patients. Family members and friends come in handy during this time and in assessing their pain.

Exercise

Exercise does not only help in solving other significant diseases or conditions. It can also help with recovery as it helps release the nerves and bones in the body, which brings a relaxing feeling to the brain. The exercise programs for these patients improve their survival chances and improve their battling capabilities with the disease. Even though the best exercise for these people is not yet clear, the advantages are visible.

The need to reduce gluten food on a diet is paramount to the patients. Studies conducted in 2010 showed that the role of nutrition for these people mitigates the risk for this disease. Diet encourages the avoidance of saturated fat and promotion of food with antioxidants, and leniency towards Mediterranean diet should be integrated. All of these diets help reduce the risk and factors contributing to dementia. Vitamin D deficiency has been widely linked with the greater occurrence of dementia. The involved researchers need to take part in assessing the eating ability of these people. This will positively help them develop an appropriate training program to maintain their eating ability and diet. Creating a pleasant environment for these people and a right social environment will help in their diet. This also serves as a reasonable explanation for the carers to improve their care techniques for patients (Lee & Song, 2015).

Palliative care

Palliative care is beneficial for these patients, and caregivers go a long way in helping people with this kind of disorder. The caregivers fully understand what is required of them, especially in dealing with memory loss or physical abilities. It is recommended to offer palliative care before the individual with dementia can reach the final stages since a decline can be comprehensive when the person is allowed to make his decisions. However, undertaking additional research is necessary for helping to determine the recommended palliative care for the patients.

Eating difficulties

The trouble with eating is known to be one of the symptoms. A caregiver is needed to help these people, especially when they need to eat. A secondary solution for a person who has a problem with swallowing is using a gastrostomy feeding tube. Extra care here is required to prevent the risk of death of aspiration pneumonia. The dangers of using tube feeding are serious, and the person might reject and, worse still, try to pull the tubes out. This procedure had directly contributed to one percent of deaths and a 3 percent complication rate for the people using it. However, the percentage of people using these tubes in the United States has dropped from 12 percent to 6 percent between 2000-2014. (Sanders, et al., 2014)



Conclusion

well-being.

If all care, nutritional facts, exercises, cohesive brain stimulation are put in place, these people can live an extended autonomous life. Even though it is hard to note the symptoms when they are in their first stages, detecting this disease while it is still at its early stages will be an essential element in driving the disease's treatment and diagnosis.

The disease has been on the rise. This section has outlined some over the years, and the govern- existing approaches towards the ment is doing all it can to ensure disease that are being applied in a straightforward treatment for it diverse medical settings. The purand prevention. Patients need love pose of outlining the contemporary and care, particularly as symptoms medical approaches is to show how develop towards confusion or up- architectural solutions can build set in those suffering. Taking care of upon these current methods and them is essential, especially when specific problems associated with it comes to their recovery and the disease to complement the autonomy of people afflicted with the condition.



Fig.3.6 Giving love to dementia patients

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Fig.3.6 Kotwas, M [2021]



4.

AUTONOMY

A CARE CRITIQUE ON AUTONOMY
CONSOLIDATING DEPENDENCE AND
SELF-RULE IN DEMENTIA CARE
DATA USAGE AND SMART
TECHNOLOGY ASSISTANCE

4. Autonomy

Home-based care is challenging, significantly where ethical questions are raised. How will the medics balance patient's autonomy with their safety and well-being? Independence is an essential incentive in clinical approaches. The regard given to an individual's privileges, decisions, and inclinations is vital. The disease raises troublesome morability to perform actions autonomously is frequently changing. From an ethical viewpoint, it's critical to attaining some synchronization between a patient's independence, their current circumstance and the medical approach. The accessibility of therapeutic arrangements is an essential element in the betterment of an individual's autonomy. Consideration of the variety of individual wishes, social qualities, and social foundations involves an ongoing exchange between patients and their formal and casual caregivers.

The medics should be given fundamental guidelines regarding the patient's ability to make their own choices. Having this chance to make their own decisions, the patients will have pertinent data about their well-being and treatment choice. A patient cannot be compelled to treatment unless they give full consent, which is another factor relying on autonomous decision making and is required continuously as treatments are changed, moderated or updated.

Intimidation from others can also restrict an individual's capacity to settle on a self-ruling decision. In any case, there are various influences on making a self-governing choice and being in charge of ones' activities.

One thought is that an individual's activities should be inspired by sensible contentions dependent on pertinent realities, so the ability to settle on a self-ruling choice is grounded in the capacity to comprehend significant facts and intentions, rather than volatile and unstable opinions or feelings.

al issues because the individual's ability to perform actions autonomously is frequently changing. From an ethical viewpoint, it's critical to attaining some synchronization between a patient's independence, their current circumstance and the medical approach. The accessibility of therapeutic arrangements is an essential element in the betterment of an individual's autonomy. Consid-

The symptoms associated with the disease prompt challenges in recollecting, figuring out issues, reasoning, and understanding a circumstance since intellectual capabilities tend to reduce. Fitness might be protected, notwithstanding reliance on the level of sickness and clinical images, and can fluctuate from circumstance to circumstance. Research has shown that to improve the hysterical individual's capacity to settle on a self-governing choice, ual's capabilities, and offer the individual a chance to partake in daily life choices. This will help in understanding how to gain a comfortable relationship with a mentally unstable patient.



Fig.4.1 Keeping individual's autonomy

4. I A care critique on autonomy

judge the consideration viewpoint carers. as though it would be a bad situathe strain that exists between paapproaches. For example, convenwas viewed as exclusively as women's' training' have subverted the inladies hold back their aspirations and classify themselves with the objectives of others to disregard their care in terms of caring work is especially communally undervalued in society, which deteriorates ladies' als have been scrutinized for not autonomy. sufficiently defending the autonomy of caregivers. To comprehend this, Stemming from a supposition that an evaluation of self-governance is appropriate. A qualification should be made between an ideal of selfrule as far as self-sufficiency and independence from one perspective, reliance on communities for living and self-rule as far as the ethical ability to settle on one's own decisions in life. This idea of self-dependence is widely discussed via care ethicists. Self-sufficiency ideal lies in the notion that we do not a person's moral capability to make need constant assistance or backing from anybody to gather our necessities and do our daily activities.

This potential for decreased autonomy of the carers for dementia sufferers is also an important consideration when factoring in smart architecture techniques. If architectural solutions can alleviate some of the stress and demands placed on carers, not only will the autonomy of those with dementia be poten-

tion to gaining more independence. Care ethicists vary from these dif-Today, it is absolutely obvious about ferent reactions in that care morals focus on the impacts that one's levtient independence and caregiving el of a freedom impacts a persons' moral status. Susan Wendell subsetional care acts under which care quently argues for the ideal of support (Wendell, 1996). She expresses that we should scrutinize our social dividual self-rule of these ladies. For fixation on autonomy and supplant quite a while, it bas been known that it with a model of correspondence. If there is hope for integration for people who have disabilities and hindrances such as those caused by own. Relating this with the fact that dementia, we must also change our normative views on what it means to rely on others. Rather than being seen as an affliction, relying on circumstances. For these reasons, others can be a pathway to greater Joan Tronto contends that mor- fulfilment and paradoxically; higher

> human beings are interdependent, care ethics means offering our undivided concentration to other ethical issues and inquiries. Given our and achieving our bio-social needs, inter-dependence is certainly hardwired into us. Criticizing autonomy in regards to self-sufficiency also leaves a gap for viewing it as personal decisions as sustained by other people. In particular, care ethics offers room for a conception of autonomy that is not defined in opposition to reliance and correlation. For instance, Diana Meyer suggests that people ought to think about independence as proficiency, defined as a repertoire of synchronized skills that allows a person to undertake a precise duty (Meyers, 1987). These abilities are applied in undertaking a routine that permits a person to

Some people tend to mis- tially alleviated, but also, that of the monitor their conduct and evaluate whether it is according to a person's real identity. An independent agent asks the following questions 'It is possible to take responsibility for a particular action while still managing to retain my respect?' or ' Is it possible to be the type of individual who is okay with doing such?' The real identity of a person which one consults during this process is not to be comprehended as an authentic identity in ontological requisites, or as an individual that can be revealed by uncovering the placed layers of socialization. Instead, a person's real identity is dynamic. It is a developing collocation of qualities that surfaces via the usage of sovereign proficiency (Meyers, 1987, p. 76). The real identity of oneself is an 'encumbered self,' which is ever entrenched in relations joined with flesh, blood, and others and is partially made up by these associations. When a relational concept of moral agency is developed, care ethicists emphasize the need of creating relations to view an individual as self-sufficient.

> The purpose of this detailed and somewhat philosophical critique of autonomy is to show how our understanding of autonomy is restricted to individuality. This is also more the case in individuated, western societies, where thriving is increasingly labelled as a personal, or individual journey. To unearth these underlying assumptions in our thinking patterns is essential for changing what it means to be autonomous and subsequently, essential to changing our approaches to dealing with issues such as dementia. By treating inter-dependence as one-tenth of autonomy, opens up the possibility for architectural solutions that in

clude some level of inter-dependence as part of an autonomy endorsing approach.

Up until this point, autonomy has been criticized as focusing too heavily on self-ruling and self-governance rather than inter-dependence. This logic doubts the possibility of self-reliance as an autonomous process and focuses on underscoring this ideal of independence. Different qualities, such as trust, mindfulness, and obligation, are ignored in such ethical talk. Furthermore, self-governance as an ethical competency should not be seen in isolation of just one individual's capabilities, but rather, as an individual's autonomous potential through dependence on others. It emphasizes that autonomy can be developed with concern for and dependence on other people.

Possible solutions for dementia

Self-rule is generally connected to independence. In any case, patients, although they hope to be self-sufficient and live at home, turn out to be progressively reliant on others. In what manner can self-rule at that point be perceived and advanced? The morals of care offer a comprehensive methodology that can give new bits of knowledge and advance complete comprehension of this research's moral predicaments. In clinical care, paternalism is one of the most relevant issues, and an appropriate inquiry is whether it's advantageous or impeding in independence interrelated quandaries.

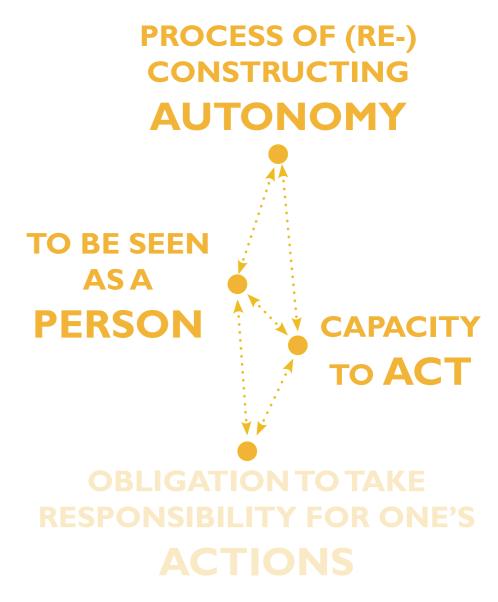


Fig.4.2 Different components of autonomy

Consolidating dependence and self-rule in dementia care

vital temperances.

requirements. This requires mind-

In some circumstances of home rule of non-perniciousness is a negcaring, as indicated by Agich, a re- ative obligation to cease from acting liance on others does not entail a or incurring hurt. These two standreduction in independence. Though points can simply be understood as some aspects of the individual's life promoting an individual's advantagwill remain personal and internally, es and preferences and secondly, subjectively understood, some fac- as helping to avoid the infliction of tors can be understood by the

Research has shown that carer that assists in the personal patients who wished to stay in their happiness and daily contentment. own homes seemed to acknowl- Ethical hurdles and decision-makedge dependence on family car- ing procedures should certainly inegivers and expert guardians who volve a thorough consideration of made this possible. Most of the the setting and circumstance, and cases showed that it was critical to this can be managed without necinvestigate moral quandaries inside essarily requiring extensive input ethics of care, stressing the signif- from the person suffering from the icance of connections and corre- condition. For example, one might spondence, the specific setting, the decide to change the material of uniqueness of people, and human the bedsheets on the person in care comprehension. Essentials for join- because they see that bedsores are ing reliance and independence with arising. This may be done without patient care were that family car- reference to the individual afflicted egivers and expert parental figures but may still give them more aushow emotions. Inside the ethics of tonomy by improving their physical care, affectability and sympathy are health and reducing their hindering afflictions.

However, this does not diminish Not all patients with the ailment morals only to a passionate reac- are entirely mindful of the dangers tion, as mindfulness has a profound that accompany at-home living. impact, and requires mediation of They need to rely on other peothe emotional responses towards ple who can distinguish hazards alleviating others suffering without and prevent pain. In any case, facing having to suffer from the person; challenges is an innate part of reghence, compassion, rather than ular daily existence, and existence mere empathy. A firm understand- with no dangers is impossible. In ing of the situation is needed for dementia care, family caregivers and carers to react properly to others' expert guardians can think of it as essential to limit hazards. This can fulness, duty, capability, and respon- prompt limiting opportunity and siveness, and it follows that the previous advantages, adverse to a individuals who care are dynamic, feeling of self-governance. The rule dedicated, and included. Caring is a of value is a vital commitment to dynamic and progressing measure medical care. It is a positive obligarequiring more than settling on the tion to represent others' advantage correct choice at a specific second. and advance prosperity and not merely keep away from harm. The harm upon that individual.

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DATA AND DEMENTIA

TARGET GROUP

CIRCADIAN RHYTHM AND STABILISA-TION OF SLEEPING PATTERN

SLEEP AND DEMENTIA PATHOLOGY

DISTURBED SLEEP AND THE RISK OF DEMENTIA

SLEEP PATTERNS AND AB

AMYLOID PLAQUES

IMPACTS OF AD ON SLEEP

PROBABLE CLINICAL APPLICATIONS

TRANSLATION TO ARCHITECTURE LEARNING - BRAIN STIMULATION (CASE STUDIES)

LEARNING ACTIVITIES

NATURAL REHABILITATION STEPS

MUSIC

5.

IN EARLY
STAGE OF
DEMENTIA

5. I Data and dementia

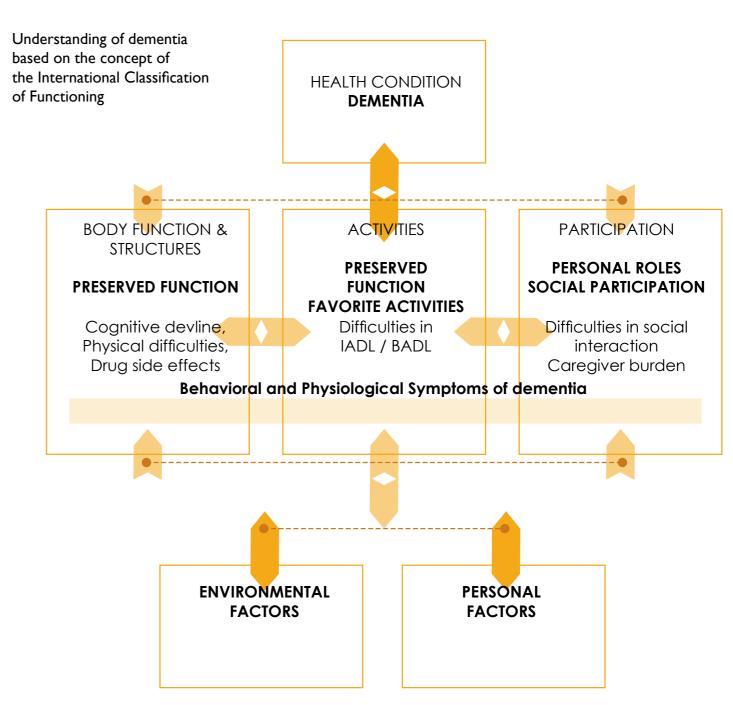
aim of cognitive therapy for people with dementia is normally to help them cope with day-to-day problems rather than to train or develop cognitive ability. The purpose of cognitive recovery should be applicable in everyday life while also being attainable in this approach. As each individual's remaining functional capabilities to enhance the quality of life, independent of their cognioverview of the integrative outlook covery as a general comment: An inthat empowers people with demenbegun. Intervention strategies are given by stage and recovery needs vary depending on the stage of designs of dementia (BPSD) raise challenges as well as recovery options at crucial aspects of the recovery process: Psychological assistance, family collaboration, and therapists are all needed.

Unlike standard restorative Dementia is a neurodegenerative treatments, which seek to reduce neurological disorder characterized harms or resolve the elementary by significant cognitive dysfunction pathophysiological or neurological from former stages of ability, obfoundations, rehabilitation's primary structing daily tasks and freedom. purpose is to help each participant. The majority of people with deaccomplish his or her ideal level of mentia have multiple BPSD and performance. This is a well-known geriatric syndromes, which lead dementia recovery method. The to daily difficulties that get more difficult as the illness progresses. Physical issues and a lack of physical control are two examples of these causes that work together to aggravate each symptom. By breaking the vicious circle of dementia by proper treatment and adaptation of the right coping mechanisms, every a result, therapy seeks to increase person with dementia can increase their quality of life. Since multidisciplinary interventions will support each other and reap gains, a holistic tive status (QOL). Here's a short interdisciplinary-team strategy to rehabilitation is critical. Health phyand the fundamental principle of re-sicians, caregiver, and apothecary oversee pharmacological therapy terdisciplinary approach to healing and general medical services, which is correlated alongside non-phartia to live their best lives; The Inter- macological perspectives, which national Classification of Operating, are also executed through rehabil-Incapacity, and Health (ICFDAH) is itation practitioners. Medical social a concept that was created by the workers are in charge of linking de-International Classification of Func- mentia sufferers and their families tioning, Disability, and Health (ICF- to access resources in the city. Car-DAH). The recovery criteria are egivers who help dementia sufferthen established, which entails joint ers with daily tasks are also called decision-making and a thorough as- family members. Since dementia sessment: The healing process has caregiving is exhausting, treatment for family carers is a key priority of rehabilitation.

To begin, the individual with demenmentia: Behavioural and psychiatric tia, his or her household, and the psychiatrist must work together to decide the most appropriate treatdifferent stages of dementia. Finally, ment goals for each client. Targets we'll go through some of the most should be attainable and suitable for daily life. Persons with dementia should take the opportunity to lay down targets centered on their needs, irrespective of their level of

dementia, and what is significant in life should be determined by each individual with dementia himself. The therapist's cognitive skills are used to identify the needs of the individual with dementia, even though they are in an advanced state. The aim of a therapy evaluation is not to make recognition, but to determine the optimal extent of the task that each client can attain and the causes of the challenges that he or she is experiencing to find solutions to those problems and increase one's well-being. A systematic appraisal should be formed from the ICF theory, regardless of cognitive status, and the assessment of extra capacities is more crucial than the evaluation of lessened capacities. In comparison to one that describes shortages with the intentions of treating pathological deficiencies, such as cognitive disability, one that considers deficits to heal pathological deficits, such as cognitive impairment. In evaluations, both standardized and custom-made materials are used. The Comprehensive Geriatric Assessment Battery (CGA) is a systematic analysis used for older adults to provide a holistic perspective of people with dementia, including their social environment, and it is a shared vocabulary for the interdisciplinary team to share knowledge about people with dementia. Even though multiple CGA batteries have been built. dementia still exists. The CGA battery consists of the following tests: I dementia diagnosis; (ii) cognitive function; (iii) BPSD; (iv) physical complications; (v) basic/instrumental activities of daily living (BADL/ IADL); (vi) motivation, mood, and depressive tendencies; (vii) quality of life; (viii) social environment; and (ix) caregiver pressure.

ICF



The International Classification of Functioning, Disability and Health (ICF) is a classification of health and health-related domains proposed by the World Health Organization (WHO) in 2001 as a comprehensive framework of rehabilitation. ICF is based on the concept of evaluating every person with disease and/or disability from the perspective of the whole person. focusing on healthy aspects and strengths rather than disabilities.

Fig.5.1 ICF model

Assessment

their aspirations and regain their with family carers will not help peoin the long run. Since dementia is of independence and family caregiver support is needed for day-to-day activities, recovery will benefit all parties involved.

Tailor-made intervention

Since each person with dementia has varying expectations, well-being recovery will provide customized therapies. Interventions should be strategically designed to take advantage of spared remaining abilities, the psychological mechanism, and coping style in a stable environment, which should include all family assistance. The strengths and shortcomings of people with dementia are assessed in dementia rehab to come up with the right ways to make daily living more manageable. Changing habits and/or introducing new ones, as well as modifying tools, are examples of this. Rehabilitation may be able to make a significant difference in the living environment, and involvement in daily tasks may prodementia patient.

Psychological support

The main criterion is if people with Successful therapy and the prevendementia, with the assistance of tion of undesirable effects necestheir family and caregivers, achieve sitate psychological intervention. burden the same. Rehabilitation for people with deself-confidence. The divergence mentia can be traumatic when ther- Therapists' expectations from baseline is measured using the apies force them to confront their same battery that was used for the issues, and change can be slow. Due baseline calculation. And if people to sloppy communication, interferwith dementia achieve their aims, ence can trigger BPSD symptoms. rehabilitation that leads to conflicts It's important to remember that non-pharmacological methods are ple with dementia or their relatives not without risk. Therapists should pay close attention to the emotionlinked to a slowly progressing lack all health of people with dementia and their family to avoid adverse consequences, and be able to change their methods if necessary. Interventions should not be carried out with strict adherence to predetermined timetables.

Working along with families

Involvement of the family is beneficial in daily life. Via cooperation, families learn fixed insight about the abilities and weaknesses of people with dementia, as well as the expertise and skills needed to manage symptoms, provide enough stimulation for persons with dementia, and communicate effectively. Family participation is also essential to the family as a whole. It's important to note that family members will be both recipients and providers of assistance when it comes to dementia caregiving. As a result of their jobs, caregivers are more likely to experience stress and anxiety. Respite treatment is beneficial to both vide a sense of self-efficacy to the people with dementia and their caregivers, and training interventions for caregivers can be beneficial to both people with dementia and their caregivers. According to previous studies, improving carers'

coping strategies in dealing with behavioural problems in people with dementia reduces the psychological stress while keeping the physical

The first challenge for clinicians is

to estimate productive stages and

determine saved skills that people with dementia and their households are uncertain of in order to reclaim the assurance needed to battle dementia. It is difficult to resist telling individuals with dementia of the results of an impartial judgment, particularly the dismissive aspects; as a result, mental help is much more important for retaining motivation. Therapists must still be able to easily communicate. Dementia finds it impossible for people to learn about and express their own words and emotions. Therapists must separate their hazy thoughts from their point of view to allow dementia sufferers to make their own choices. Miscommunication with others can play a significant role in the onset of BPSD. It is first and foremost a matter of the dementia sufferers themselves to live properly with dementia. While most dementia-causing disorders are still incurable, individuals with dementia and their households can develop trust in handling their everyday lives if they catch on the value of recognizing their current purpose, improving their attitude to select what they will do right now, and make attempts to upgrade the QOL of the pair of individuals with dementia and their family members. Dementia takes away people's individuality and connections with others, but it's vital to remember that they are really the same people they were before the

diagnosis. Dementia healing aims to help people with dementia and their families maintain their identity through the condition.

In terms of self-efficacy, an error-free intervention is critical for individuals with dementia who are continually confronted with declining skills, and this knowledge decreases their personal-courage. Therapists should select intrusion options wisely based on this appraisal and build an attempt to avoid mistakes that can lead to dementia sufferers losing confidence. As a result, unnecessarily burdening people with dementia is not recommended in order to minimize the chance of making errors. Since learning the mental condition of individuals

through trial and error necessitates the use of memories, it is not used as a retrieval technique for people with dementia who have memory problems. Maintaining a healthy climate is also critical. Cognitive practice, such as reality orientation preparation, was mostly done in a controlled environment until the mid-1980s. Frustration, fear, depression, and a loss of self-esteem were described as negative consequences, prompting the American Association for Geriatric Psychiatry to make a cautionary statement about the potentially harmful effects of strict instruction. During counselling, therapists should be mindful of

with dementia and their households. as well as inspiration, emotion, and mood therapies.

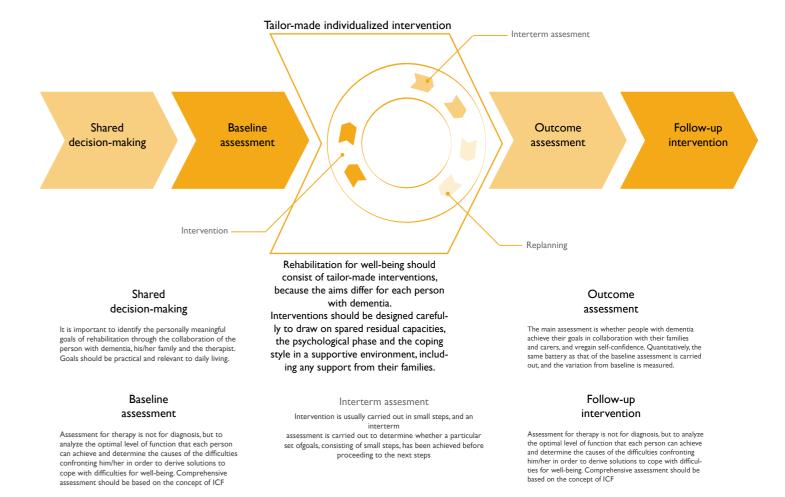


Fig.5.2 Dementia rehabilitation

5.2 Target group

why the early stage dementia suf- healthcare system that is strained, ferers will be the focus of the re- allowing many people to reach later search question. As outlined so far, stage dementia without prevention there are a variety of affectations methods will lead to an overload that occur with different stages and excessive burden on those in of dementia and the focus of the healthcare positions, also on those smart architectural solutions will be to solve or reduce the impact of Therefore, it is integral to forestall those affectations for people with early-stage dementia.

As noted, later stages can imply symptoms of much deeper-rooted de-personalisation, a total inability to complete basic survival tasks like making food and sustaining energy levels and also, in an inability to omy in their life while having the stages. Moreover, those who are disease. They can often recollect things that are personal to their life such as who their friends and family are and they will still have a fairly high functional ability to look after themselves, thus somewhat more autonomy. Because they are still more responsive, treatment implementations are likely to be more effective.

When dementia reaches later stages, sadly, the effects cannot yet be undone with modern medicine. The only thing that can be done is to make the life of the carers, and those suffering from later stage dementia, slightly more comfortable and less stressful. Because we do not have a cure for dementia, but only ideas for methods of prevention, it makes more sense to target the early-stage group in this research question because this can save the biggest stress in future.

It is important to mention With an ageing population and a suffering from the disease.

the development of severe symptoms in early-stage dementia and slow the rate of progression of the disease. If the rate of progression can be slowed, with the additional help of architectural solutions proposed in this research, then the burden on caregivers and those with late-stage (and harder to treat) lead an autonomous lifestyle. These dementia will be greatly diminished. stages are far more difficult to treat. The difference with the early stages The difference with the early stage is that more can be done to slow dementia affectations is that peo- the rate of progression compared ple can still act with some auton- to reducing the symptoms in later

suffering from early stage are still more responsive, are better able to look after themselves and respond to caregiving advice and are likely to benefit more from treatment than those in later stages.

The solutions offered by the implementation of smart architecture will look at eight key factors: Human interaction, light, sound, diet, exercise, brain stimulation, refuge and nature. These factors will not be considered exclusively, but inclusively; meaning they will have overlapping themes and interlinked effects that can be mutually beneficial. My standpoint is that an inter-disciplinary approach is essential to helping those suffering from the early stages because it is also evident that there is a multitude of causes for developing dementia and therefore, we should look at a multitude of solutions if there is any hope of tackling the negative impacts of this disease.



Fig.5.3 Early stage dementia patients capabilities

Circadian Rhythm and stabilization of sleeping pattern

Other factors such as sleeping patterns have been noted to play a huge role in increasing the risk of dementia. Amassing the brain's amyloid- β (A β) peptide appears to instigate a flow of critical occurrences in the pathogenesis and rise in the disease. Moreover, research is proving that the sleep-wake cycle has a direct impact on the levels of $A\beta$ in the cerebrum. In exploratory moulds, sleep deficiency amplifies the grouping of dissolvable $A\beta$ and this leads to a constant collection of $A\beta$, while sleep augmentation offers a contrary impact. When $A\beta$ gathered, it increased attentiveness and adjusted sleep patterns. People with an early deposition of $A\beta$ have regular mental capacity reports and sleep variations from the norm. In this way, sleep and neurodegenerative disease may impact each other from numerous points of view that have significant ramifications for diagnosing and treating the ailment (Samman, et al, 2011).

Sleep disturbances and circadian issues regularly damage the quality of life and an individual's lack of sleep, agitated behaviour, and over-sleeping during the day affect between 25% and 40% (Sloane, et.al, 2007). The force of these progressions respectively corresponds with the seriousness of this disease. Rhythms decline in frequency and indicate a stage delay, especially in individuals with highly developed phases of this illness. Sleep issues happen almost immediately throughout the cycle of dementia, in line with the discovery that brain areas associated with sleep and circadian management are impacted early on in the condition's pathogenesis. Patients suffering from mild amnestic mental impairment, a considerable



Fig.5.4 Circadian rhythm issues affecting sleep

lot of which show early symptoms, portray EEG anomalies during sleep or rest, together with fewer sleep axles and minimal levels of slowed wave in sleep.

Dementia's pathology arises preceding any symptoms, with the first identifiable alterations occurring ~10-15 years before any mental symptoms. In the early stages of the preclinical strain, dissolvable amytend to amass into amyloid plaques, showing a decrease in solvent A β 42 levels in the cerebrospinal liquid (CSF). The variations are essential when change occurs for age, gender, and the availability of the APOE $\beta4$ allele (a significant threat aspect for late-beginning, inconsistent dementia) (Bryant, 2004)

Changes in how an individual sleeps appear before the beginning of cognitive side effects in patients with the disease. The quality of sleep or potentially circadian working reduces further in parallel with mental dysfunction and disease pathology progression. The evidence that there is an association between light and dementia is quite immense. It is also to check based on this information,

and we recommend a bidirectional connection between the illness and the quality of sleep and a premise for the causal mechanism for this relationship (Nir, et al, 2011).

Light is relevant to sleep for its impact on circadian rhythms and thus, sleep cycles. Sleep cycle abnormalities have been consistently linked to an increased likelihood of getting dementia. Targeting light input in architectural technologies will be loid- β (A β) gets indecipherable and a key factor for architectural solutions that prevent the progression of early stage dementia.

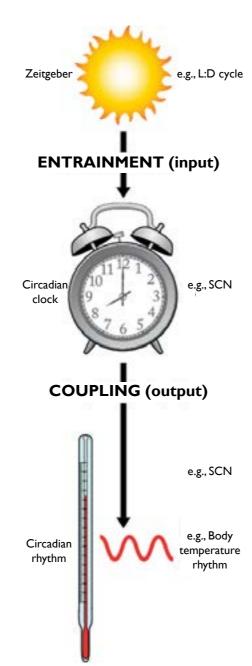
Sleep and dementia pathology

within the brain is one of the primary vital possessive discoveries in the disease's severeness to the seriousness of sleep issues. Older people, particularly if they have other diseases, might not have normal continues to grow. active work or feeding periods and, nomenon that acts as a cue in the regulation of the body's circadian rhythms) to entrain their circadian ability or light availability for patients in institutional care may bring reducing circadian adequacy. Prefor example, stress, hypertension, or with dementia and may additionally , 2013). In short, lack of light (particularly natural light, as we will see later in this essay) hurts sleep regulating, thus having a negative impact

Mouse models studied of the disease affirm the relationship linking upset sleep and pathology and demonstrate a potential underlying impact of $A\beta$ amassing in the outconnection. One transgenic mouse come of sleepwalking (Luik Al, et model creates A β testimony in the al,2013). person's brain, improved attentiveness, as well reduced sleep. This began when amyloid plaques started to aggregate in the hippocampus and cortex (a half-year-old enough). Altogether upset sleep designs are

Even though $A\beta$ integrating apparent when that plaque increases in size. The APP/PSI model of dementia exhibits a circadian mood this kind of disease and may fill in as impediment. However, the PLBI the provocateur of disturbed sleep, triple thump in the model indicate different factors presumably affect decreased sleep length, eased back EEG follows while awake, more limited sleep sessions and decreased circadian abundance as the person

in this way, need solid zeitgebers (a APP/PSI model studies exhibit dirhythmically occurring natural phe- urnal variety in the degree of solvent $A\beta$ in the interstitial liquid, which increases during their wake periods and reduces during sleeprhythms. Insufficient sunshine avail- ing time. This diurnal variety ends with the transformation of amyloid plaques, which happens at a half about an inadequate contribution year in the hippocampus, but not to the suprachiasmatic core using until nine months in the rest of the the retinohypothalamic lot, further brain. Significantly, dynamic vaccination with AB before amyloid is taken scriptions for frequent problems, into the brain, the development of these plaques, kept up diurnal vaheart sickness, can likewise disturb riety in the degree of dissolvable sleep-wake capacities. Obstructive $A\beta$, and standardized sleep-wake sleep apnea is again basic in patients designs in this model. The perception unequivocally proposes that weaken sleep quality (Luik AI, et al $\,$ a type of A β that gathers prompts the sleep-wake interruptions in this model, and potentially those seen in preclinical dementia. Further exploration is needed to produce and on symptoms of dementia and the separate these and different elepotential development of dementia. ments to sleep issues in dementia. Nonetheless, information obtained from preclinical diagnosis in people, as well as the models of the mice, uphold an immediate pessimistic



Simplified scheme of the circadian system.

Linear model which includes an endogenous oscillator (e.g., the hypothalamic suprachiasmatic nuclei), the environmental entrainment agent (zeitgeber), and the output that governs overt biological rhythms. This 3-box, 2-arrow scheme helps to exemplify the three main questions of chronobiology I) The endogenous oscillator: where and how is the endogenous clock organized, and what is the cellular/ molecular basis of circadian function? 2) Entrainment: how is the clock entrained to achieve an ecological adaptive role? 3) Output: how does the endogenous clock couple

Fig.5.5 Simplified scheme of the circadian system.

and control temporal synchrony?

5.3.2 Disturbed sleep and dementia risk

In numerous researches, with generously longer, subsequent than normal have been related to delayed start of sleep, developed attentiveness after the beginning of anomalies. sleep, and more snoozing during the day, have related to disabled mental capacity (Ancoli, et al, 1997). A estimated by actigraphy, exhibited that more sleep fracture meant a higher risk of contracting the disease. Factors that disturb sleep may bring about cognitive debilitation from research conducted on people with sleep disarranged relaxing. A forthcoming study of 298 patients without signs and symptoms that may be related to the disease revealed that 105 people with sleep confused breathing had a changed chances proportion of 1.85 of contracting mild cognitive behaviour or loss of memory impairment. This increased risk was related to successive oxygen depletion in the body (more than fifteen times every

Recent research proves that sleep disturbances heighten the risk of getting the disease (Shi, et.al, 2018). However, significant thought is that for upset designs of sleep in adjustanalysis typically happens a very long time after the beginning of neurotic changes of this illness in the cerebrum. Most of the studies have examined have been directed between I to 6 years, and this is significantly more limited compared to the 10 to 15 years bracket. Preclinical loss of memory is available preceding the beginning of an indicative illness. These research studies ought to almost certainly be considered to speak to cross-sectional preliminaries. Until human research

lengths of sleep that are greater occasions have been done, creature models of dementia will probably a greater risk of mental weakness. furnish the best accessible informa-Extra indicators of low-quality rest, tion to recognize the directionality for example, low sleep proficiency, and entire systems of the connection among this illness and sleep

In mice and human beings, the levels of solvent AB vacillate in line with the cycle of sleep-wake in a diurnal massive forthcoming sleep study, example. Such a perception recommends an expected component under which the issues of sleep might expand the threat of increased illnesses. The intense impact of sleep deficiency is an increment in Aβ focuses; besides, constant lack of sleep quickens $A\beta$ statement into non-soluble amyloid plagues in two distinctive transgenic mouse models of amyloidosis (which provide insights into the energy metabolism with regards to brain morphology or function). Conversely, upgraded sleep via therapy with an orexin receptor enemy diminished A\beta plaque testimony in the above models (Luik Al, et al 2013)

People and rats have amazingly comparative $A\beta$ elements, that differ in situations where amyloid plaques are available in the cerebrum. Vital information from the mouse's model uphold a contributory part ments of solvent $A\beta$ elements and, therefore, in amyloid aggregation. Studies in people also uphold the speculation that disturbed sleep is a threat for the occurrence and progression of dementia. Nonetheless, more longitudinal studies would be helpful to confirm a concrete relationship between the mouse model information demonstrating that upset and an understanding of the disease at a pathophysiological level (Luik Al, et al, 2013).

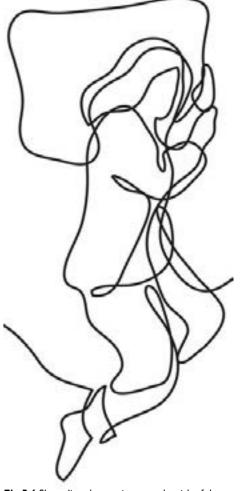


Fig.5.6 Sleep disturbances increase the risk of demen-

5.3.3 Sleep patterns and $A\beta$

state at the neuronal level. Fluorode-grees of $A\beta$ during rest. oxyglucose Pet research is used to determine and aid in diagnosing the When an individual has a poor disease within people during their conscious state, as well as non-REM and REM sleep which demonstrat- and support SWS, at that point, the ed that the rate of cerebral metabolic functioning, as estimated by glucose use, is comparative in REM There is a probable increment comsleep and attentiveness. However, it decreases by 43.8% regularly during ty period of sleep. This increment Sturge-Weber syndrome (SWS), in neuronal terminating during and this is the most profound phase low-quality of sleep will bring about of this type of sleep. The physio- more noteworthy arrival of $A\beta$, and logical contrasts in this boundary higher levels of $A\beta$ in the interstitial among SWS and wakeful states are liquid, contrasted during a decent at some level, appearances in neuronal movement changes. For instance, the neurons in the cortex increment in the grouping of disfire sporadically in the awake as solvable $A\beta$ free of the pressure well as the REM conditions, bring- reaction pathway, as shown by iming about reduced-abundancy and increased-recurrence EEG waves. tures. Cortical neurons waver between quiet times of hyperpolarization and terminating during depolarization at the SWS phase. This swaying shows as high abundancy on EEG, reduced-recurrence waves.

Neuronal terminating, or synaptic action, discharges $A\beta$ into the interstitial liquid of the brain, and territorial increase in the actions of the neurons are related to the provincial increase in the centralization of $A\beta$ in the interstitial fluid. During SWS, neurons invest the majority of their energy in the hyperpolarized condition and, in this manner, are anticipated to attain fewer by and less sizeable movement of the neurons to deliver minimal Aβ as compared to the ones that do during different phases of being asleep or waking alertness. Diurnal varieties in AB fixation saw in interstitial liq-

The non-rapid eye move- mice and CSF in humans, described ment sleep phase is a generally calm in the two cases by diminished de-

> sleep quality, he or she is conscious, delicately dozing or cannot attain measure of sleeping time frame is depolarized by the cortical neurons. pared with that of a decent qualisleep period. Undoubtedly, intense lack of sleep in mice prompted an peding corticotropin-delivering fea-

Experiments specifically concerning explicit phases of sleep are forthcoming; however, based on the above information, we can make an informed estimation that SWS has the most grounded relationship with decreases in AB discharge from neural connections and fixation in the interstitial liquid. The abundance of diurnal variety is a fluctuation or change in $A\beta$, or the amyloid plaques focus was more in adults—30% top to-peak 19—is very high, and recommends that the patterns of sleep extensively influence the levels of solvent, extracellular Aβ. For example, in conditions of ongoing sleep interruption, disruptive sleep apnoea, or behaviour (Burns, et.al, 2009).

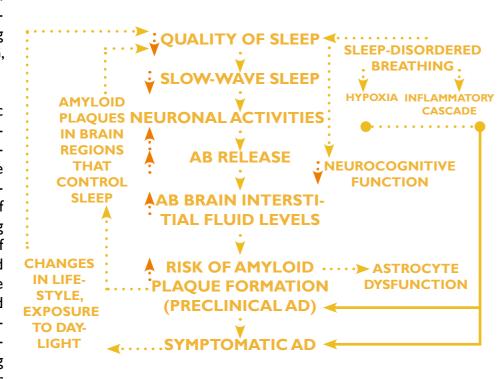


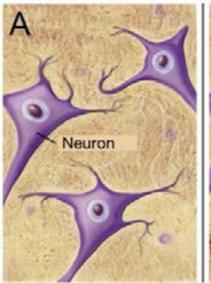
Fig.5.7 Different components of amyloid plaque formation

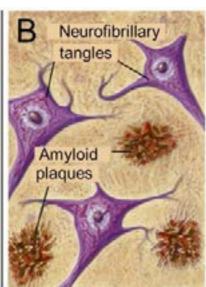
5.3.4 Amyloid Plaques

Hereditary, physiological, or ecological aspects rush the movement from preclinical to indicative phases of the disease and this enhances this illness's strain. Quality sleep works as a therapeutic capacity in the cerebrum and also plays a fundamental part in cognitive capabilities. Constant lack of sleep has been related to amassing neurocognitive shortages in memory while working. Another research study indicated that divided sleep-wake designs, as estimated by actigraphy, were related to reduced mental capacity, even when controlling variables such as age, gender, and physical activity (Burns, et.al, 2009).

Chronically disturbed sleep has the same effect in bringing about reduced psychological capacity. Moreover, a person with dementia pathology is likely to be suggested to a clinician on the off chance that they are also affected by debilitated sleep or rest. Further, hypoxia identified with scattered sleep breathing, and provocative resistant fall identified with sleep issues may either contribute straightforwardly to the obsessive cycle of this disease and implicate the movement from preclinical to suggestive dementia.

NORMAL ALZHEIMER'S DISEASE HEALTHY BRAIN SEVERE ALZHEIMER'S





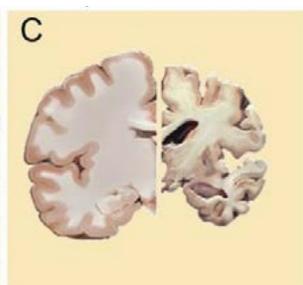


Fig.5.8 Amyloid plaques in AD

Impacts of AD on sleep

circadian rhythms are disturbed by the shaping of the amyloid plaques in both mice and humans. The amyloid plaque development upsets sleep by impacting the regions of the brain that assist in sleep regulation. Even though a maturing lifestyle tends to encourage more regcircadian rhythms become more et.al, 2008).

Moreover, when the symptoms advance to the indicative stage, extra factors add to progressively lower the quality of rest and sleep. Worries for an individual's wellbeing may incite their consideration in an organization related to helpless light intensivity and diminished daytime movement levels. The medications used in treating unsettling could additionally upset the patterns of sleep or cause a decreased synchronicity periods of sleep. These variables all add to the list of sleep disturbances for the patients, which would then prompt further decreases in their psychological working, hence rushing the pathophysiological course of the disease (Nathalie, et.al, 2008).

with dementia in two consideration states demonstrate that: i) high fosignificantly leads to an increase in night-time sleep hours and conflicting impacts on evening time sleep solidification and daytime drowsiness. Besides, circadian beat studies identified significant acrophase moving (contingent upon treatment timing) but there were no

Sleep-wake capacities and other major effects on circadian rhythmicity measures (i.e., mesor, abundancy, intraday fluctuation, or internally steadiness). The research was very much endured and was not related to antagonistic impacts. (Nathalie, 2008).

These outcomes propose that natular routines and sleep time-tables, ural modification might be better than lightboxes, the current helpful divided, with more regular times of norm, as a light conveyance techattentiveness around evening time nique. Albeit genuinely relevant, the and inertia during the day (Nathalie, clinical relevance in regards to the finding that absolute time of sleep was II minutes more while under morning or the entire light is indistinct. To more readily measure the medical importance of this discovery, the outcomes contrasted and those of distributed clinical preliminaries of ordinarily recommended sleep prescriptions (Swaab, et.al, 1985). The most generally recommended sleep prescriptions in 2005, generate roughly 30 minutes of extra sleep in youthful and middle-aged volunteers. However, the of circadian rhythms as well as the impact of sleep medicine seems lessened in more elderly persons. One randomized preliminary in 72 older people with constant a sleeping disorder announced just 4.4 minutes longer of sleep with temazepam as compared to placeb0 (Nathalie, 2008).

Studies from the number of people Additionally, in long stay home care populations, the risk of tranquilization and sedentary narcotic drugs cus light treatment in the daytime are exceptionally high. A randomized preliminary of 17 members, discovered no contrasts among temazepam(which is used to treat has a few impediments. Maybe insomnia) and substandard treatment but brought about one member pulling out due to a hip break caused by the drowsy side-effects of the drug during the first week of starting temazepam. Therefore, the ure of light arriving at the eye is up

volume of the impact of natural light on sleeping is likely to be equivalent or greater than sleep drugs, with far less insidious impacts. The finding of likewise exhibited that brilliant light a more grounded result in the subsample with more severe dementia was outstanding.

> Since light treatment is a zone of scientific debate, the study assessed three different treatment conditions: morning light, full sunlight, and night light. The standard way of thinking is that night peach black is ideal for treating sleep aggravations in individuals who have more progressive symptoms since it causes a postponement in acrophase (Meeter, et.al, 2009). However, this present study's perceptions of evening time sleep and daytime languor demonstrated favourable outcomes from early morning activity and access to the natural light. The discoveries are predictable with a few other ongoing examinations, revealing clinical merits or a dumbfounding stage impediment in the nursing home occupants accepting exposure to the morning light. A potential clarification of such perceptions could be that people with Alzheimer's illness and related dementias tend to experience hindrances in acrophase sleep.

> Different examiners have announced this, and this current study finds that members with extreme to a serious strain of the disease acrophases two hours after the time than those with mild symptoms likewise uphold it. This study generally significant, the objective light portion of 2,500 lux, albeit under-acknowledged remedial norms, might fail to be sufficient for more seasoned people, whom the meas

to 66% not exactly the same as in young adults (Nathalie, 2008). By focusing on all occupants in the study units, the examination may have incorporated a significant extent of people without sleep issues, thus lending some potential invalidity to the results. In addition, because a couple of indicative information was accessible on the examination contestants, investigations could not be carried out to establish whether the disease was identified with light treatment reaction. At long last, even though the sleep session is a typical proportion of the quality of sleep and has been accounted for to be responsive to the levels of lighting, the clinical importance of a session as operationalized by actigraphic programming is muddled because the individual may not see a few scenes of "enlivening" as defined systematically.

Although this is an admirable statement, this impediment ought not to influence the significance of noticed contrasts. The way no distinctions were established even at a high affectability level is substantial evidence of a non-effect of lighting levels on this specific proportion of sleep quality. Tragically, the two strategies for giving encompassing light treatment utilized in this examination were costly and heat-producing. Although fusing such a plan into another structure would be less expensive as compared to retrofitting that was previously undertaken, thought should be offered to the concession among the advantages gained and the costs of high-force light in open regions.

So, what is the response? Since natural light seems to have a humble yet quantifiable impact on sleep

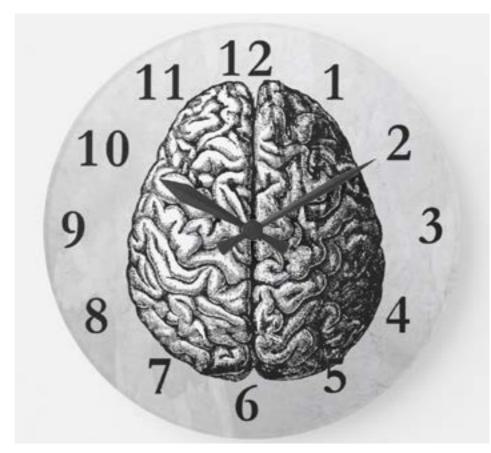


Fig.5.9 AD influences sleep length

boundaries (Nathalie, et.al, 2008), new establishment of the particular range of light (natural) maximally invigorates the framework of human circadian rhythm and may offer worthwhile treatment options for the prevention of progressing symptoms in early stages of dementia. The advancement of natural light could decrease cost while helping symptoms. Another option would be changing the in-office plan and arrangements that would expand openness to normal light as a preventative measure. Though the relationship between natural light, sleep and dementia is still in its embryonic research phases, the evidence currently available supports the need to maintain regular availability to natural light for the maintenance of healthy circadian rhythms and subsequently, healthy minds.

5.3.6 Probable clinical applications

5.3.7 Translation to architecture

window for a helpful specialist to be Sleep is a promptly quantifiable compelling in easing back or halting brain work that is unusual in the this disease's progression is most preclinical stage. Accordingly, sleep probably the preclinical stage. By quality might be utilized as a biodefinition, preclinical dementia is a marker of illness trouble in patients phase without cognitive anomalies. with preclinical dementia. A meas-Subsequently, the quantity of treat- urement of sleep associated with ments that can be tried is restricted infection trouble in the precliniby the long length and significant cal stage could likewise empower expense of clinical preliminaries to quick assessment of novel remedisurvey the impacts of treatment al specialists at a phase when they

The most beneficial time on movement to suggestive illness. are well on the way to effectively easing back movement to indicative



tail on the biological processes at work with natural light, $A\beta$ and sleep work that is linked to dementia cycles are essential to understand development. The detail of how am- as the building blocks for dementia yloid plaques are related to poor therapy. From these building blocks sleep and the increased chance of come my additional architectural developing dementia is essential to solutions that aim to layer further know as a trigger of the disease. Although elderly people tend to have ing ones through an evidence-based more tight routines, their circadian approach. Given that sleep is so rhythms are affected with age. What repeatedly shown as a major causwe have seen with some studies al factor in developing dementia, it in the section is that exposure to intensive natural light at different tion and causes in some detail and points in the day has respective clear biological explanation. With effects on sleep and acrophase. In- the fact that sleep and its biological tensive exposure to natural light in associates (like amyloid plaques) are the daytime had a positive effect on so closely linked to dementia develregular and better quality sleep in the evening.

tion is to outline the importance of some preclinical phases and early biomarkers for developing dementia. These biomarkers may involve measuring the AD plaque prevalence to provide early warning signs or even treatment plans for those in the more developed stages. By investing in these preclinical stages and the vital role of sleep in developing dementia, I was able to arrive at specified targeted solutions that will lean on light-based architectural solutions and the application of smart technology with a focus on sleep. There was a need to offer explicit understanding from a biological perspective because this is a reliable way of targeting the causes of the disease and implementing design solutions that had a firm grounding in science.

This section went into some de- The current clinical approaches that treatment plans on top of the existwas essential to mention its affectaopment, we get a picture of its importance. From this comes tailored design solutions, targeted as specific The reason for the detail in the sec-biological causes, as we will see in the later sections of this work.

Fig.5.10 Sleep improvments with smart technologies

5.4 Learning - Brain stimulation (Case Studies)

Efficiency learning strategies

subsequent patient, MD, relearned vanishing cues blend frontward and a recreation action, which was how rearward chaining learning proceity with a blend of learning strate- and Wilson, 1994). gies. Transferring these aptitudes in comparative settings proved a bit hard for the MD. She was unable to coordinate the radio into her day-to-day life routine, yet she could consistently attend the social activity she had planned, prompted by a morning timer. In total, the techniques of learning utilized were powerful with these ailing individuals, yet transfer and unconstrained use were quite challenging. Because all these factors are fundamental to rehabilitation, they ought to be explored to build cognitive interventions' efficiency.

In the initial phases of dementia, numerous researches have showcased the promising consequences of various learning strategies or the ability to re-learn probably useful exercises which would aid in building a few utilitarian autonomy parts. The top three most promising approaches that have been applied with this

generation: spaced recovery, learning without errors, and disappear-The main reason behind ing cues. Spaced rehabilitation techthese two case studies will be to nique entails asking the member investigate the importance and ef- to remember dates after different ficiency of learning strategies when escalating time gaps. This strategy applied in these medical cases. This appears to increase the reliability is important because it will help un- of one's self judgment (Camp and derpin the architectural approaches Schaller, 1989) or forthcoming duthat seek to mediate the negative ties of an individual's memory such effects of the AD condition. The first as using a calendar. The errorless participant in these case studies, learning strategy comprises offering DD, was able to look at the calendar the participants with the right reand use it to tell dates, times, and sponse and letting this date to be manage calls to his family. His wife used on numerous incidences to used progressive cueing to slowly limit the production of error (Badreduce the need to significantly in- deley and Wilson, 1994). This type of crease the calendar use, which was learning has been put up in working, difficult for the first participant. The mostly in face-name learning. Finally, to listen to music on radio cassette dures, which comprise graduating and take an interest in social activ- the member's assistance. (Baddeley



Fig.5.11 User-specific photo album is linked to a personalized playlis

Learning Activities

Many research studies have In regards to cognitive rehabilitaexamined if the data learned using various strategies is transferred and easily adaptable by patients in their everyday life routines, raising the another context, for instance from question of whether the methods for cognitive rehabilitation offer and portray the change in the patients' daily routine.

The transfer is defined as the ability of an individual to make use of his or her past encounters to perform a new duty or another unique situation (Barnett and Ceci, 2002). The transfer has been mainly concentrated regarding the approaching transfer of engine expertise in an experimental setting regarding the patients. Near transfer regards at the journal, the partner was rethe utilization of acquired expertise in indistinguishable or comparable prompt at first ("Haven't you forcircumstances. More absolutely, the circumstance comparability is controlled by the accompanying features.

- (1)material used.
- Setting traits, like the actual surroundings (e.g., area, individuals present), the sequential situation (e.g., time among preparing compared to a real-life relationship and testing), as well as the practical context(restricted to the setting of learning or pertinent in everyday living).

This research as well as other contemplates investigating duties like mirror tracing and maze learning indicated that the ability to pass on a new skill is adaptable if the circumstance to which it is being passed on is parallel to the circumstance. The unprompted use of learning wherein the initial skill was found. The partakers indicated a preserved capability to put in the application a recently acquired ability to patients with a particular flexibility level.

tion, a few scholars have indicated that particular expertise acquired in a clinical setup is transferable to a day-care focus to the person's home. One study encouraged a patient to utilize a journal that contains the schedule and arrangements of each day (Adam et al., 1999). If this undertaking is appropriately controlled in the day-care centre, the partner needs to cheer the journal's use at exact occasions of the day at home. He needed to utilize verbal guidelines as supportive of aggressive signalling specifically. If the sick individual didn't have a look quired to offer an extremely broad gotten something?"), subsequently, he must be progressively precise, concluding it with straightforward order("Look in your agenda"). This methodology was efficient with Surface- these refer to the the individuals, who quickly adapted to the use of this diary in their day to day life. Clare and colleagues (1999) also showed that the patient was in a position to a face-name as setup. When the patient was given room to give a name to all the pictures in the house, the mediation was conveyed to the social setup. This conveyance stage included coordinating the photos with genuine individuals and giving them names. The patient took in the relationship with the photos, and achievement ultimately transferred his newly acquired skills to people in real life. every day, to our understanding, has

not yet been broadly studied in this

population. In general, writers have

reported that the sick coordinated

their new abilities in their everyday

activities even though perceptions are regularly recounted.

This study aimed to allow investigation of how effective these learning techniques were when applied in the home setup on applicable skills or information for the members and the people taking care of them. They additionally sought to investigate if the learned skills and experience were transferable to a parallel context and immediately utilized by the partakers in their day to day ac-

Transfer and unconstrained utilization of acquired information are definitive targets of cognitive rehabilitation focus on the ailment. Indeed, acquiring new abilities is inconsequential when the individual cannot incorporate such aptitudes into his/her everyday life schedule. The study is meant to investigate the effectiveness of knowledge acquisition strategies in enhancing new abilities and the opportunities for two members to convey and suddenly utilize the newly realized abilities. The two contextual investigations indicated that the strategies of acquiring knowledge were powerful for new learning of day to day fundamental abilities. MD could figure out the utilization of radio and VCR. She additionally took in the relevance of various banners and an alarm. DD was also ready to rapidly realize what he ought to do when he needed to be aware of the current date or make calls to his relatives. For instance, Lekeu et al. (2002) utilized a mix of errorless and reviewing prompts to effectively help patients figure out the usage of a cell phone. Adam et al. (2000) sewing concentrate likewise indicated that a lady suffering from the

illness was in a position to learn the colleagues (Glisky, Schacter, and relaxation action again through a reformist signalling strategy.

Moreover, divided rehabilitation was an extremely viable technique with DD and MD. Nonetheless, separated rehabilitation was utilized distinctly for each relationship in turn, and this might be a significant rule regarding the guarantee of its viability. Long term care was likewise accomplished with MD as long as nine weeks post-intercession for the tape radio and a month and a half post-mediation for the rosary. This is a confirmation that it is possible to keep both learnings or relearning in dementia for a prolonged period. The transfer was just investigated with MD, yet our outcomes demonstrated that transfer was difficult for the participant. It is conceivable to guarantee the conveyance, several learning activities prompting excessive learning is important.

In amnesia, it appears that the likelihood of conveyance of activity goes higher with excessive learning. Overlearning alludes to additional preparation of an errand past a set basis, by and large, one amazing preliminary. For instance, after one amazing preliminary, preparing may proceed for ten additional preliminaries.

Excessive learning has the possibility of making new expertise more dynamic and accordingly convey in a better manner in various contexts. However, a few authors feel that overlearning might be a deterrent to efficient transfer. Overlearning of a procedural activity by broad redundancy may prompt hyperspecificity in amnesia. They contrasted their out toward the tape radio and did and energy. A keen assessment of outcomes and those of Glisky and not transfer. All of these deficien- the requirements and the merits at-

Tulving, 1986a and 1986b), which demonstrated that transfer of peregy, did not prompt any exchange in their amnesic members. They estimated that their sick individuals could depend on their leftover decisive memory, which is presumably more flexible and deliberately more open than the procedural recollecbeen concentrated solely on the disease, further investigations that control this factor could recognize how patients may be capable of transferring the newly acquired knowledge efficiently.

Concerning unconstrained use, the two participants indicated significant challenges in the application of their new abilities in their everyday life schedules. It is conceivable that needed some commencement, may have added to these difficulties. In this way, the intercession applied vestigated utilizing different sorts of daily living exercises to decide MD's difficulties in the application of their new aptitudes may liketive deficits. The two patients had significant roundabout memory isdysfunctions. Moreover, DD lacked insight, and MD indicated some lev- ule. el of unresponsiveness. For instance, viders recommending that she tune

cies may have meddled with DD's and MD's ability to utilize their new aptitudes precipitously in their daisonal technique and co-operation, ly life schedules. To have the option with the evaporating signals strat- to utilize a scholarly aptitude at a specific time, an individual must first detail an aim to do a transfer, recollect the data that was found out, and perceive circumstances in which he/she could apply this data (Barnett and Ceci, 2002).

tions. Since overlearning has not Unconstrained use of these scholarly studies could, in this regard, share numerous similarities with forthcoming memory tasks. The likelihood of making sure to do an activity includes coming up to do the activity, later on, creating a sign to do the activity at the required time and then making sure to do the activity, and afterwards doing the activity (McDaniel and Einstein,

the kind of exercises chosen, which When the natural prompts are powerless, review depends just on the individual's ability to commence the activity. To make up for in the investigation should be in- a frail climate prompts, or powerless self-commencement limits, the activity must be incorporated into whether unconstrained preparation a fixed routine. Activities are then is important in dementia. DD and firmly connected, and each activity turns into the trigger for the following activity. To guarantee unconwise be connected to their cogni- strained utilization of new learning at the end of the day, we may need to depend on the caregiver's signifsues, and MD additionally had chief icant commitment to incorporate this new learning into a fixed sched-

when she saw the banner on the di- Nonetheless, as referenced by DD's spouse, who was profoundly enin to music, she would state: "What ergetic, constant checking of DD's a smart idea," however did not set conduct was referenced to time

gy could be to utilize viable ecological signals. The caution could be one of the most efficient approaches to incorporate new ways of obtaining knowledge in a fixed schedule by giving viable prompts to patients who presently do not remember them. Other natural prompts utilized by MD (banners and messages) were not powerful in setting off

an unconstrained reaction.

Additionally, all the prompts offered by the caregiver showcased many outcomes in our research. A compact paging framework with a screen pointed toward transferring suggestions to individuals with extreme deficits in memory (Wilson, Evans, Emslie, and Malinek, 1997). This outside guide has the possibility of being a solid signal to prompt an activity, contrasted with the morning alarm, seen as a feeble prompt because it has no importance. A third methodology might be to consolidate cognitive restoration with a planned memory treatment and rehabilitation. This forthcoming mediation could target assisting the patient with remembering to perform a recently learned aptitude at a particular time. Questionnaires filled out by the patient's caregivers appear as the best method of accumulating criticism regarding the patient's conduct. Nonetheless, guaranteeing indefatigable utilization of the agenda or even cognizance of its motivation and how it should be filled out can be a genuine test for the caregiver.

tained by both the patient and his or To sum up, there is a need to in her caregiver ought to accordingly vestigate transfer and utilization of be done if a significant commitment abilities that would create systems from the parental figure is being that could be incorporated as a feathought of. An elective methodolo- ture of the psychological rehabilitation measure

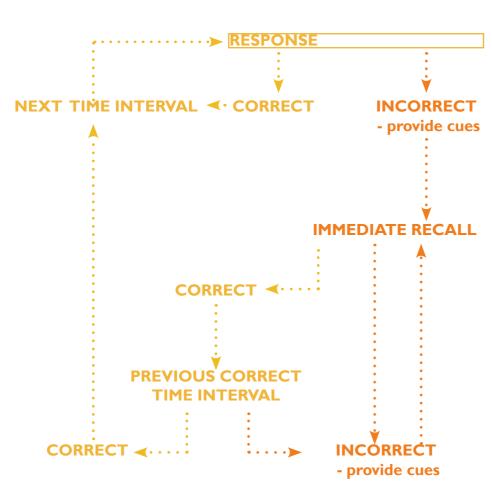


Fig.5.12 Learning strategy giving cues

Link to Architecture

clear that certain learning activities are valuable in maintaining the memory and autonomy of those with symptoms of dementia. Though the ed. As mentioned in this section, the methods applied for this learning role of a carer or family member process vary, the unilateral theme is may be to remind the person with that memory triggers and transferable learning processes must find a to do today. The fact that this trigway to be engrained into the persons routine. By integrating these learning processes into persons routine, they become a well-established part of the person's life and can be triggered increasingly by the routine itself, resulting in a di- equal to the demand. The purpose minished need for carer input and of the architectural implementaa higher level of autonomy for the tions for something like learning individual suffering from dementia habits could be to remove the need symptoms related to memory loss. Through integrating smart architectural technologies that help with and re-learning habits, we see clearthe structure of routine, (i.e., builtin response mechanisms that act as gap as time goes on and staff are an alarm, kinetic facades that help encourage circadian sleep routines by responding to light) may reduce the need for carer input and increase the autonomous capabilities of those suffering from dementia symptoms.

From this investigation, it is It is particularly important to understand how these factors contribute to dementia symptoms and how they are currently being enactdementia that they have something gering process happens through a human being highlights an area for architectural solutions. There is an increasing number of elderly people and the number of caregivers and staff to compensate will not be for human beings. By highlighting key factors like memory triggering ly how architecture could fill this likely to be well outnumbered by patients respectively.

5.5 **Natural Rehabilitation Steps**

their life with more natural environlike plants and woods; and processes, like following a natural lightbased sleep routine. Rehabilitation allowing the individuals to have a better life by easing symptoms and alleviating the troublesome manifestations that are invoked by the disease. These manifestations are In this approach, natural rehabilitabrought about by neurological deelements; therefore, multidimensional evaluation and nature-based of their ability to treat and understand symptoms inclusively, rather than exclusively. Nature is understood as an interconnected system, and in natural rehabilitation, humans are seen as part of this system and routines and environments.

essential daily living activities detraining to adapt techniques that everyday living. are beneficial for these patients as

The main aim of invoking every individual to achieve a good nature as a treatment is to improve quality of life where their symptoms people's well-being by integrating do not impede more than needed on their autonomy and functionality. ments, like the outdoors, materials, Natural rehabilitation methods for these patients are regularly planned to prepare or improve cognitive capacity and are completed in ways as a natural methodology means that deal with overarching difficulties in their daily living through integration with nature (Maki & Endo, 2018).

tion's objective ought to be meanbilitation that is altered by different ingful and achievable in everyday living. Accordingly, recovery intends to amplify every individual's lingerapproaches are compelling because ing functional abilities to accomplish personal satisfaction regardless of their cognitive status; through collaboration with family and therapists' requirements (Maki & Endo,

learn to integrate into more natural Compounding the difficulties in the day-to-day activities that deteriorate as the illness advances, a ma-As the disease advances and the jority of the patients experience the effects become more prominent, ill effects of different symptoms of dementia and geriatric syndromes teriorate, and interventions should at the psychological and behaviourbe customized concerning the in- al levels. These incorporate actual dividuated living situation of the confusions and the decay of physical dementia sufferer. To reduce behav- work, which commonly communiioural and mental manifestations cates to exasperate each symptom. of this disease, it is basic to think It is feasible for each individual to about the individual and the mean- have a better life by breaking the ing behind his/her practices from endless loop through ideal treatan all-encompassing point of view. ment and adjusting the best sys-Family caregivers need support and tems to adapt to the challenges of

well as themselves as the caregiv- A significant point of view in reers. Rehabilitation can help these covery is a holistic interdisciplipatients and their families to cope nary-group approach. Doctors, atand adapt to living with this disease. tendants, and pharmacologists in The essential objective of recovery an interdisciplinary approach will and rehabilitation is to empower deal with pharmacological treat-

ment and natural considerations. facilitated by non-pharmacological methodologies (Maki & Endo, 2018). The natural considerations may facilitate interaction with natural environments and the pursuit of natural sleeping rhythms. Clinical social specialists are liable for coordinating local area care by connecting patients and their family caregivers to local area assets. Family caregivers are also regarded as colleagues who offer help to patients in everyday living. While providing care for these patients is stressful and challenging, care for family caregivers is likewise a significant objective of rehabilitation.

The integration of a biophilic plan means integrating living environments (biomes) with human environments. The outcome can be relieving and positive by highlighting those things which are natural to human life in close company with our day-to-day experiences. As per DeGroff and Wood (2016) and Ann (2013), human partiality for the components as well as standards present in nature stays dynamic, but pertinent for those people suffering from this disease. Consolidating this essential association with the surrounding into treatment-plan choices can advance well-being. Additionally, as a model reflecting how we collaborate with our typical habitat, the human instinct association can upgrade our said environment encounters. Occasions to associate our characteristic partiality with nature can be accomplished inside just as outside, generally through the contribution of natural components in an indoor setting.

Joining components of nature into the inside plan of typical living spaces can offer advantages for cognition and new methods for rehabilitation, such as finishing and tending to gardens as part of the treatment plan, even bringing the outside and nature inside. Components of nature included in inside living spaces can unpretentiously expand the positive association to the living environment and commitment of the inhabitants to this treatment. Elings (2006) found that "Studies with dementia patients demonstrated that actual exercise could improve the psychological capacities. Explicitly planned school-like environments can be a wellspring of tactile incitement for the patients regarding smell and surface, and can animate feelings, good sentiments and recollections". Further, openness to a biophilic plan, for example, living plants, a window with a view of grass and trees, standard or incidental collaborations with friendly animals and pets, openness to the hints of winged animals and the rain, or seeing snow falling and floating, can build positive action levels for this population of inhabitants (UIrich, 1984; Gibson et al., 2007).

In this context, the conversation is incorporated concerning a biophilic plan's relatedness to different hypotheses, especially helpful arrangements and agriculture treatment; therapeutic spaces/recuperating spots. The context likewise addresses the utilization of biophilic plan contemplations in other shared planned conditions, for example, nature focuses. Finally, to completely illuminate this examination regarding biophilic plans in constructed conditions, quantitative and subjective exploration strategies should

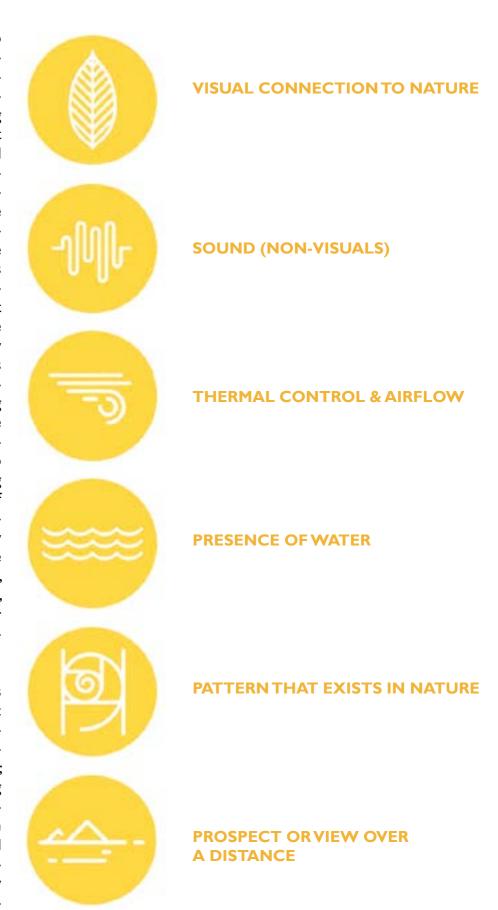


Fig.5.13 Different rehabilitation steps

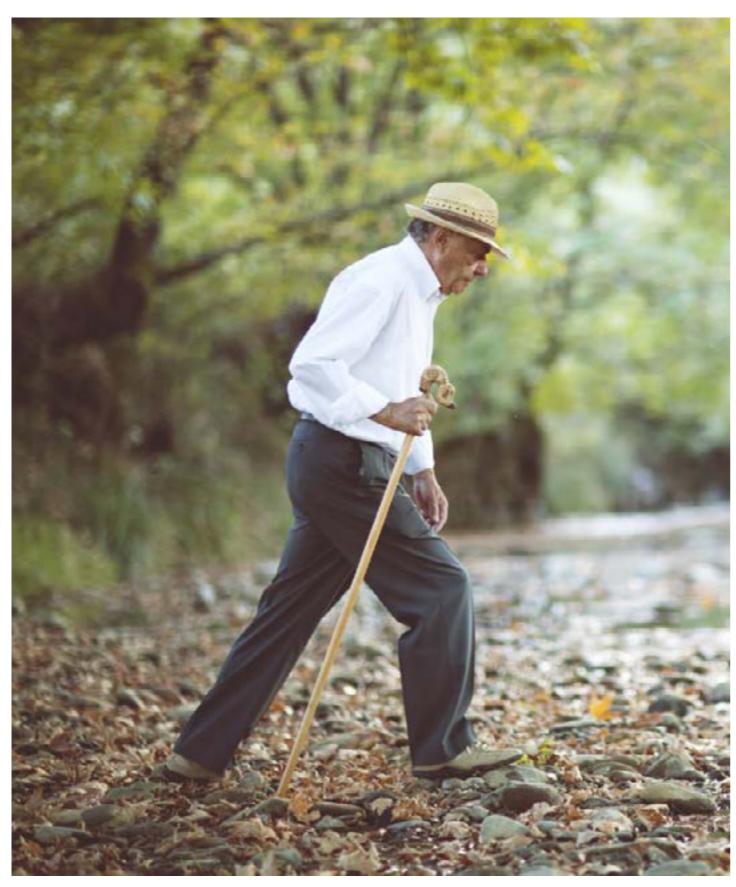


Fig.5.14 Dementia Friendly Nature Walks

be used. This requires catching the emotions and experiential reactions of those of different inhabitants, to improve the comprehension of the on inhabitants.

Qualities of a biophilic plan in shared settings incorporate plants, creatures, water, and perspectives on grass and trees, just as the exercises and cycles identified with inclusion in cultivating exercises. As indicated by Ulrich (1999) and Rodiek (2002), well-being result exploration can prove the therapeutically useful aftereffects of having gardens in medical services conditions. For example, advantages can integrate "decrease in pressure and nervousness, a decrease of wretchedness, higher quality of life, reduced suffering," in addition to "reduced supplier costs, expanded patient versatility, freedom, and higher patient fulfilment" (Ulrich, 1999, p. 74). The positive advantage of natural environments in medical care conditions, for example, helped living settings, has been perceived by the medical services industry (Cooper-Marcus, 2007; Rodiek, 2002), even though the level of advantage versus cost-adequacy of a nursery stays under scrutiny. Hypothetical methodologies uphold the use of this idea, for example, helpful spaces/recuperating places, restorative cultivation/finishing, and the idea of edge space.

Natural treatment includes planting and developing plants as arranged projects, utilizing plants, gardens, and different parts of nature, executed as a component of a proper arrangement with active intervenmight be alluded to as rehabilita-

tion, garden treatment, social agriculture, and remedial planting with the terms utilized reciprocally. The qualifications among these terms biophilic plan concerning its effect are significant for proficient affirmations, yet practically speaking, the terms allude to human communication with plants and gardens. Mending gardens give guests occasions to latently and effectively draw in their faculties and bond with inhabitants (Smith, 2007; Haubenhofer et al., 2010). "The essential point is to recapture health in at least one of the Actual plan and programming exerthree elements of presence: physical, mental, spiritually."

> As per Noone et al. (2015) and Rodiek (2002), fusing plant treatment exercises in the careful consideration of people was linked to the rehabilitation of this disease. The examination has exhibited this as a way of working with inhabitants and natural environments as a viable way of alleviating dementia symptoms (Noone et al., 2015), thus, bettering the prosperity of those inhabitants. Planting can be an enjoyable activity for those who have dementia. (Noone et al., 2015; Rodiek, 2002). Such an activity can be created to co-operate with members who have mental and actual difficulties. "The cognitive changes experienced by these patients, however their actual age-related debilitations, may affect their capacity to partake in cultivating and mentally reformative exercises. A plant nursery planned in a beneficial can give an improving, rehabilitative and restorative encounter for suffers of dementia" (Noone et al., 2015, p. 6).

As per Noone et al. (2015) and Gonzalez and Kirkevold (2013), intion. The act of natural treatment habitants partaking in green treatment intercessions revealed pride

in working in their natural gardens. The faculties' commitment helped members with recollections of planting prior in their lives, and brought with it a renewed joy for cultivation.

Rehabilitation gardens, also described as therapeutic nurseries, are intended for explicit populations in an assigned spot to ensure the increased well-being of those who partake.

cises are educated by the exploration and consolidated into medical services structures, such as emergency clinics and helped living and hospice offices (Haubenhofer et al., 2010). These nurseries can also be located in city parks, or as an additional element in exhibition hall grounds, and shared collective spaces, for example, a part of a local area garden. The outcome can bring about decreased stress levels of the cortisol hormone, decreased melancholy, improved personal satisfaction, and improved way-finding in a medical care office (Ulrich, 2000). Giving specific accentuation to push decreasing and other useful impacts of survey nature in indoor and outside settings." Sachs (2016) indicated that seeing nurseries from the inside, just as getting to the nurseries on the outside, is beneficial every season. (Ulrich 2000)

Music

people with dementia can be managed, however, pharmacological medicines are related to antagonistic effects. Although these medications cannot resolve this illness, After World War I and World War they are relatively successful in postponing disability movement and helping control-related mental illnesses (WHO, 2021).

scope of non-pharmacological therapy and this would be a facet worth considering in architectural technologies, such as well integrated speaker systems or locations in a group setting.

Music therapy is an objective, de- was set up in 1944 at Michigan State liberate action wherein specialists University. work with people or gatherings, utilizing music expressions and the As indicated by the AMTA, there recollections, sentiments, and sensations it inspires. It has been discovered to be especially useful for or graduate degrees in music treatolder adults with different sorts of ment and roughly 100 globally Alzheimer's disease. Music treatment has numerous faces. An example is; with a more ageing population, wartime melodies are utilized an improved review of their formore. These songs appear to carry numerous energetic recollections to their minds (Leaproach, 2018). States' older populace. The eventual Music has a convenient relationship with oblivious emotions; these emotions are activated by musical movement. Psychologists claim that Alzheimer's sickness, and psychomusic speaks to microcosms that neuroimmunology is archiving the have a close connection to our inward emotions. These emotions are the context of a biological, medical so tangible, and they are vital re-model (AMTA, 2006). Music therapy gardless of whether patients cannot in treating dementia lacks sufficient recall their identity.

treatment of dementia originates Though conclusions are not certain,

Behavioural problems in from over 2,000 years ago. The it has been shown to at least stimupossibility of music as a mending impact ready to influence wellbe-II, local area musicians went to military medical clinics worldwide to play for the vast number of veterans Anxiety that is regularly the conseenduring physical and emotional in-However, there is presently a broad juries; this birthed the 20th-century discipline. The patients' reaction to systems to treat conduct issues. music drove doctors and medical Among these techniques is music caretakers to demand performers' recruiting by the clinics. It was soon apparent that the artists required some earlier preparation before playing in medical clinics; thus, the on-site that can facilitate live music interest developed for a school educational program. The world's first music treatment degree program

are presently 75 foundations cross country offering unhitched male's to tune their customers and patients into a treatment that encourages gotten histories with the proceeding with increment in the United fate of music therapy is promising because of the cutting edge music therapy research in actual recovery, effectiveness of music therapy in medical evidence but has observable links to heightened mood and Music therapy utilization in the invigoration of strong memories. As indicated by functional and inde-

late auto-biographical memory, i.e., memories that relate to themselves ing and conduct is at least as old as and their identity (Moriera et al the works of most influential artists. 2018). There is, however, a need for more research that is controlled, significant and extensive.

quence of a troubled patient in distinguishing their environment, could likewise be an objective manifestation of therapy through music. It is hard to contend that manifestations undoubtedly depend on natural alterations, which may include hallucinations and poor identification, which ought to profit from this sort of treatment. Various investigations regarding the utilization of music treatment in the later phases of the illness have been distributed. An examination utilizing crowd singing in a gathering of around 10 patients discovered a critical adjustment in conduct after administering treatment meetings, yet a control group was not present (Olderog-Miller and Smith, 1989). Music treatment (AMTA, 2006). Experts might need has been utilized to treat depressed moods in people either suffering from this disease or not (Hanser, Thompson, 1994; Suzuki, 1980). A couple of researches were directed utilizing quantitative proportions of the impacts of using music as a form of therapy. One of them is a case-control concentrate on the consequences of music treatment meetings on perception and conduct, and it indicated critical advancement in perception (Van de Winckel et al., 2004).

This type of treatment is applied in various contexts and settings of a wide variety of patient groups.

pendence degrees of older patients



Fig.5.15 Music as medicine

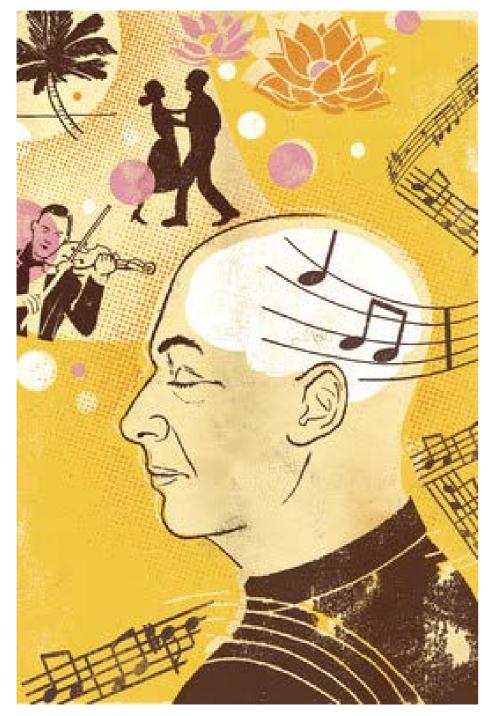


Fig.5.16 Memory recall while listening to music

in geriatric medication, music treatment can be utilized in retirement homes, civic centres, hospitals, private homes, and senior residences. Even in the late dementia stages, responsiveness to melody might be preserved. While language decays throughout the sickness, some musical abilities are as yet saved, for example, the capacity to play a formerly learned piece of music or a musical instrument. Therapy using music can advance correspondence among specialists and patients in individual settings or among patients in gathering settings. Without a doubt, it is quite possibly the most captivating and genuinely unique stimuli. Tuning in to music can significantly affect individuals' moods, thinking, and even physiology, which establishes a likely explanation that certain songs help us distinctively remember a particular memory. That being stated, memory is a stores, coordinates, changes, and recuperates data from sensory input. Feelings and memories offer many connections, and because music is charged inwardly, it can trigger past recollections, both great and terrible. Using music as a form of therapy is a precise procedure; it is target-oriented and knowledge-based, which helps the customer advance wellbeing via the connections formed from shared music encounters (Bruscia 1998). The setting off of memories through music can likewise advance correspondence inside the older patient, basically giving that person a re-established

There are two perceived kinds of Music therapy: passive or receptive and active. In the two structures, the music is, for the most part, per-

feeling of identity.

sonalized to fit the individual's musical preferences (Aldridge 1994). Active necessitates the individual to get an interest in playing the instruments or singing alongside the therapist, independently or as a gathering. Passive music therapy envelops methods that permit the individuals to listen to music; the music utilized might be live or recorded and of any classification. It is noticed that well-known music from the early stages of adulthood can kindle memory and encourage reactions during music therapy mediations. In this case, patient inclinations should be considered when planning musical interventions for either individuals or groups.

Senior clients communicate and reminisce the memories that music awakens and stimulate them through meeting within gatherings or individually.

psychological framework that gets, Listening to live music is associated with its production results in an increased quality of life. This enables patients to rise out of the detachment forced by Alzheimer's illness and dementia. Therapists make use of music treatment to develop the general physical and cognitive prosperity of people with dementia. Other benefits include; chances to connect socially with other people; recall of memory; changes in moods and emotions that are positive; a feeling of control over life; management of agony and discomfort in non-pharmacological ways; an incitement that advances an interest in any event; when different methodologies are incapable and structure that advances musical and nonstop development or vocal familiarity as an aide to actual recovery. Music is essentially utilized with older adults to keep up or increase

increase their degrees of physical, mental, social, and enthusiastic functioning. The process of using music as treatment assists in building a beneficial relationship by listening and reacting to a sound since listening demands you to be attentive.

For patients who experience infrequent or mild dementia, music can be a factor in assisting older folks with getting regular exercise. Music should be deliberately chosen or explicitly designed to help every specific training by signalling the speed, power, number of repetitions, and direction. Because music causes exercise to appear to be more pleasant and seem shorter, individuals— younger or older will, in general, exercise in programs where music is incorporated. Music therapy can also be utilized not exclusively to treat elderly folks with dementia and avoid the sickness. By recollecting memories from music, these folks stay happy and active; thus, the disease can be avoided.

To assist patients in using music as therapy, one needs to distinguish natural and agreeable music from the individual. If conceivable, let the individual pick the music. The person in charge must pick a wellspring of music that isn't hindered by advertisements that may create distress and confusion. Use music to make the disposition you need. For instance, a serene piece of music can help establish a quiet climate, while a quicker paced melody from somebody's adolescence may inspire happy recollections. Movement should be encouraged (applauding, moving) to add to the delight and engagement. Avoid sensory over-burden; take out competing for noise by closing windows and entryways.

Ensure the volume of the music isn't excessively loud as it may lead to anxiety attacks (Tyler, 2017). Music can likewise profit caregivers by decreasing distress and anxiety, brightening up the mood, and creating an approach to connect with friends and family who have Alzheimer's illness — particularly the individuals who experience issues in communication.

In conclusion, numerous individuals who have dementia have a deficiency of language or relational abilities. non-verbal methods, music therapy might be valuable in building helpful following as valuable impacts of mudecrease in depression, diminished recurrence of agitated or aggressive behaviours, expanded familiarity with oneself as well as the surrounding, non-pharmacological pain decrease for both the sick individuof them, and chances for closeness offer through architecture. when families share musical encounters.

Link to Architecture

As the ailment advances, psycholog- In earlier sections of this paper, By outlining some current rehabilical function decreases; in any case, some preclinical markers were music receptivity is considered to shown and some key causes such be a positive influence until the fi- as sleep variations and circadian nal phases of the illness (Aldridge rhythms were mentioned about de-1996). As a mental treatment that mentia development. This section provides a chance to convey via highlighted some natural rehabilitation steps i.e., non-pharmacological, that rely on things such as music, associations with a dementia client sleep and outdoor environments. group. AMTA (2006) refer to the These offer fruitful direction for the architectural solutions that can sic therapy; positive mood changes, specifically aim at integrating these rehabilitative methods into new smart buildings for the dementia sufferers. Clear designs will be exemplified later in this work, but the importance of mentioning natural management, uneasiness and stress rehabilitation methods is that they were able to guide the tailored and al as well as the person's taking care specific design solutions that I will

itation approaches, the implementation of design solutions becomes far easier, as they will work with existing practises in a way that offers long-term solutions and lower stress placed on workers in the dementia care field. By reducing the stress on carers through practical architectural solutions, their quality of life will improve and they can place more focus on their required tasks because the design solutions in place will take some of their workloads for them and also provide evidence-based rehabilitation methods for those who are experiencing negative effects of the dis-

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Fig.5.9 https://www.zazzle. co.uk/vintage brain drawing

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Fig.5.13 Kotwas, M [2021]

Fig.5.14 https://www.upliftingmobility.com/wp-content/uploads/2017/05/walking-cane.jpg

Fig.5.15 https://www.wallsauce. com/us/designer-wallpaper-murals

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Fig.5.4 https://www.nicolamonson. com/circadian-rhythm-why-it-mat-

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6. Data Subjects & Multidisciplinary Approach

'data subjects can give their consent to certain areas of scientific research when in keeping with recognised ethical standards for scientific research.'

Redesigning the architecture of health care in the EU requires the participation of every stakeholder involved. This is critical if the vision of having a transformed health care system has a chance of being reified. Some issues need to be put into consideration in this sector. It has bundles of challenges that may, in the future, lead to a shortage of medics or nurses. Technology shifts will be of great importance to this industry as they will incorporate the medical ideologies that come with the studies and add the technological touch, and with this, the merger would mean the best patient care.

more data-intensive and sensitive. data is being reused, linked, and analysed on an unprecedented scale. The data protection currently being used has brought about a potential effect on the way people process data in medical research. This analysis will give precise information on various EU legal framework solu-2015).

Medical research over the years has risen to become a significant data reliant institution. As we progress to more advancements in the field, the need for critical data usage will not only be a need during patient treatment but also as a mode of targeting and preventing some of will see the betterment of human health with minimal need of over-

zealous treatment.

This use of data as a prevention method for certain diseases and ailments is exactly in line with how I encourage data usage through smart technology to prevent dementia development in certain stages.

critical requirements for the patients with dementia, the plan is to incorporate the data collected from the rehabilitation centres as part of a betterment plan for patients and future sufferers of the disease. The use of technology will positively favour the ideal rehabilitative data collection methods, as it will provide patterns and insights to the Since medical research is becoming patient's life, where the data will be used to materialize the recovery of the patients. With the building be- Although interest for care workers ing put in place, the ideal rehabilitation techniques will have begun the journey into combining the patient's therapeutical need. With the linkage in data sharing across all the medical-related institutions, designing the patient care centre will come tions for data protection (Lynskey, a long way into the materializing of the complete rehabilitation centre.

The European Healthcare Service sector has a necessary task to carry out the visions of the objectives of the Europe 2020 techniques by adding to the general wellbeing and prosperity of the labour force and society as a whole. Additionally, the wellbeing and social care sector is the medical ailments that over time likewise a significant issue whose importance is probably going to fill with regards to segment change, cluding nursing and care homes,

*Recital 25aa of the Council's draft GDPR

Thus, healthcare stakeholders are not just influenced by patterns towards a maturing population regarding the rising interest this puts on assistance conveyance. This is in regards to arising work market deficiencies coming about because of declining birth rates. By 2030, the With the need to understand the number of inhabitants in eligible working-age found in the European Union (EU) could be reduced from the present number 303 million to 280 million. This has brought about suggestions not just for expected development and the maintainability of annuities, but in addition for the subsidizing of the health and social care sector and for the enlistment of workers to offer this kind

> and staff deficiencies are required to develop, research shows that the sector frequently offers helpless and unworthy working conditions and compensation contrasted with sectors requiring identical degrees of abilities and preparations. This has just prompted tremendous portability of the workforce inside and outside the EU and could serve to intensify capabilities deficiencies later on. The Health and social care sector are probably the most critical in Europe, utilizing around 10 % of the EU's workforce, with women representing 77 % of the workload. A critical extent of healthcare labourers is used in clinics; in any case, they can likewise be found in different work environments, in

2015).

vestigated. Labourers found in the medical healthcare sector need to manage a broad scope of activities and conditions that threaten their general health and put them in danworkers work are extraordinarily perilous for these workers and Healthcare workers are exposed to numerous attendant risks, such as organic risks that come from diseases brought about by wounds and other transferable diseases. Here is a list of many other risks faced by these workers during their working

- the therapy of malignancy and from disinfectants.
- Chemical risks, for example, from ionizing radiation.
- Ergonomic risks, for instance, when handling a patient
- require a lot of moving.

clinical practices, and other well-be- The mix of these various risks ing-related action regions (Lynskey, makes healthcare a high-hazard sector for the working population. However, there are a few new turns The relationship between the secu- of events and patterns that the rity and wellbeing (OSH) issues in healthcare and social care sector the Health and social care sector in in Europe needs to confront. These the EU Member States has been a have brought along new OSH chalquestion left unanswered for a long lenges that need to be looked into; time now. For example, healthcare some of these examples include activities in organizations, such as increasing deficiencies of medical clinics and nursing homes, just as healthcare experts; an ageing labour those activities embraced in pa- force with inadequate beginners to tients' own homes, have been in- supplant the personnel's who are resigning; the development of new healthcare examples to handle numerous chronic conditions; the developing utilization of technologies that require new skills; and imbalger of transmission-related diseases ances in skill levels and working pator, on the other hand, business-relatterns. These progressions affect the ed mishaps. A considerable amount working conditions and, ultimately, of the settings in which healthcare the prosperity and safety of the medical healthcare workers.

add a tremendous amount of stress. While attempting to answer this question, most of the research done focuses on issues such as; the fundamental contrasts in healthcare frameworks across Europe, featuring any current advancements, the primary classes of healthcare experts in the healthcare sector in hours or when helping out a patient: Europe. Current and arising issues in the healthcare sector, including Synthetic/ biological risks, home and local sector. European incorporating from drugs used in Agency for Safety and Health at Work (EU-OSHA) looks into the primary demographic, cultural, and mechanical patterns and changes that affect OSH in the healthcare sector across Europe.

The principal changes related to ac- 2. A solicitation from EU-OSHA tivities done outside and within the workplace for healthcare experts, Psychosocial changes, in- without forgetting non-experts for cluding viciousness and work that home care. The effect of these risks on the work and the administra- The desk-based research was used

tions given by these care experts is dissected. The identification of the healthcare experts faced with the most significant risk is also another issue they tend to look at. The development of new risks across Europe depends on the logical changes and current risks, examining the effect they could have on crafted by and the assistance given by healthcare experts. The significance of home and local sector care has been underlined in these reports, and the accompanying angles have been outlined some of them being that the contrast between the local healthcare workers as well as across Europe. This also incorporates how they prepare their pay rates as well as how the working conditions change in various member states of the EU.

Another concern is how home care work is coordinated across Europe, recognizing current designs (public, blended or private) and the predicted future difficulties for home care designated helpers. The degree of insurance that casual or unregistered homecare workers get, and if there have been any adjustments in the manner the OSH of homecare workforce has overseen since the execution of ILO Convention No

There have been two primary activities that have been used to acquire data to help address the research questions:

- I. Desk-based Research or literature search.
- (European Agency for Safety and Health) to its national focal points (questionnaire).

The desk-based research was used to survey the literature distributed all through the EU on healthcare infrastructure, patterns, OSH risks, their effect on work, and the assistance given by care suppliers. The data and information reviewed in these reports were sourced from notable associations, for example, the International Labour Organization (ILO) and the European Commission, specialists, organized data sets (for instance, EU measurable data sets) and databases of peer-reviewed journals (for example, Scopus, ScienceDirect, PubMed). In addition, Google was used to identify some other applicable data.

SAFETY HEALTH FORALL

85

Fig.6.1 Safety and health for medical workers

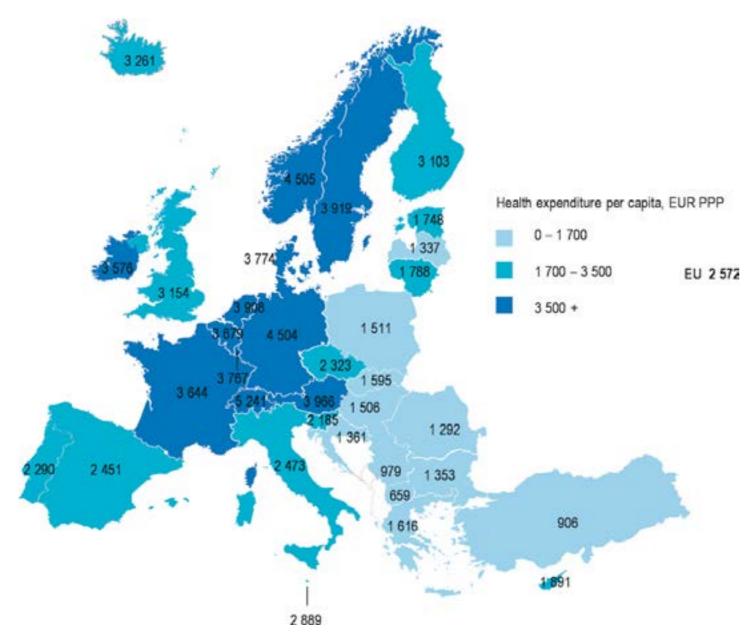


Fig.6.2 Health expenditure per capita, 2019 (or nearest year)

gather ideal information from individual EU nations at a national level through EU-OSHA'S public central focuses. The questionnaire's focal point was to identify the current and arising OSH risks at a national level. Most of the reactions came from agents of national labour inspectorates, ministries with OSH responsibilities, OSH institutes, workers associations, and the healthcare service sector. In general, the respondents had over five years of OSH experience in fields, Across Europe, healthcare is barely for example, health and safety, ergonomics, occupational medicine, or psychology. Altogether, 21 questionnaires were gotten from 16 nations in the EU.

There is a wide assortment of healthcare service frameworks in Europe. The majority of them are a few zones, for instance, changes in evidence-based medicine, cost reduction, quality management, the The need to have data on patients is ageing population advancement and prevention, and changes in data and communication technology (ICT) (Chatfield, et.al, 2017).

Looking at healthcare frameworks and their impact on their workers' OSH is too troublesome due to the absence of clear and concise information. Also, most health care indicators recognized in the audit are quality-related, current, and arising issues focused in the healthcare sector, including the home and local sector, not very objective. Financing however, there is no reasonable connection between these systems

A questionnaire was designed to as far as the proficiency, quality, as to what and how their data will and safety of care services) and the be used, and for this case, the data OSH of its labourers are interrelated, no research was recognized that ideal natural ways as to which the centred explicitly around the con-subjects react. nection between these qualities and pointers on OSH. Without any accessible information, an endeavour has been made to distinguish any patterns, qualities, or shortcomings in the different frameworks that would impact healthcare experts'

figuring out how to take care of its expenses. Not only are the techniques for raising assets to take care of costs deficient, but they are at the same time are of more significant concern since the actual costs are set to soar. The superseding worries of Europe's healthcare going through a cycle of changes, sector are discovering approaches influenced by the developments in to adjust financial plans and limiting spending.

paramount by the technological advancements that we are experiencing. The sole reliance on medics to diagnose the patient's illness over time has been outdone, as with the computers and the internet, the trends and studies indicate having data on a patient increases the chances of early diagnosis by 15% (Mostert et al., 2016). Data subjects can give their ideal consent to some specific regions of scientific research while keeping with recognized ethical standards for scientific research. The EU has a stringent objectives vary between nations; measure per the protection of data, especially the medical-related ones. It falls in the jurisdiction that every and proficiency. Albeit one could person has the right to anonymity contend that the presentation of a when it comes to their sensitive healthcare framework (for instance, data. The subjects have full consent

will come in handy in identifying the

Applying this knowledge to architectural solutions

The light patterns will be as a result of demographic changcombined with their psychological and mental composition, and with this, the architectural designs will be incorporated to make an ideal home-based care environment that can be achieved across a variety of medical recovery centres. The ethical standards that have to be maintained are the charismatic blend that exists between the need to make the medics' livelihood easier and incorporate change in the health sector. The data protection ideologies will have every involved party in a massive loop under the morality codes that will involve the Health care redesigning and changneed to strike a balance between patient care and the effectiveness of

and an increase in the available data With conclusive data, the medical modes and diagnosis that will cut by 7% of misdiagnosis, leading to undata sharing out of the EU. This allows and maintains a small circle frameworks will result in: of data sharing inter-agencies, with

Moreover, demographic changes will lead to an increased weight on ex- es. pense incomes for both quantitative (increased number of elderly individuals) and qualitative (more costly healthcare services and innovation) this is in the Bismarck system, and

es, the framework needs to help a consistently increasing number of retired individuals who presently no longer pay into it. Moreover, organizations' financial setbacks, brought about by the economic crisis, have prompted a high move in the joblessness rate and, thus, contribute to the system. This future healthcare financing crisis is additionally linked to the ageing population, the parallel rise in chronic diseases, and the rising costs of medical technologies, interlinked factors.

es in the delivery of patient services will typically affect the work envithe treatment (Mostert et al., 2016). ronment. Work-related injuries, violence in the work environment, and The need to have data on patients stress at work are interrelated parts of work conditions that are touchy • A requirement for higher intensity on patients can also aid the patient to both inner changes (for example, when it comes to financial claims. staff reductions) and outside transitions. Healthcare workers' health practitioners will have the right and safety have suggestions for understanding care and costs since staff turnover and lost workdays innecessary medication. The EU has fluence the progression of care and had concerns over the protection accessibility of trained staff. Healthof data and strict measures regard- care experts will help individuals ing what the data access is used for. in need. Still, the sheer logistics of The General Data Protection Regenextended care conveyance, the curulation(GDPR) maintains the data rent and developing lack of staff, and protection ideologies that restrict the restricted assets accessible in as of now over-burden healthcare ment.

- each bound to a heavy ethical code. Distribution deficiencies, prompting a proceed with failure to fulfil the nearby need for medical servic-
- Disproportionate healthcare experts' ratios to patients, prompting specialists and attendants working implications. Another example of broadened shifts of over 12 hours. creased business related pressure With a reduced workforce, keep-

ing up adequate ratios to guarantee the necessary degree of care will be troublesome. For instance, attendants working longer shifts are bound to encounter burnout and work dissatisfaction while simultaneously not giving the degree of service they might want.

- An increment in solitary working. This turns into a worry when the workers must take care of tasks or interact with patients or relatives with a known history of brutal or forceful conduct.
- · Higher expectations and unreasonable requests. Specialists and medical attendants will be surged, with inadequate time to have the option to give high-quality care.
- care. As more patients in the region suffer from chronic diseases, there will be an increase in the number of extra care hours needed to guarantee excellent quality care.
- · An increment in-home care requirement, prompting more healthcare experts working ceaselessly from customary organizations. Those experts who need to go into a patient's house are more at danger of verbal and physical maltreat-

Without a stable and developing labour force working under better working conditions, the OSH of healthcare experts won't improve and nor will the nature of the care they give. Working in health care is troublesome with sufficient staff; it will be considerably more so with workers' foreseen deficiency. Inwill influence and exasperate the

psychological and passionate wellbeing of these specialists. There will be heavier remaining burdens, which will be believed to increase drastically as additional patients enter healthcare frameworks across Europe. With a decreased workforce, this will overpower clinical experts. The requirement for staff individuals to accomplish more desk work, again connected to current and arising issues in the overall healthcare sector, including home and local sector care extended deficiencies of staff, will decrease the time spent with patients, and this is viewed as a stress on the labour force, which would much rather have direct patient care hours (de Jong, et.al, 2004).

With an increasing understanding of the critical need for patients with dementia, there will be the desire to incorporate the data collected from the rehabilitation centres as part of the patient's betterment. The use of technology will positively favour the ideal rehabilitative data collection methods, as it will provide patterns and insights to the patient's life, where the data will be the patients. With the building being put in place, the ideal rehabilitation techniques will have begun the journey into combining the patient's who need special care. therapeutical needs. With a linkage in data sharing across all the medical-related institutions, designing the patient care centre will promote positive steps for both symptoms' relief, rehabilitation, and an improved ability to treat the disease as more data will become evident through the centres.

With the data provided, the specialist in all the fields will have insights

into the patient's medical history, and through a combined effort of all the necessary parties, the patients will have the best comprehensive treatment. Data protection is paramount in this field, as the numerous usages of data can be a disaster in the wrong hands or if misinformation Is passed along to the health workers. The General Data Protection Regulation(GDPR) will officiate and have oversight on the data usage across the EU; it has been allowed since the research being done with the data will provide the patients' proper medical care. This will provide a trustworthy identity to this field, and the interlinkage between the specialist in this field will mean that data is used and reused as each patient's needs will be regulated and tailored.

The rehabilitation centres will have the chance to understand the patient pattern and find more nuanced links between symptoms and causes. This data will be passed on to the specialist, who in turn will officiate the treatment and recovery plan. The cognitive plans and incorporations that provide data will used to materialize the recovery of step up the medical research significantly, and it is the ideal use, analysis, and innovation that will see a stride more so in rehabilitating patients

> Once the data usage helps contribute to the rehabilitation and improves the patients' health care, it may be fair to assume that the subjects' consent would no longer be needed, as the greater good of the process will surpass the fear for data mis-usage. The healthcare sector joins a few subsectors committed to giving healthcare servic- calling and may incorporate casual es and social work activities. The caregivers and specialists. Informal

United Nations (UN) International Standard Industrial Classification arranges human health and social care activities as the provision focused on health and social work activities. The activities are widespread, from healthcare given via trained and professional clinical experts in clinics and different offices, to personal care engagements that include some social work activities that do not require healthcare experts. Many individuals work indirectly for the healthcare sector, not forgetting those used for businesses and services supporting it, for instance, the drug industry, the medical device industry, health care insurance, health research, eHealth, occupational health, and spas. These health workers who are, by implication, used in the sector are avoided from this report (de long, et.al,

Nations face various human difficulties and requirements; however, some general challenges can be recognized, including the need for data frameworks to screen the work market for HealthCare labourers and address labourers' needs for new abilities by preparing and life-long training. Since successful healthcare frameworks and the arrangement of value healthcare rely upon the presentation of an adequately taught, talented, and inspired labour force, keeping good working conditions is significant.

Generally, there is an increasing trend focused towards more outstanding community-based care and growing interest of home care workers. Home care helpers' gathering isn't comprised of one explicit



Fig.6.3 Promote independence

caregivers, migrant workers, and home-care professionals are vulnerable groups. All in all, they have The buildings will be designed to less favourable working conditions and less government-managed retirement, and they get lower compensation. The presentation of ILO Convention No 189 aims to guarantee the successful insurance of home-visit specialists. Horrible working conditions are among the causes behind current staff deficiencies in-home care. These deficiencies are relied upon to increment. OSH specialists' consequences of the research report uncovered that home care caretakers are less ensured by OSH enactment than those working in healthcare organizations.

These insights showed that health and social carers have the fourthmost noteworthy pace of genuine occupational disease in the past year, simply behind industries, such as assembly and development. Women who work in the health and social work sector were bound to have had at least more than one mishap or to have experienced a transmission related infection than ladies working in different sectors.

Subjects who share their data have the best shot when it comes to improving rehabilitation and symptomatic treatment of dementia. The patterns that each disease manifests are always recurring, and so with the data available for the stakeholders in the medical industry, who go past the doctors and the nurses, provide all the associated parties with an ideal chance to move and make more proportional results. With architecture, the data collected will be used to maintain patients' ideal

needing additional natural help.

accommodate the patients. The data that will be shared will also be subjected to protection, and the benefits we will relate to the incorporation of medicine and architecture in a fashion that is hugely beneficial to both healthcare workers and those suffering from dementia. In the recent past, the building of medical centres was not idealized to different patients' needs, but now all the patients' needs can be incorporated together through smart architectural solutions. This collaboration will come a long way to maximize the labour usage, as the need to adjust the buildings will be off the charts, and the initial foundations will incorporate all the ideal needs for each of the patient facilities. The protection of all subject data will be the main priority, and making sure all of the parties involved stay in congruence with the laws. The outcome will be the best care for patients and reduced stress on healthcare workers.

Recommendations for future research

Since there is a lack of recent comparable data at the EU level on the working conditions, exposures, and safety of these healthcare professionals, more detailed data will be needed to prioritize specific risks. There is also some more limited information on the impact of the existing risks on the quality of care patients are getting. The impact of the risks faced by healthcare workers has also not been suitably studied, for instance, with the ergonomic livelihood with different diseases and psychosocial risks. Even though

one could argue out that a healthcare framework's performance is interrelated with the OSH problems that the workforce is also exposed to, there are no studies that have proven this relationship. The new technologies being introduced, such as the introduction of robotics and exoskeletons, will significantly contribute to improving working conditions. This would be even better suited to a home care setting. Telemedicine will go a long way in ensuring there is continuous training of these workers and the related risks taken into account in the design phase of new applications and other new technologies.

Link to Architecture

smart technologies. Current issues sion of dementia on a wide scale. with data collection are related to privacy and a subsequent lack of data available on people with dementia. Thanks to new rulings such as the GDPR, which aims to offer more legally binding responsibilities for data collecting, there is hope for the increased availability of data. What I wish to do through smart technology implementation and design-based architectural solutions is to make the most of data collection so that there is the most informed understanding of how dementia is affecting people and data collection and feedback loops based on it can help reduce the suffering of those with dementia and alleviate the strain placed on their carers and close ones.

Although data and privacy will always remain linked to one another, the hope is that when the positive effects of data collection for dementia are seen to outweigh the negative effects of dementia symptoms, the thirst for privacy will be outweighed by the accepted fact that these data collecting methods can offer serious improvements to people's quality of life. Once the solutions from data collecting are shown to have a seriously positive effect by offering more informed responses to the disease, this is likely to sway people in the direction of Fig. 6.4 General Data Protection Regulation - EU data collection as a positive asset. Smart technologies would work by gathering information of those in care homes and responding to this information to prevent symptoms from developing or people with the disease regressing. If this is possible, the benefit of data collection should

The focus of this specific outweigh its privacy infringing section on data usage and design downfalls if it can successfully presolutions is particularly relevant to vent the development or progres-



Chapter SIX References & more

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Fig.6.2 https://stat.link/2n9apk

Fig.6.3 https://www.edgewoodhealthcare.com/wp-content/ uploads/2019/06/Feature-Man-and-Woman-Riding-Bike.jpg

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MACRO SCALE - EINDHOVEN MATTER

MEZO SCALE
SITE ANALYSIS
SITE VISIT
LIGHT POLLUTION
MASSING
MASSING – INITIAL
MASSING – FOCUS ON LIGHT AS REHABILITATION PRINCIPAL MOTIVATION
SECTIONS – INDOOR/SEMI-OUTDOOR
SPACES
PRIVACY OF THE DEVELOPMENT
(COURT YARD DEVISION)
FORM

TYPOLOGY SUPPORTING 24/7
REHABILITATION ENVIRONMENT
MODULES
OFFICES
CIRCULATION SPACES
SOCIAL SPACES – SPHERES
SEMI-INDOOR NATURE
DARK ROOM

MICRO SCALE
STRUCTURE
MODULARITY
SMART FACADES
MASHRABIYA
DETAILING

7.

ARCHITECTURAL TRANSLATION

7.1 Macro scale - Eindhoven matter

SMART CITY DESERVES

SMART BUILDINGS

Eindhoven is situated in Northern Brabant and is typified by its technological prowess. Also known as the Light City, due to its connection with Phillips and their technological developments, Brabant is experiencing an increase in migration by professionals and students who want to be a part of this growing community and access the increasingly renowned and multi-disciplinary city.

Per this pattern of city growth, the Malvalaan-Waarle is located in the south of Eindhoven Central across the High-Tech Campus, which is approximately 4km away from the inner city ring. This project will add to the developmental architecture and design of the city, promote novel business thinking and offer jobs to the local area.

As the city of Eindhoven continues to develop, the architecture of the city should complement this forward motion and inspire new designs and solutions that can counterbalance the inevitable issues of an ageing population.

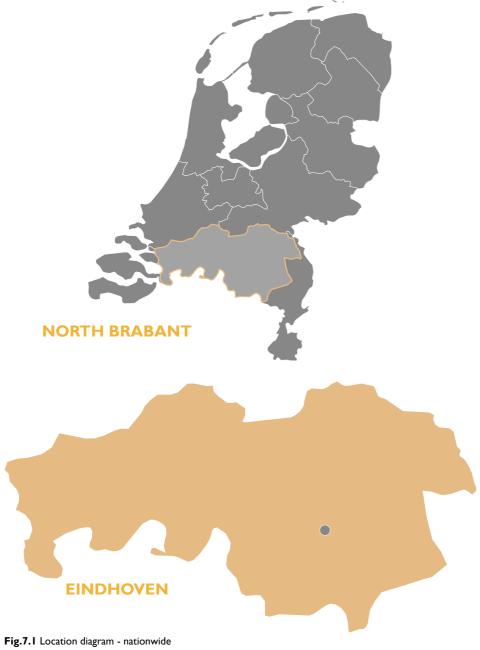




Fig.7.2 Location diagram - Eindhoven

- **MALVALAAN WAALRE**
- **GAT VAN WAALRE**
- **MÁXIMA MC VELDHOVEN**
- **HIGHTECH CAMPUS EINDHOVEN**
- **GOLF & COUNTRY CLUB DETONGELREEP**
- **A2 HIGHWAY**
- **EINDHOVEN TRAIN STATION**

7.2 Mezo scale



Fig.7.3 Location diagram - Malvalaan

- I. MALVALAAN WAALRE
- 2. GAT VAN WAALRE
- 3. HIGHTECH CAMPUS EINDHOVEN
- 4. GOLF & COUNTRY CLUB DETONGELREEP
- 5. A2 HIGHWAY

The surrounding environment is complementary to the site chosen because it will offer a home-like quality of life with access to activities and simple, efficient commuting pathways. The purpose of these qualities is to encourage a smooth transition for those who move from home to the facility and ensure that once they are there, they can easily integrate their old lifestyles into the new environment.

As the site is in the direct vicinity of the A2 highway, this makes commuting and other access effortless. Furthermore, Maxima MC Veidhoven is just over 3km away from the site and this plays a significant role in the extension of rehabilitation capabilities. A further bonus is that there is a nearby park, golf club De Tongelreep and a lake all under 2km away which offers residents the chance to exercise, socialise and stay healthy.

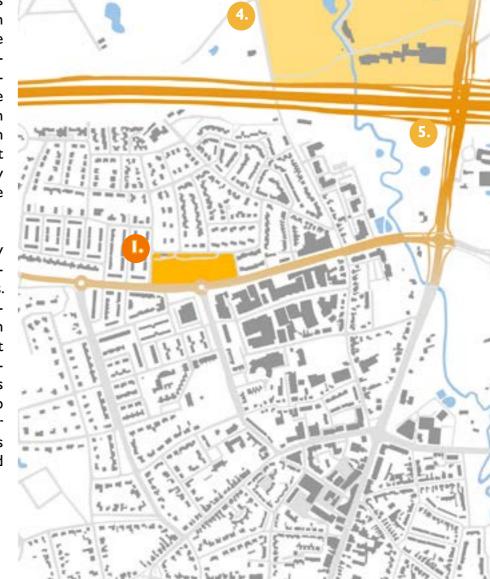


Fig.7.4 Location diagram - site



Fig.7.5 Satelite view- Malvalaan 99

7.2.1 Site analysis

In order to proceed with massing, site analysis based on the existing structure was significant. Generating views on the eight different time of the day in 4 different seasons helped with further studies. Appreciate this process was essential to see how the facades have been affected by light.

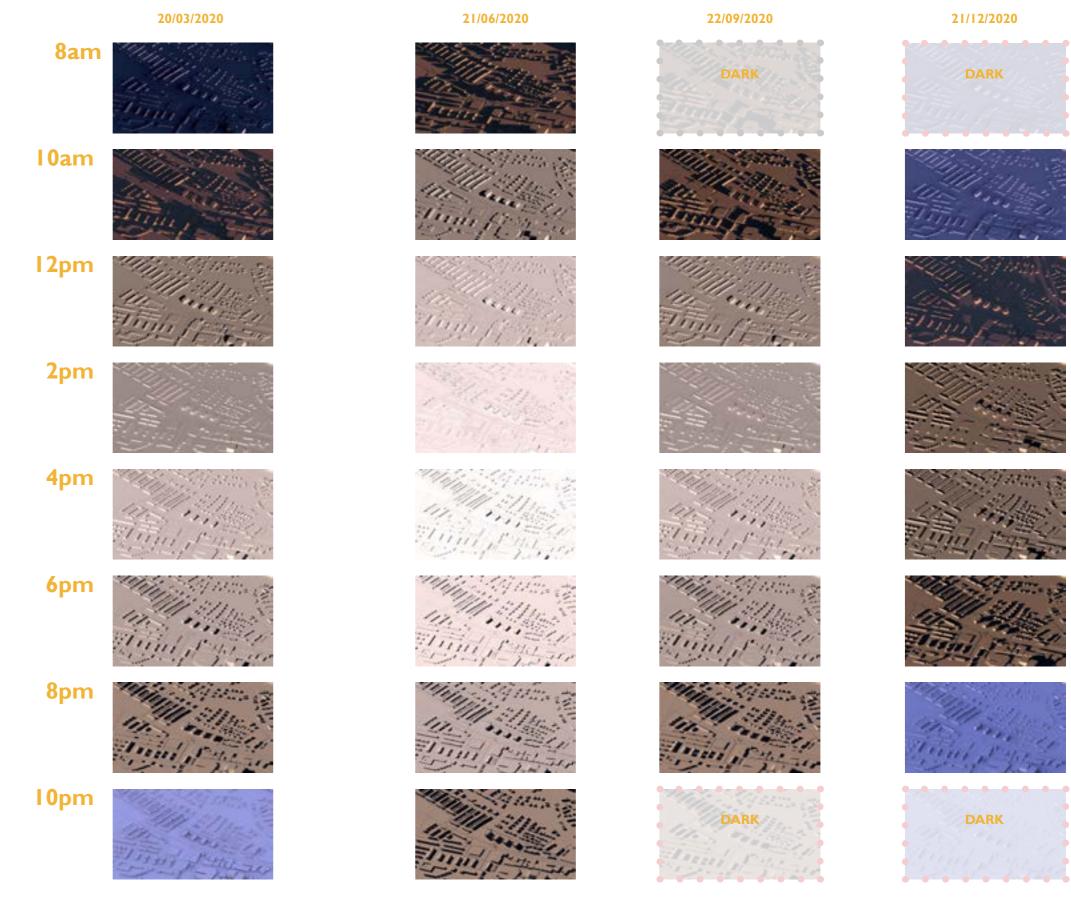
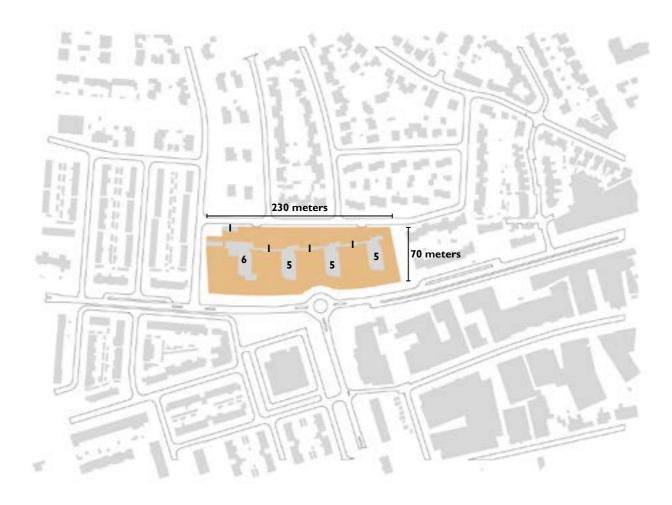


Fig.7.6 Sun exposure study - Malvalaa

Plot location



Plot area

Fig.7.7 Malvalaan site - plot location

Total area: ~1.8ha

Existing:

Ix 6storey 3x5storey 3x linkage(single storey) Ix garage

Conclusions

The plot is allocated very close to the roundabout, which creates many constraints based on accessibility and traffic engineering while planning.

The site is sandwiched between residential and commercial zone.

Building age



Fig.7.8 Malvalaan site - building age

Conclusions

Analysing years of construction of the surrounding structure and looking at the facades of the buildings in terms of aesthetics and heritage concern, the site is clear from such matters.

In the southeast of the site, the industrial estate has been operating for more than 20 years.

Building height



Fig.7.9 Malvalaan site - building heights

Conclusions

The heights of the surroundings and existing structure are in between low and mid-rise.

Type of use



Fig.7.10 Malvalaan site - type use

Conclusions

The use on the site is in between commercial and residential. The density of commercial is based on the south side of the structure.

Surrounding vegetation meets light pollution

Fig.7.11 Malvalaan site - vegetation & light pollution

Surrounding vegetation meets noise pollution



Fig.7.12 Malvalaan site - vegetation & noise pollution

7.2.2 Site visit



Fig.7.13 Existing structure on Malvalaan site

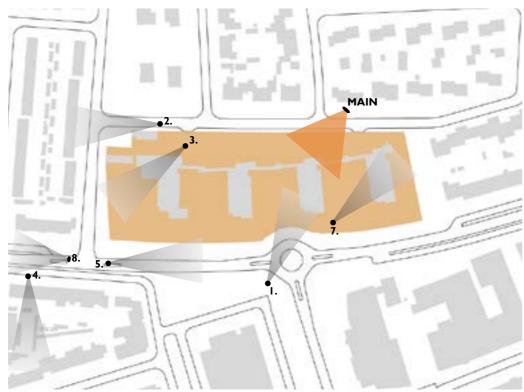


Fig.7.14 Diagram with phtograph orientation

The focus here was centred around some key themes like accessibility, building quality, sunlight intensity and prevalence of existing natural habitats.

The area was flawed for its lack of natural light and poor building quality but slightly salvaged by the presence of some natural environments. Based on an investigation of the area, it was evident that some natural spaces already existed around the buildings, but they were not integrated with the care home and only sparsely scattered in the surroundings. This meant that further development would be required to achieve the standard of nature required for my design.

The availability of light on the chosen sight was poor and this stimulated my decision to encourage a design that would complement natural light as I saw the lack of it here to be a great disadvantage; and one in need of fixing.

Furthermore, the buildings were also of poor quality which prompted the need for demolition and architectural redesign with the integration of smart technology.

The purpose of these proposed solutions to the existing site was aimed at providing the best quality of life with the highest potential for rehabilitation for those with early stage dementia. For me, this meant a focus on nature, natural light, building quality and building composition.







Fig.7.16 View 2



Fig.7.17 View 3



Fig.7.18 View 4



Fig.7.20 View 5



Fig.7.20 View 6



Fig.7.21 View 7



Fig.7.22 View 8

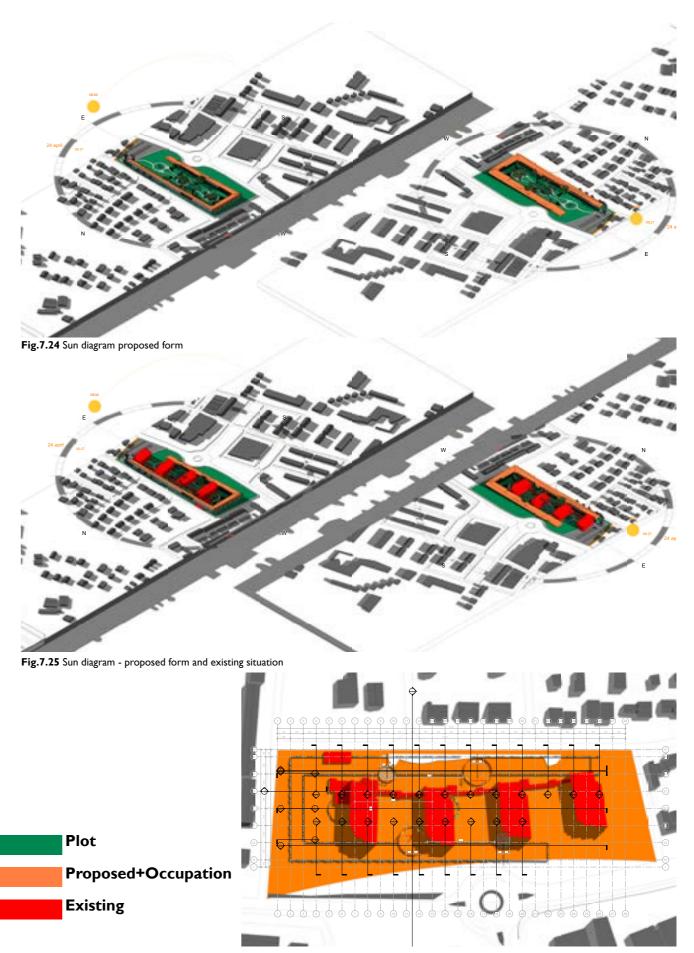
7.2.3 Light pollution



Fig.7.23 Light pollution diagram

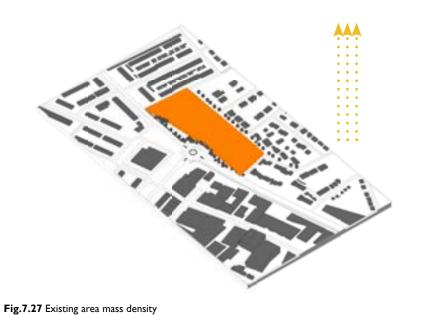
Through the results of my research, I established that light is playing a crucial role in the rehabilitation process. During nights massing exercise should allow blocking the external light pollution totally for the best outcome. Massing follows up on-site based analysis made U-shape with different height as the best beneficial form, which could allow daylight to come in, avoid the night light pollution.





 $\textbf{Fig.7.26} \ \textbf{Plot} \ \textbf{diagram - proposed form and existing situation}$

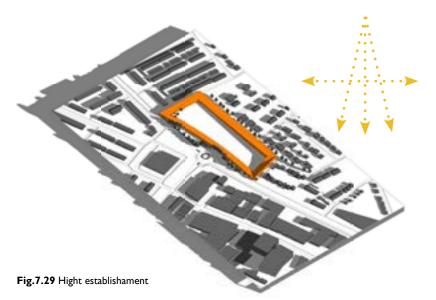
7.2.4 Massing



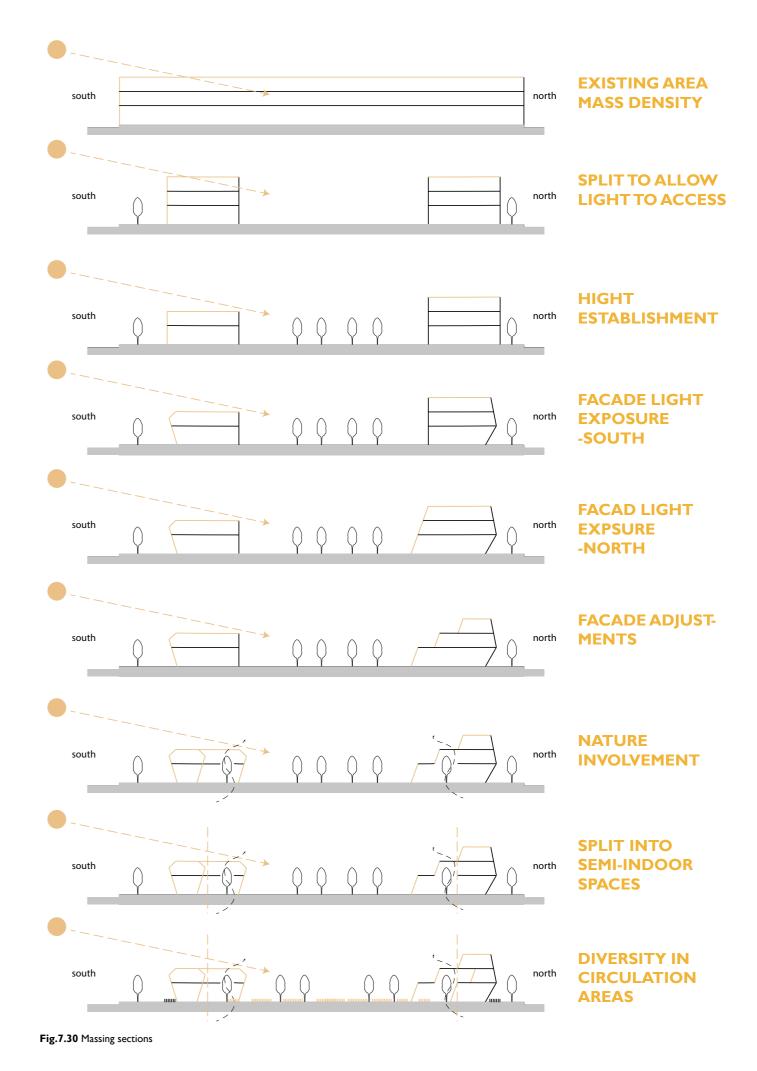
EXISTING AREA MASS DENSITY

Fig.7.28 Split to allow light to access

SPLIT TO ALLOW LIGHT TO ACCESS

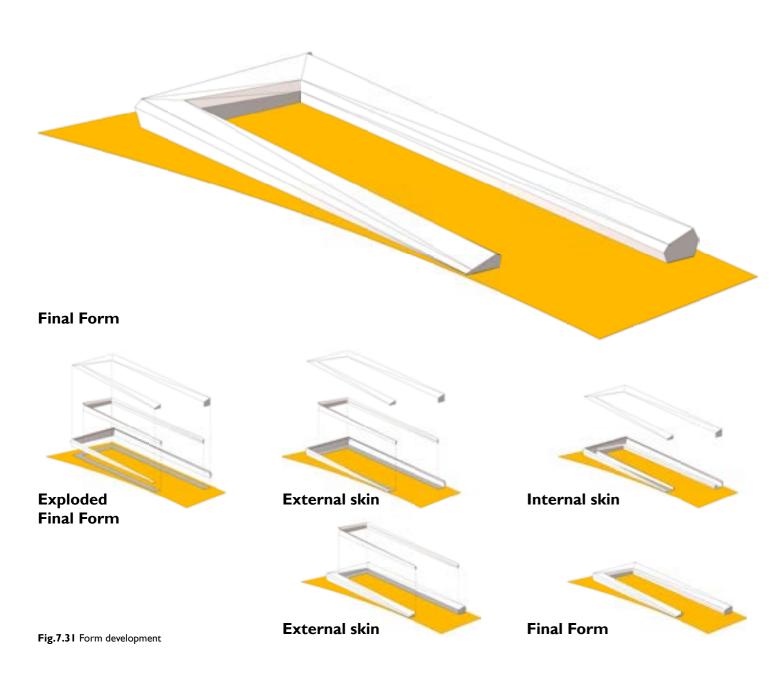


HIGH ESTABLISHMENT

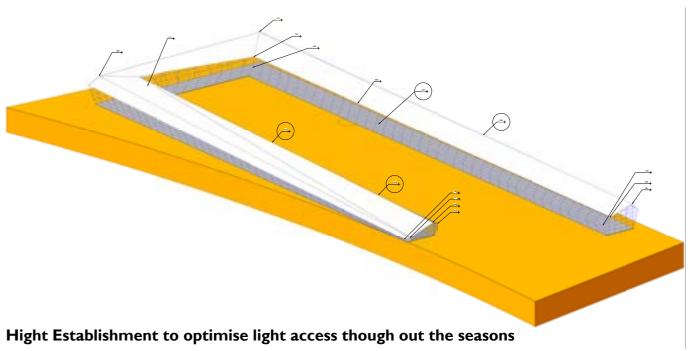


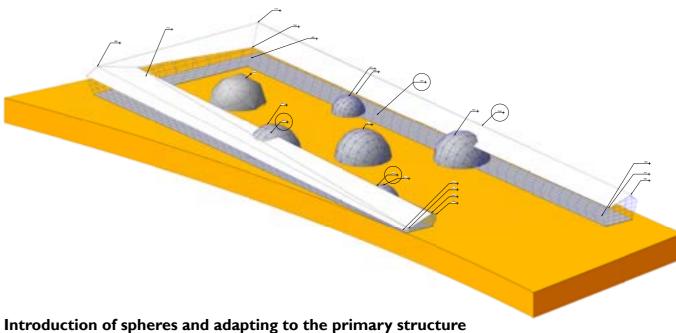
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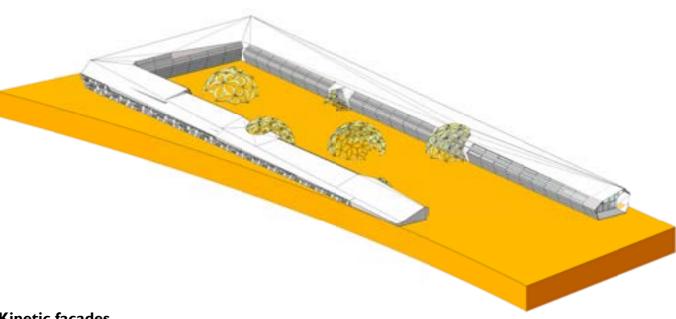
Form establishment



- The first step was the allo- 2. cate the existing area into its existwith buildings, trees and dense foliral and non-natural spaces.
- Dividing the chosen loca- 3. ing mass density. Areas with open mat gave the blueprint for how to length, depth and shape of the built space were separated from areas develop the areas. This massing in- areas and give insight into the preage. The faint outline of the building rectangle would encircle the open area in the middle. Adding specific was thus drawn into the existing lo- courtyard in its centre. The exte- annotation gave further clarity as cation and buildings were shown as rior would function as the building to how this labelled section would coloured in to distinguish the natu- sections of the design and the inte- exist and where different materials rior would remain open, occupied would need to be applied. only by some kinetic facades.
 - Following this, clear differtion into a clear and equal grid for- entiation was made to show the dicated that the exterior of the grid cise size of the open, courtyard







Kinetic facades

7.2.4.2 Massing – Initial

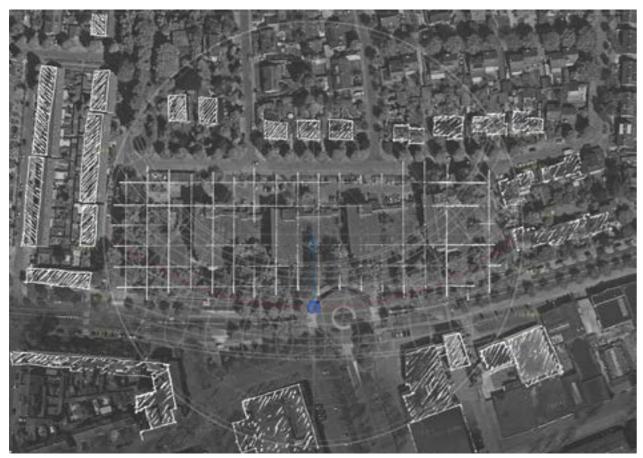


Fig.7.33 Site division

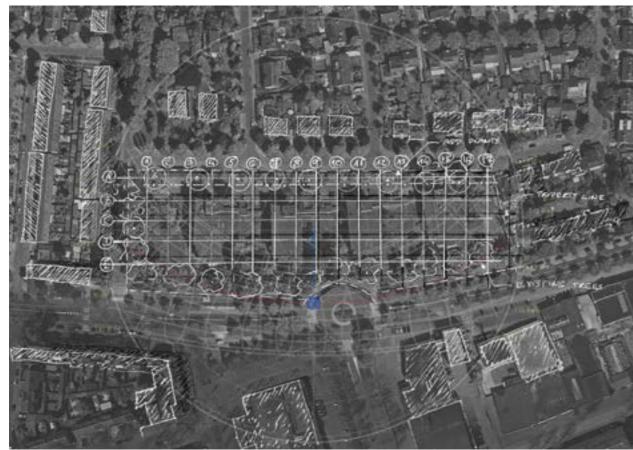


Fig.7.34 Site division - grids

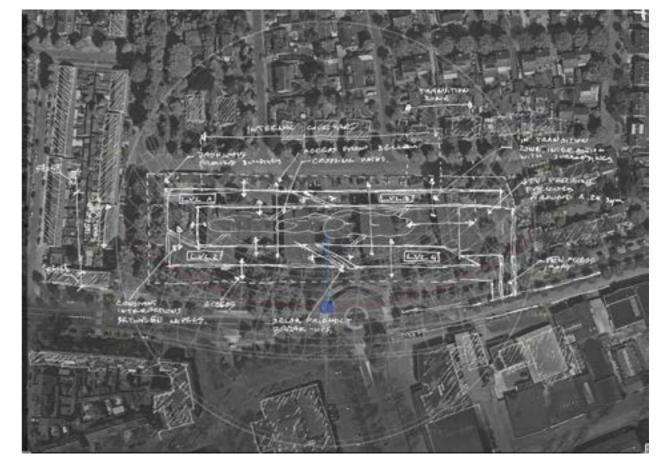


Fig.7.35 Form development - levels



Fig.7.36 Form development - division

4. The final diagram shows the final massing of the project. The long snaking courtyard would occupy the division between the long buildings on either side. At one end, the courtyard remains open and at the other end, the building closes the courtyard. Areas that will be built are shaded to highlight their specific shape and give structure to the massing proposal. Buildings will have some small separations as shown and will vary in size but follow varied cubic structures.

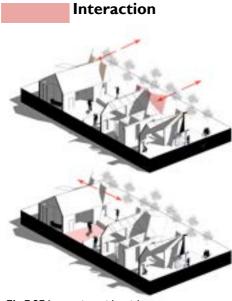


Fig.7.37 Interaction with neighours

Typology adapted to the environment



Fig.7.38 Adapted typology

As an addition to the form, the initial idea was to incorporate different functions into the site to develop a rehabilitation environment.



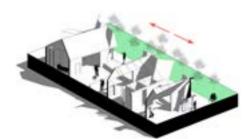
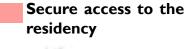


Fig.7.39 Importance of nature

Optimizing natural light



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Fig.7.40 Natural light usage Fig.7.41 A



Fig.7.41 Access to the residency

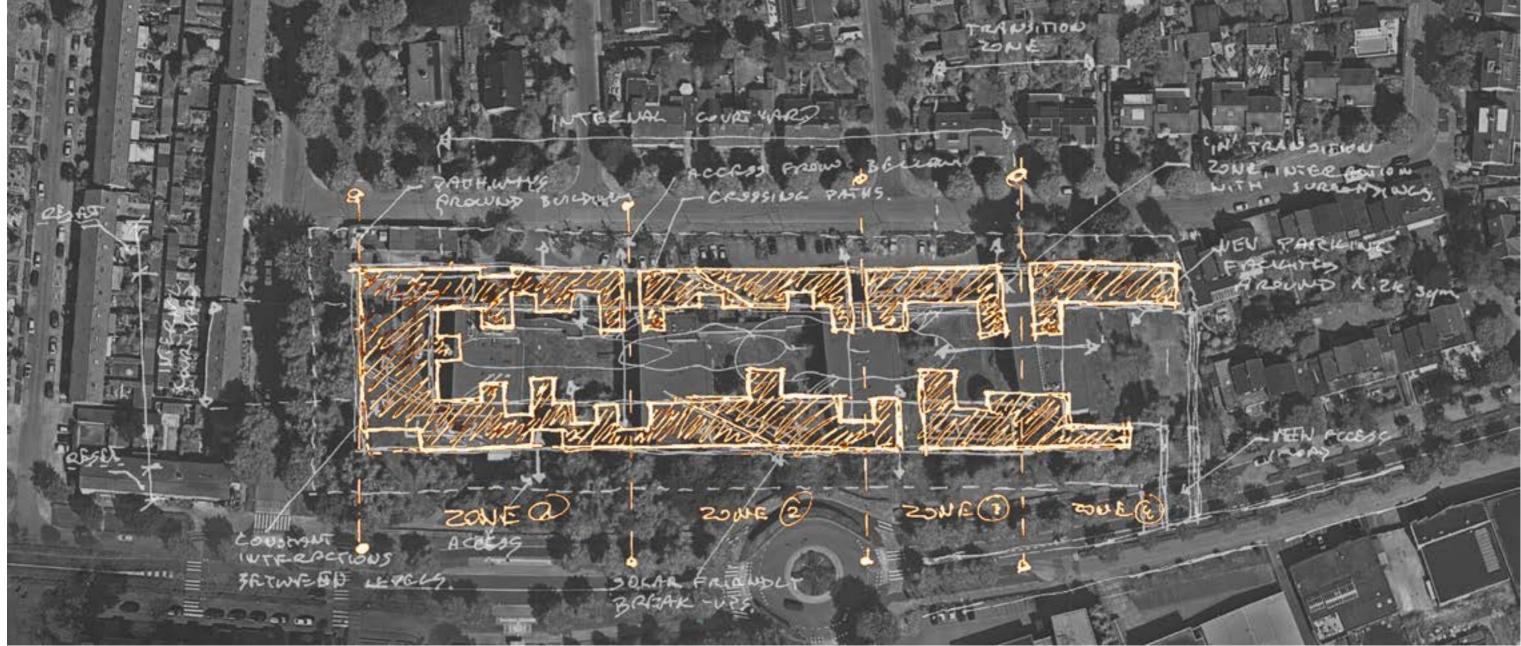


Fig.7.42 Initial overall plan

False color rendering - masses

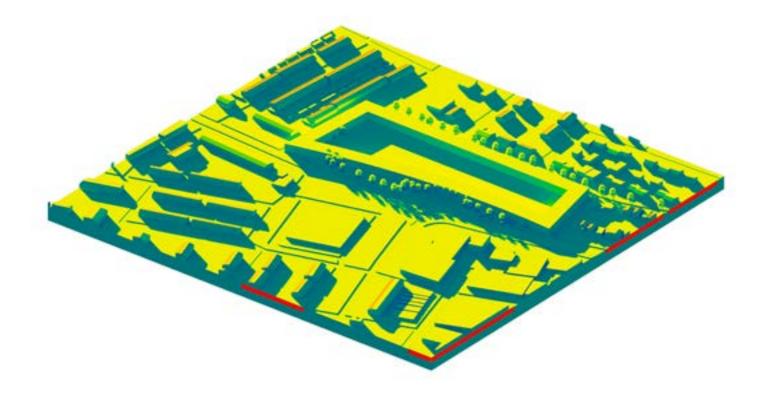


Fig.7.43 Overall massing during afternoon

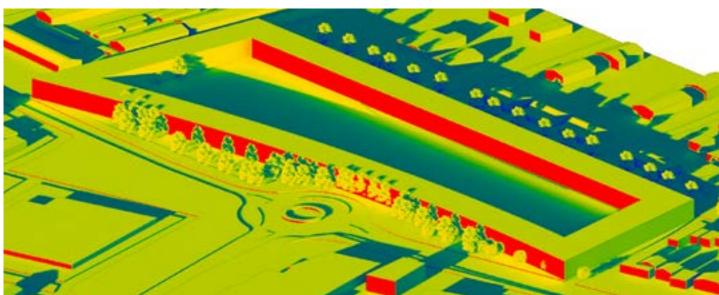


Fig.7.44 Overall massing during early morning

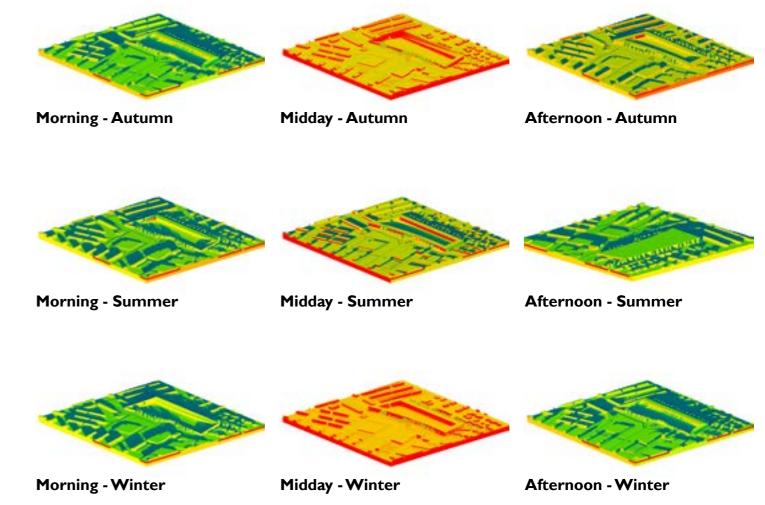


Fig.7.45 False color rendering in different seasons and times of day

The importance of measuring (through false colour rendering) the respective heat intensity of different areas is to provide a com-By measuring the heat intensity, as shown in the diagrams, it provided how the heat would play a role in the kinetic façade locations on site.

The kinetic facades are located in Given that different activities can different places on site and offer take place under these facades, such multi-functional environments, but as cooking, gardening, relaxing, the this is no use if they are inadequate- relevance of a good temperature fortable environment for different ly moderated and become too hot cannot be understated. Without functional aspects of the building. or cold at certain times of day and heat moderation in these environthroughout different times of the ments, their functional purpose year. Therefore, the false colour could be made redundant. For exfactual information as to how heat rendering gave insight by predicting ample, an area cannot be used for affects the building and particularly, heat at different points of the day. socialising and relaxing if it is incred-This offered the chance to get the ibly hot. The false colour rendering best temperature within the areas with facades.

gives the chance to moderate this and improve the functionality of the façade environments.

False colour rendering - facades



Fig.7.46 Internal false color rendering study



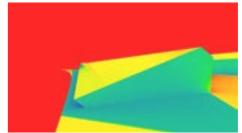
Courtyard 8an



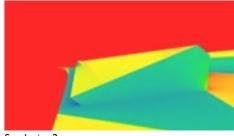
Southwing 6am



Northwing 4nm



Southwing 2p



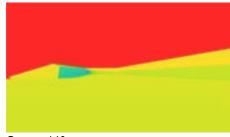
Southwing 2pn

False colour rendering established that roof and facade form must be diverse to deliver the most amount of morning daylight.

As predicted, bedrooms need to be allocated in the south of the structure regardless of the wing variety.

Having a rough idea of how the modules will be arranged, the study could predict light delivery into internal spaces.

The east site of the wing needs to be allocated the lowest to allow the rest of the structure to experience equally morning light. Moreover, this part must be completely disabled from residential living activities. It will be the closest to the parking and existing round, which creates the most of light and noise pollution.



Courtyard 10am



Northwing 8am



Northwing 6pm



Southwing 4p



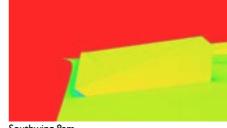
Westwing 12pm



Courtyard 12pm



Northwing 10am



Southwing 8am



Westwing 6am



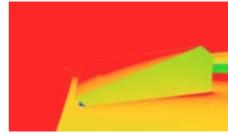
Westwing 2pm



Courtyard 2pm



Northwing 12pm



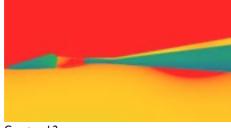
Southwing 10am



Westwing 8am



vestwing apin



Courtyard 2pm



Northwing 2pm



Southwing 12pm



Westwing 10am



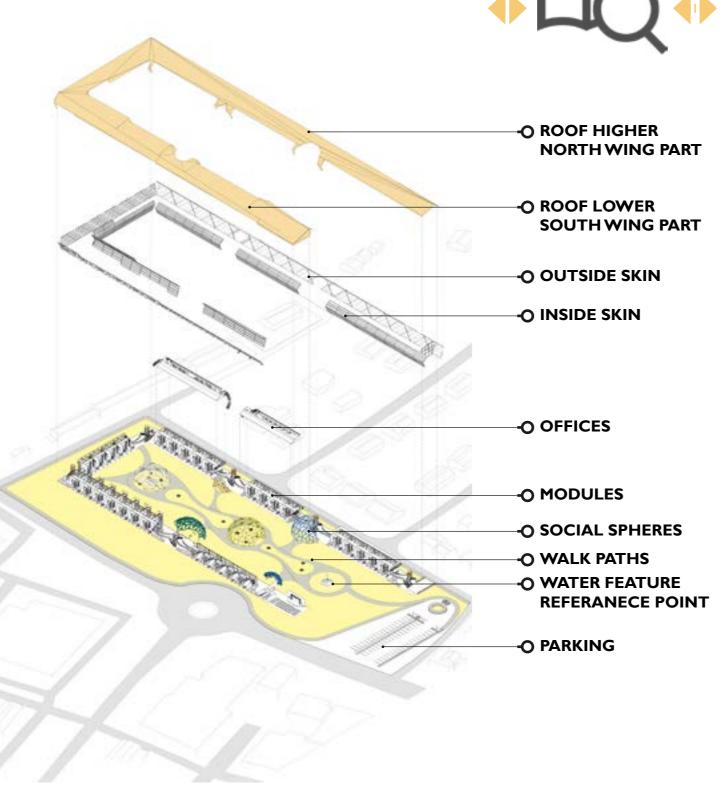
Vestwing 6pm

Fig.7.47 False color rendering study - facades

7.2.4.3 Massing – Focus on light as **Rehabilitation Principal Motivation**

The approach for this building was Based on these factors, I could outand the influence of several key followed by the design processes. features of dementia progression.

motivated and moderated by the line the process of massing. The existing environment, the surround- research established eight different ing nature, light cycles of the area factors to settle modules typology,



11111111

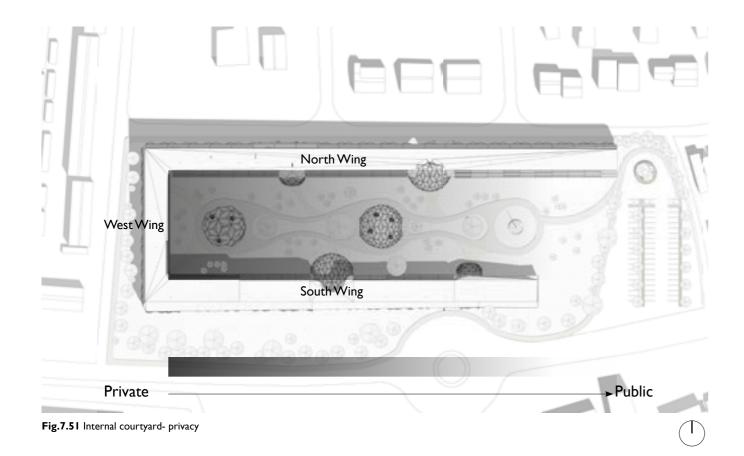
Fig.7.49 Rehablitation Environment diagram.



Fig.7.50 Blinds - internal light ajustment

Fig.7.48 Exploded axonometric

7.2.5 Privacy of the Development (Court Yard Devision)



Space division:

Put most simply, space in the facility is divided into three domains of public, private and semi-private.

Public areas allow for family visits and social interactions without impeding the privacy of other residents.

Private areas offer facilities such as a therapeutic swimming pool that require exclusive privacy for the residents and can only be accessed by workers and residents.

Semi-private areas allow for an overlap where family and close friends may be allowed to visit the room of a resident and some social spaces; if they have permission. These areas allow for social encounters with a well-managed amount of privacy.

7.2.6 Typology supporting 24/7 Rehabilitation Environment



As far as dementia-based architecture is concerned, my proposal is more inclusive and inter-disciplinary in nature than that which is currently being implemented in dementia care homes and dementia healthcare facilities. The five typologies offered in my design encompass different therapeutic approaches, each with its own purpose, but the design still allows different therapeutic approaches to overlap and intertwine. This is exemplified by the combination of natural light usage, indoor natural spaces and sound therapy solutions acting together, rather than exclusively.

The five typologies are in fact distinct, but there are some unifying characteristics that they all share. For example, one consistent factor in all areas of the building is that bedrooms will always be south-east facing to ensure that sunlight will reach residents in the morning to offer the best access to natural light, thus, the most positive effect on circadian rhythm regulation.

Furthermore, each separate area will have an indoor colour code that is consistent with the colour of its respective entry point. For example, if the entry point in one sector of the building is of a light blue colour, the internal columns of that area will also be of the same shade of blue. This approach is similar to that of the Madrid Barajas airport and will help to direct residents by colour if they struggle to remember certain routes or sign meanings.

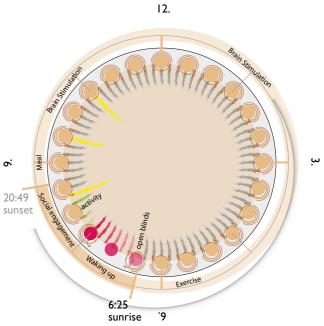
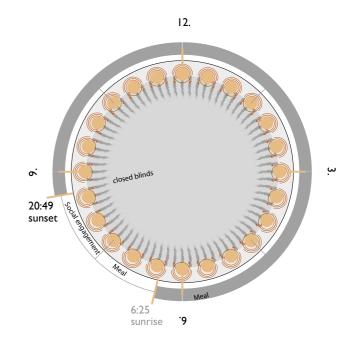


Fig.7.52 Rehablitation diagram - example day schedule





Monday, 24 April 2023 (CEST) Eindhoven

Fig.7.53 Rehablitation diagram - example night schedule

Typology supporting 24/7

Rehabilitation Environment - e.g. Human Interaction

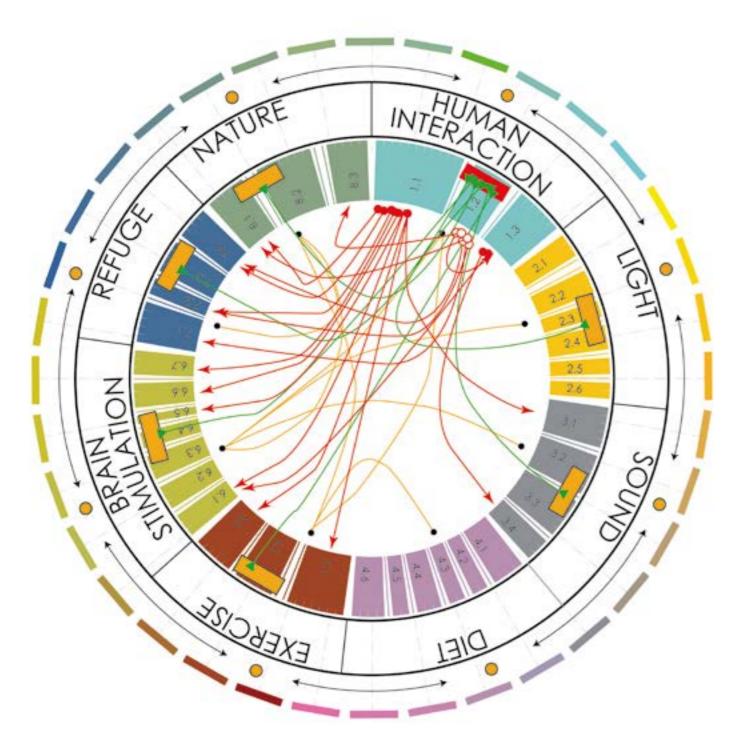


Fig.7.54 Rehabilitation Environment diagram- human interaction factor overlapping with the rest of the environment

Based on the research, the eight different factors are found to be very important to make rehabilitation as effective as possible. All those factors influence each other. Those eight main factors have been split into smaller components like social engagement or stress relief, which belong to human interaction (I). All those smaller components overlap with each other to make the environment complete.

Diet is closely connected to exercise, which help with regulating glucose index, afterwards, those two components impact brain stimulation and learning capacity in early dementia stages.

Those components created the typology of the modules network and U-shape structure.

| 1. | Human interaction |
|----|--|
| | 1.1 Social engagement (3.1/5.1/5.3/6.1/6.5/6.6/6.7/7.2/7.4/8.1) |
| | 1.2 Companionship (1.3/ALL 3/ALL 5/ALL 6/7.1/7.2/7.7/8.1/8.3) |
| | 1.3 Stress relive (ALL 2/ 3.4/ ALL 5/6.1/ALL 7/ALL 8) |
| 2. | Light |
| | 2.1 Blockage/additional exposure to natural light (1.3/3.4/ALL 4/ALL 5/ALL 6/7.2/7.3/7.4/8.1/8.3) |
| | 2.2 Sleeping pattern stabilization (1.3/3.1/3.4/ALL 5/ALL 7/8.3) |
| | 2.3 Brain Fasting-sleep (ALL 4/ ALL 5/8.3) |
| | 2.4 Feeling of orientation (3.1/ ALL 5/ ALL 6/7.1) |
| | 2.5 Reduction of toxins in the brain (ALL 4/ ALL 5) |
| | 2.6 Body clock reset (ALL 4/ ALL 5/7.1) |
| 3. | Sound |
| | 3.1 Sensory stimulation (ALL 1/2.2/ALL 4/ALL 6) |
| | 3.2 Memories recalls (1.3/ 2.1/2.2/2.6/ALL 4/ ALL 5/ ALL 6/7.2/ 8.1/ 8.3) |
| | |
| | 3.3 Memory prompts (AS ABOVE) |
| _ | 3.4 Relief with depression and mood swings (1.3/ ALL 2/ ALL 4/ ALL 5/ 7.1/81./8.3) |
| 4. | Diet |
| | 4.1 Glucose index (2.1/2.2/2.3/2.5/2.6/ ALL 5) |
| | 4.2 Brain Fasting (AS ABOVE) |
| | 4.3 Low carb meals (AS ABOVE + ALL 8) |
| | 4.4 Decreased insulin realize (stabilized blood pressure) (AS ABOVE + ALL 8) |
| | 4.5 Meal planning and scheduling (ALL 5/ ALL 8) |
| 5. | Exercise |
| | 5.1 Walking/jogging (1.1/1.3/2.1/2.5/3.1/3.3/3.4/6.1/6.4/6.7/7.2/7.4/8.1/8.3) |
| | 5.2 Aerobic Exercise machines (1.1/1.3/2.1/2.3/2.5/2.6/3.1/3.3/3.4/ALL 4/ 6.1/7.4) |
| | 5.3 Team Sports (low aerobic intensity) (1.1/1.3/2.1/2.3/2.5/2.6/3.1/3.3/3.4/4.1/4.2/4.4/6.1/7.1/7.2/7.4/ALL 8 |
| 6. | Brain Stimulation |
| | 6.1 Maintain connection with residents (1.1/1.2/1.3/2.1/ALL 3/5.3/7.1/8.1/8.3) |
| | 6.2 Recording exercise (ALL 2/ALL 3/4.1/4.4/ALL 5) |
| | 6.3 Picture recognition (AS ABOVE) |
| | 6.4 Stabilization of blue/white light (AS ABOVE) |
| | 6.5 Recognition training (AS ABOVE) |
| | 6.6 Routine cognitive games (AS ABOVE) |
| | 6.7 Recollection (AS ABOVE) |
| 7. | Refuge |
| | 7.1 Safety (1.1/1.3/2.1/3.1/3.3/3.4/6.1/ALL 8) |
| | 7.2 Concentration (1.1/1.2/ALL 2/ALL 3/ALL 4/ALL 5/ALL 6/ALL 8) |
| | 7.3 Decreasing aggression (ALL 1/ 2.2/ 2.4/2.6/3.1/3.3/ALL 4/ALL 5/6.1/6.4/ALL 8) |
| | 7.4 Reduction of inflammatory response-stress relive (ALL 1/ ALL 2/3.1/3.3/3.4/ALL 5/6.1) |
| 8. | Nature |
| _ | 8.1 Increased interaction with others (ALL 1/ 5.3/6.1/7.4) |
| | 8.2 Support with frequent recollection (ALL 1/ 2.1/2.2/2.6/3.1/3.2/4.1/4.2/ALL 6/ 7.1/7.2/7.3) |
| | 6.2 Support with frequent reconection (ALL 1/ 2.1/2.2/2.0/3.1/3.2/4.1/4.2/ALL 0/ 7.1/7.2/7.3) |

HUMAN INTERACTION Social Spheres - Residents Entrance/ Neighbours interaction Social Spheres - Activities Interaction between zones

Fig.7.55 Rehablitation Environment - Human Interaction diagram.

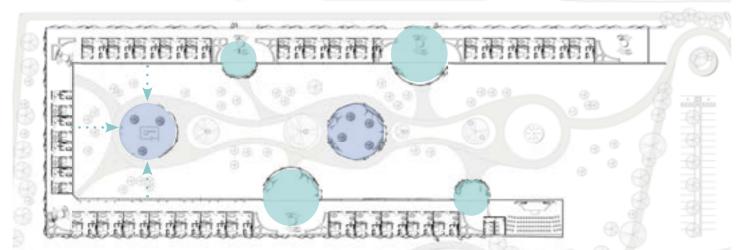
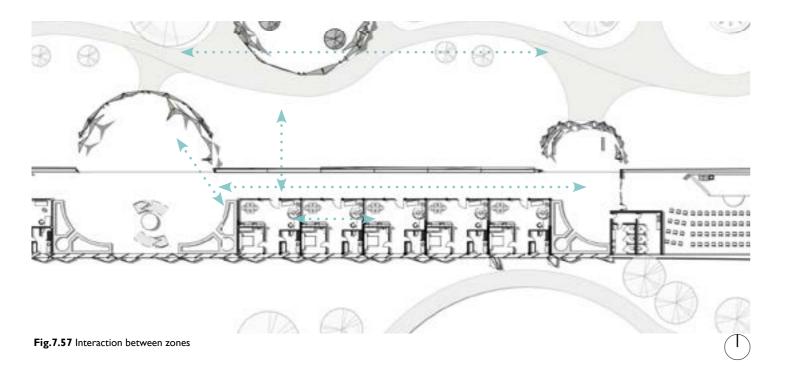


Fig.7.56 Ground floor social spheres



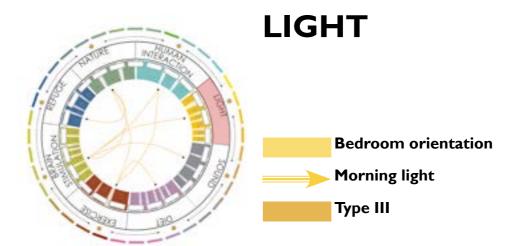
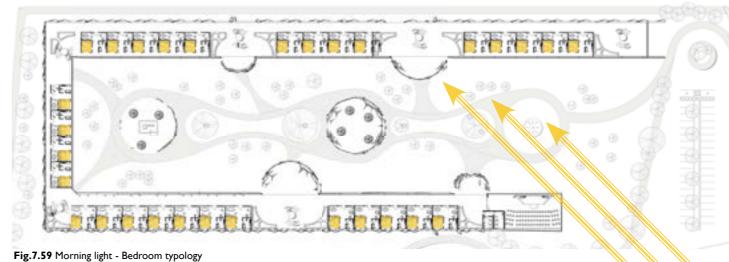


Fig.7.58 Rehabilitation Environment- light diagram



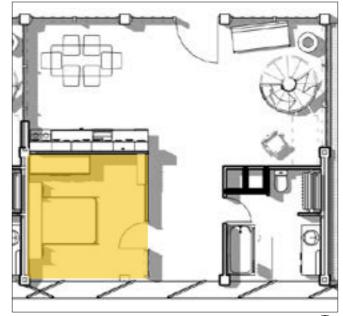
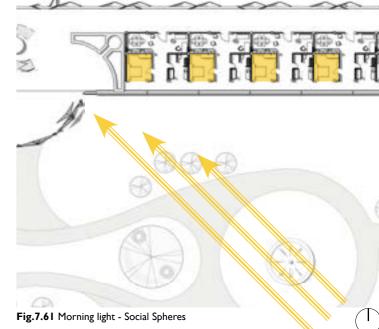


Fig.7.60 Bedroom



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Type II Type III Type III Fig.7.62 Rehablitation Enviroment- Nature diagram.

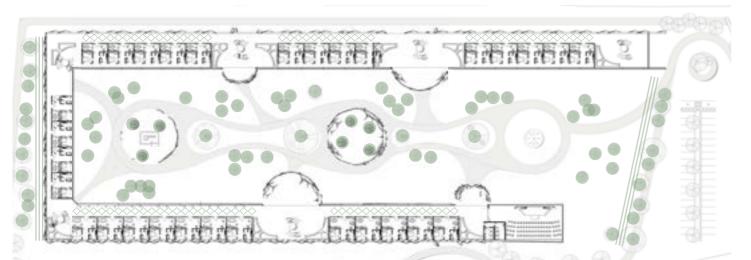
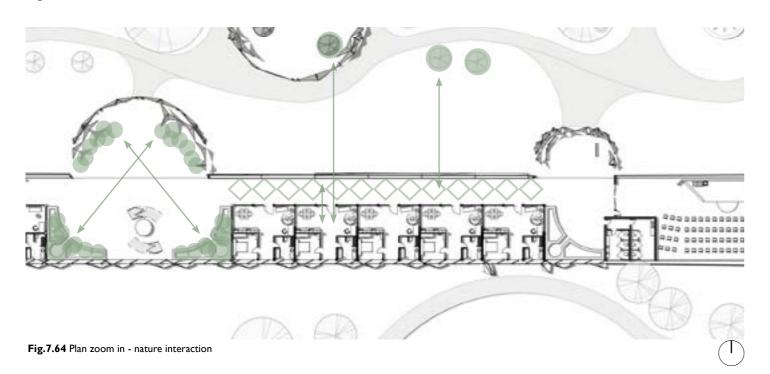


Fig.7.63 Plan - nature



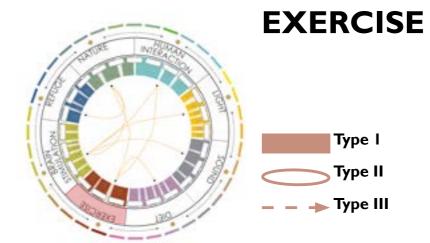


Fig.7.65 Rehablitation Environment diagram-exercise diagram.

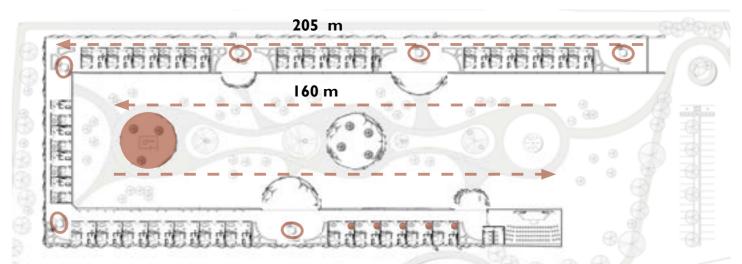


Fig.7.66 Plan - Exercise diagram

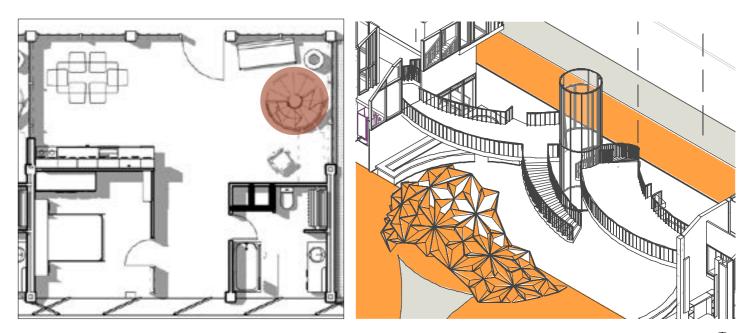


Fig.7.67 Staircases - increased movment

Fig.7.68 Common staircases for residents

BRAIN STIMULATION DAY TIME BRAIN STIMULATION AREAS

NIGHT TIME BRAIN STIMULATION AREAS

Fig.7.69 Rehablitation Environmentbrain stimulation diagram

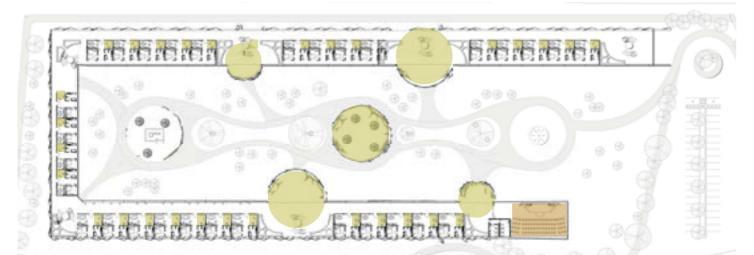


Fig.7.70 Brain stimulation areas

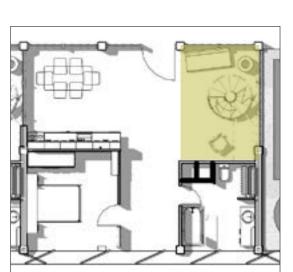


Fig.7.71 Designated area for brain stimulation (private) - ground floor

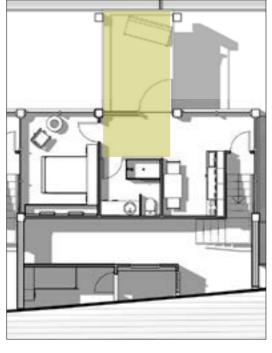


Fig.7.72 Designated area for brain stimulation (private) - 1st floor

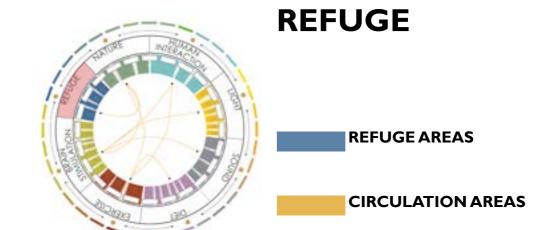


Fig.7.73 Rehablitation Environment - Refuge diagram.

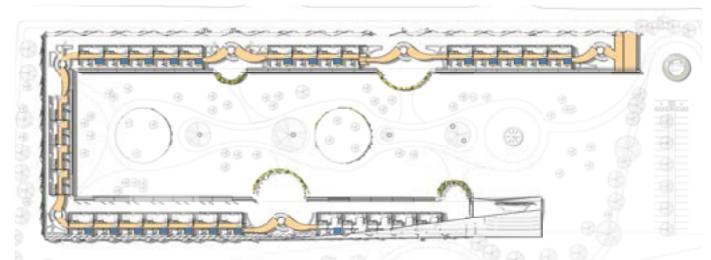
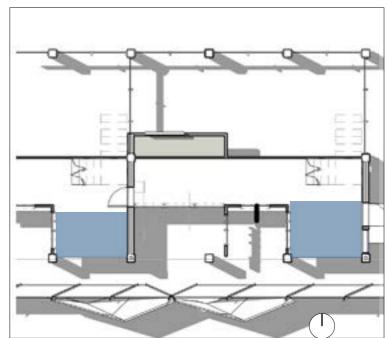
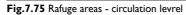
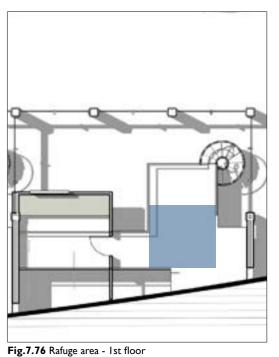


Fig.7.74 Overall refuge spaces in circulation zone







7.2.6.1 Modules

Those components created the typology of the modules network and U-shape structure.

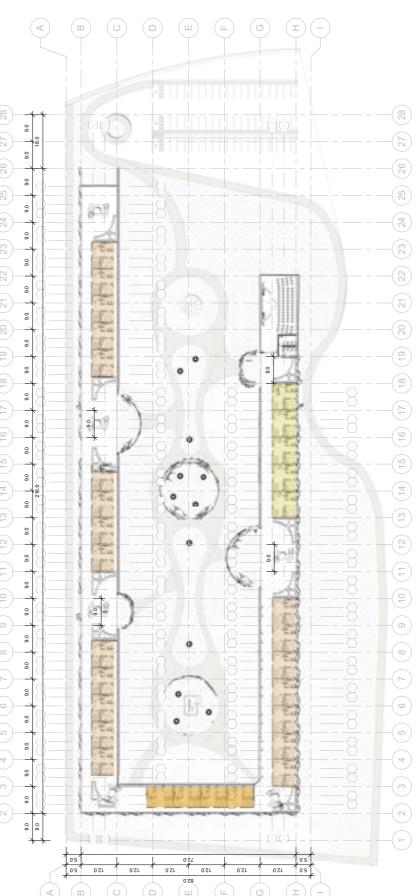
The U-shape structure is divided into modules with three different types. The typology of those has been arranged similarly following the same 'rehabilitation environment' principles.

The facades are working as a building skin and modules making the construction affordable.

Type I

Type II

Type III





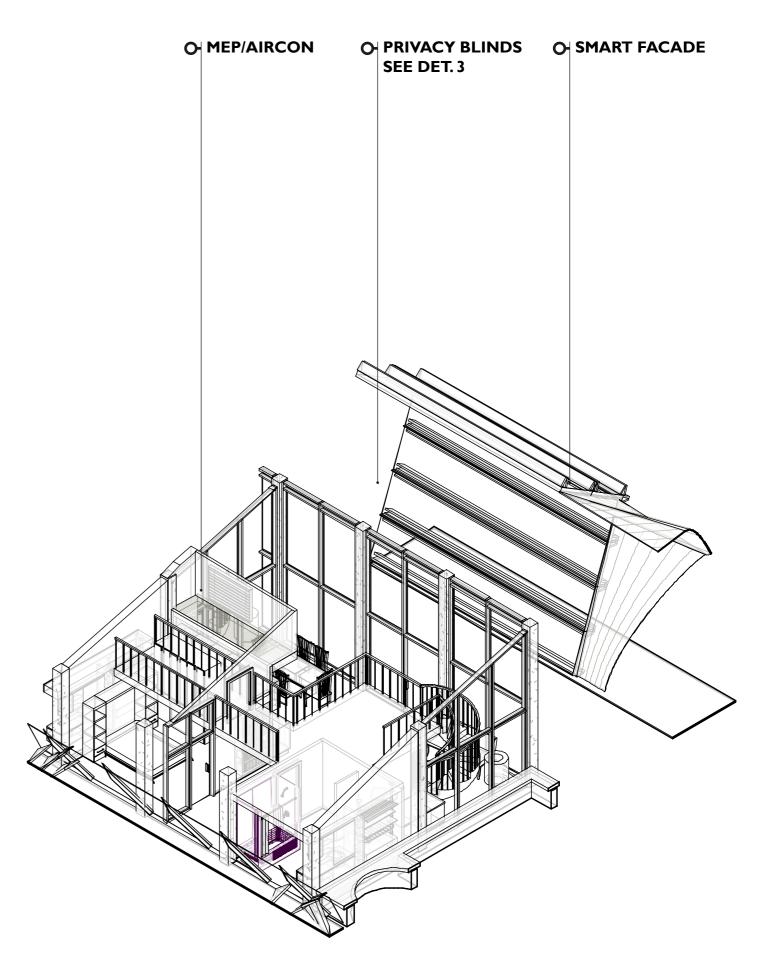


Fig.7.78 Typical module axonometric



O MODULE I

Type I

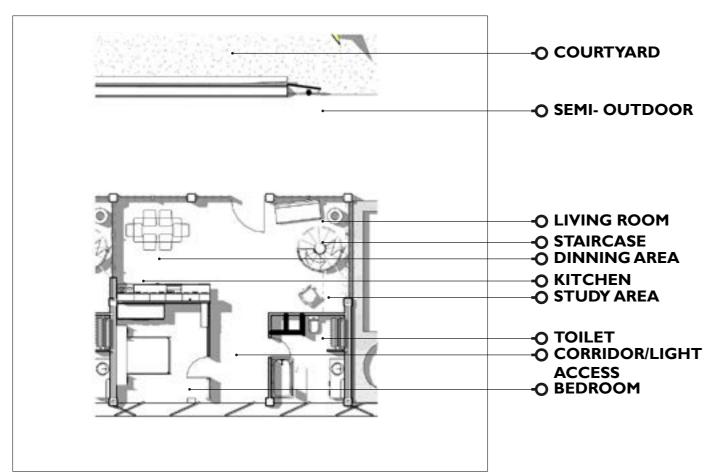


Fig.7.80 Ground Floor - Module I

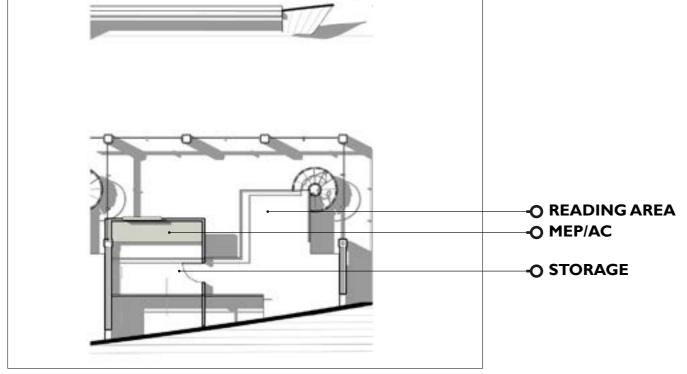
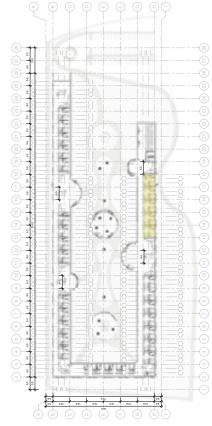


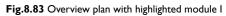
Fig.7.81 Mezzanine floor - Module 1



Fig.8.82 Overview with highlighted module I



SOUTH WING IN BETWEEN GRID 13 &18





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Transparent partitions:

In communal areas that residents will perform daily tasks like cooking, relaxing, reading - the partition walls will be made of a transparent material that promotes social interaction. This wall will also have the optional function of a blind/façade if they so decide to use it, but primarily, the function is to create an environment where people can see each other, feel part of a community and engage more with other residents that live there. Social stimulation is vital in mitigating the isolating effects that early-stage dementia can have. By seeing others more often with these transparent partitions, people are more inclined to engage with one another socially. Bedrooms will not have a transparent partition because they will be places for privacy, offering residents the chance to be on their own if they so wish.

Type I

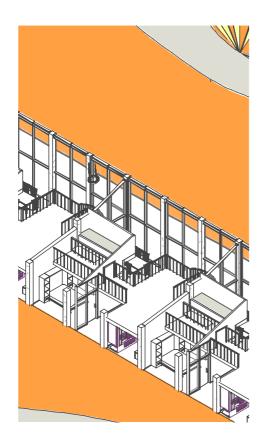


Fig.7.84 South view isonometric type I



Fig.7.85 Adjusted windows in regards to sun exposure and privacy- shaded

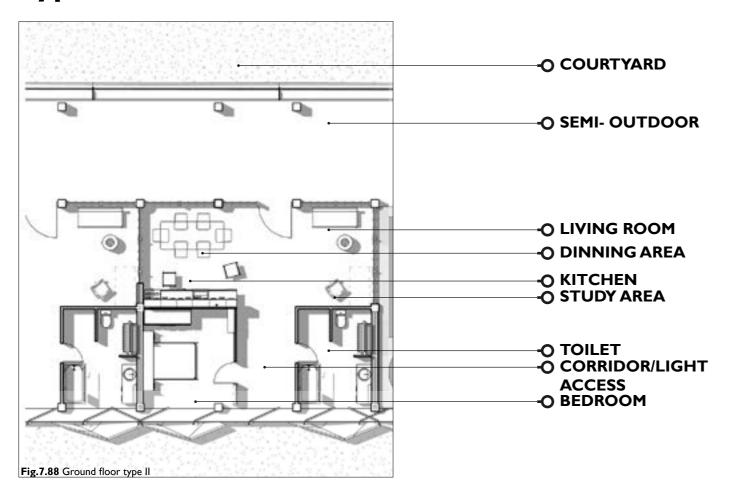


Fig.7.86 Adjusted windows in regards to sun exposure and privacy- transparent



O MODULE II

Type II



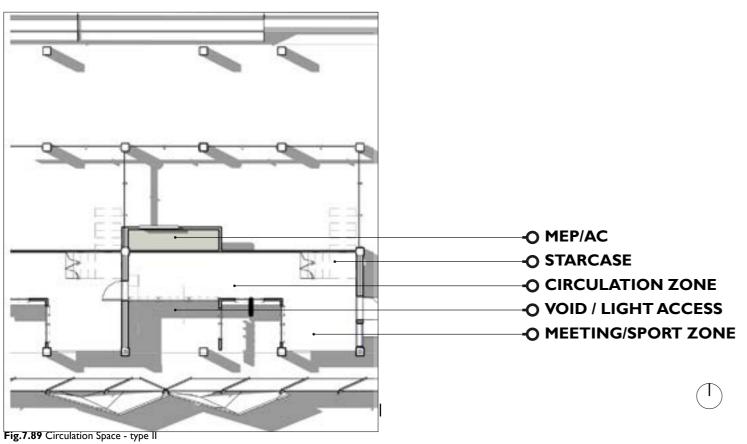




Fig.7.90 Overview with highlighted module II

SOUTH WING IN BETWEEN GRID 3 & 10

NORTH WING IN BETWEEN GRID 3 & 8 GRID 11 & 15 GRID 18 & 13

Fig.7.91 Plan with highlighted location of module II



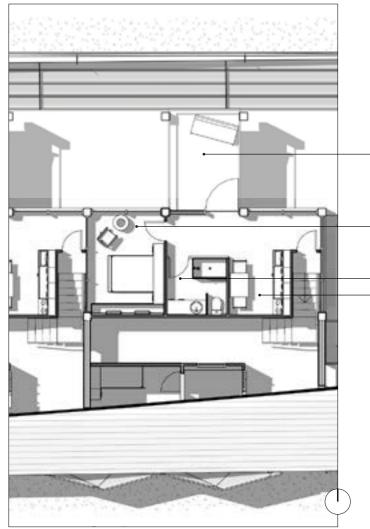


Fig.7.92 2nd floor- type II



-O BEDROOM

-O TOILET -O KITCHEN

Type II

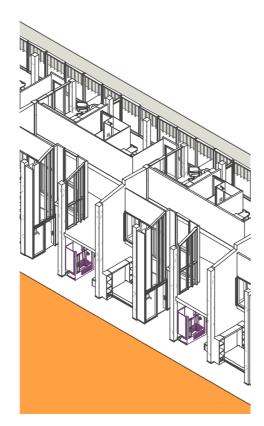


Fig.7.93 Isonometric south view



Fig.7.94 Balcony view type II

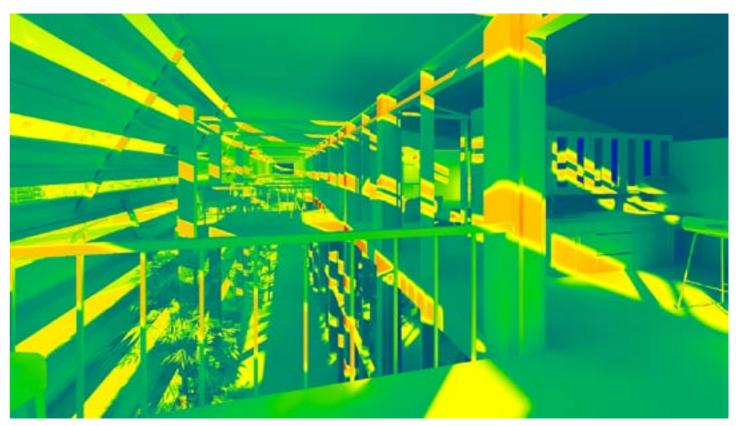


Fig.7.95 Light intensity morning hours

O MODULE III

Type III

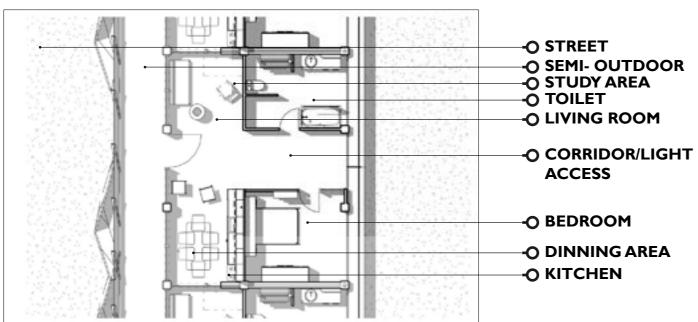


Fig.7.96 Ground floor - type III

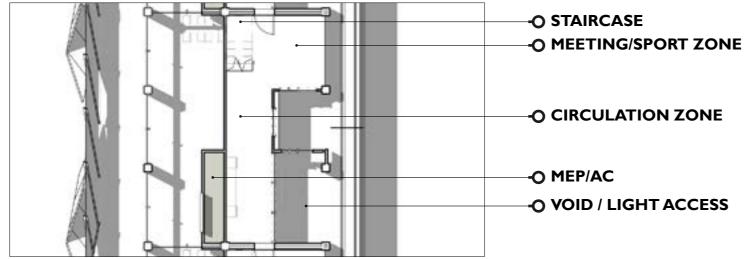


Fig.7.97 Circulation Space - type III

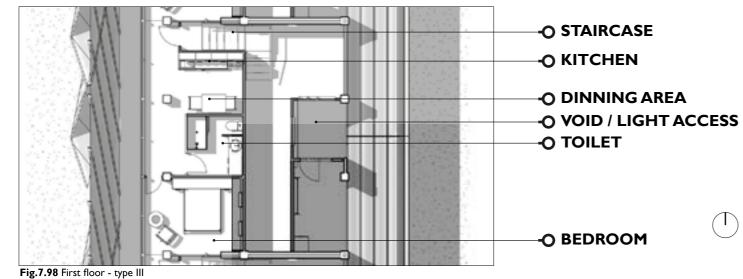
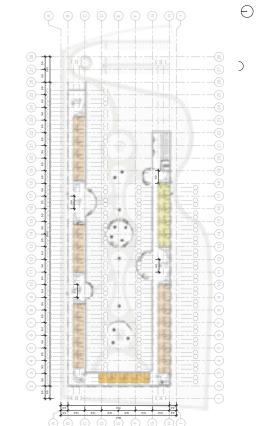


Fig.7.99 Plan with highlighted location of module III



WEST WING IN BETWEEN GRID D & G

Fig.7.100 Overview with highlighted module III



. . . .

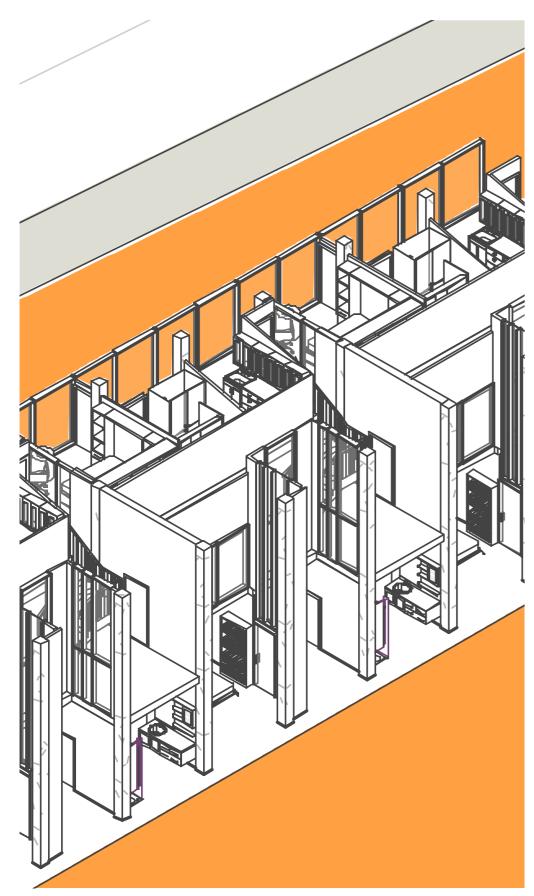


Fig.7.101 Isonometric east view

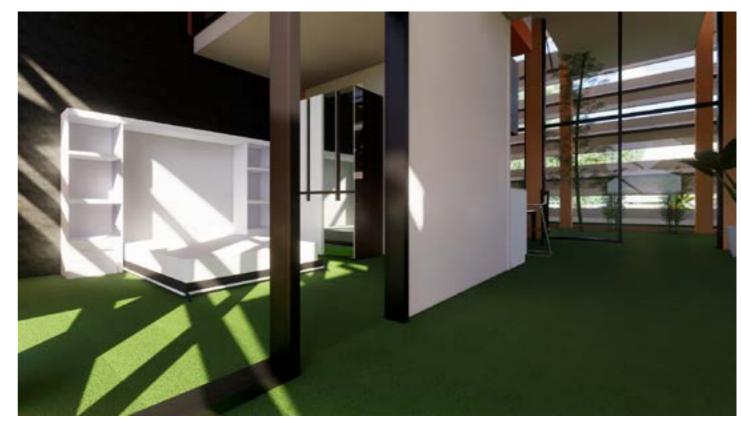
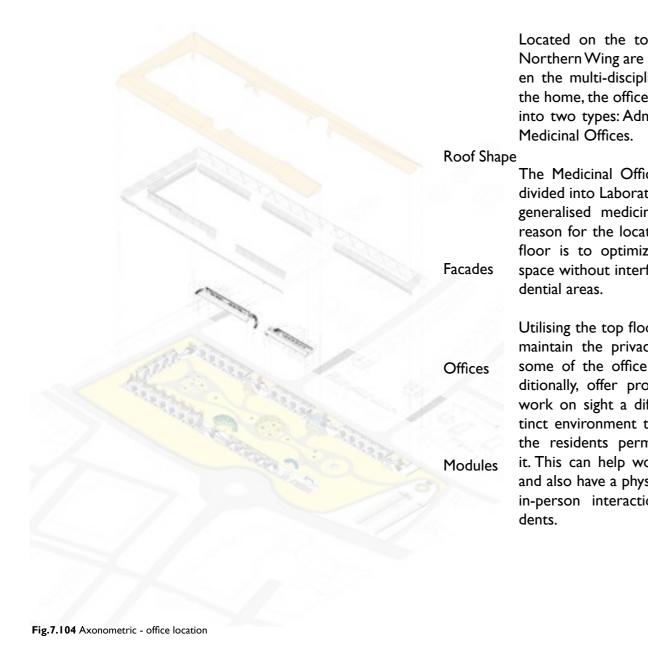


Fig.7.102 Bedroom view type III



Fig.7.103 Light intensity morning hours

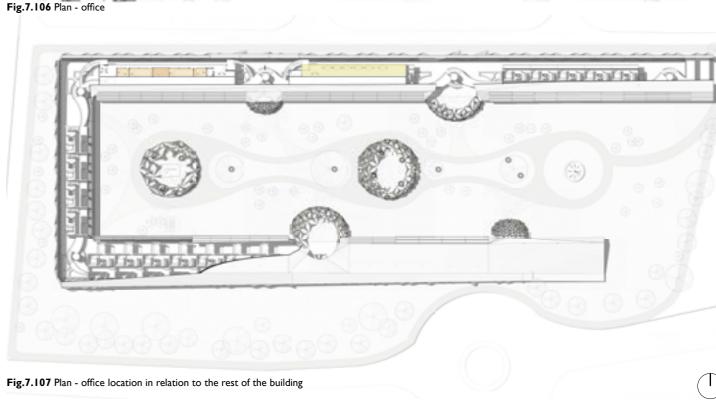
7.2.6.2 **Offices**



Located on the top floor of the Northern Wing are the offices. Given the multi-disciplinary nature of the home, the offices are bifurcated into two types: Administration and The Medicinal Offices are further Fig.7.106 Plan - office

divided into Laboratories and more generalised medicinal spaces. The reason for the location on the top floor is to optimize the available space without interfering with resi-

Utilising the top floor also helps to maintain the privacy required for some of the office work and additionally, offer professionals who work on sight a different and distinct environment than that which the residents permanently inhabit. This can help workers to focus and also have a physical break from in-person interactions with resi-



Administration room Laboratory Medical Spaces



Fig.7.105 Section though north wing

7.2.6.3 **Circulation Spaces**

All circulation spaces used Internal entrances: for commutes within the facility brain functioning increasingly debilcle group involves the largest mus- to this by making clearly marked, cle group of the body; therefore, the stair-case use will have a substantial effect on maintaining cardiovascular fitness.

will be complemented with natural Due to early-stage dementia involvspaces where flowers and shrubs ing feelings of disorientation and will grow and even some small some slight impairment of memotrees. This will be consistent across ry, the access points in the building all circulation spaces. Moreover, as are all within one internal court- and where people are entering the this facility will host people with yard. The purpose of this is to make early-stage dementia, the imple- the building most easily accessible, mentation of staircases will be in- with coloured entrance points involved with the benefit of improv- side the courtyard and a matching ing and maintaining fitness. In later internal colour scheme that follows stages of the disease, people often the same colour as the entry point struggle with physical movement as for clarity. If people have one entry point at the front of the building, itates. Nonetheless, with the early followed by an elaborate network dementia stages, the involvement of of corridors and staircases, this can staircases in circulation areas aims lead to residents with dementia at maintaining and even increas- getting lost, placing more strain on ing the fitness of residents as they them and the carers. The internal move about the facility. The leg mus- entry point design offers a solution

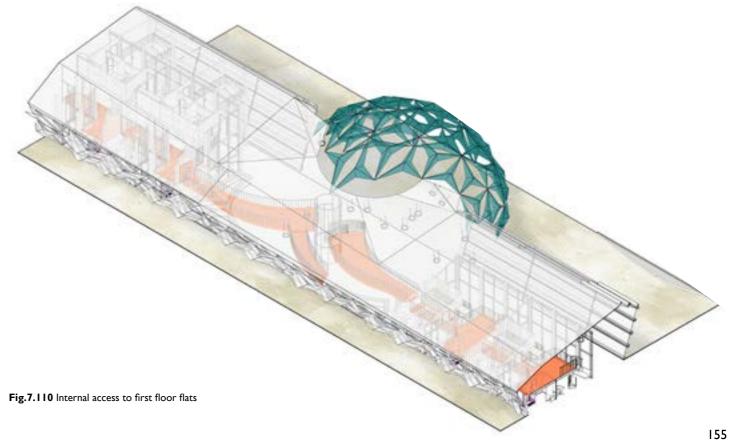
colour-coded entrances that are all visible from inside the courtyard of the building and also allow for carers/workers to easily see when premises and allows residents to have clear, colour-coded entries.



Fig.7.108 Madrid airport terminal 4- colors as orientation tactic



Fig.7.109 Outside circulation space in autumn period



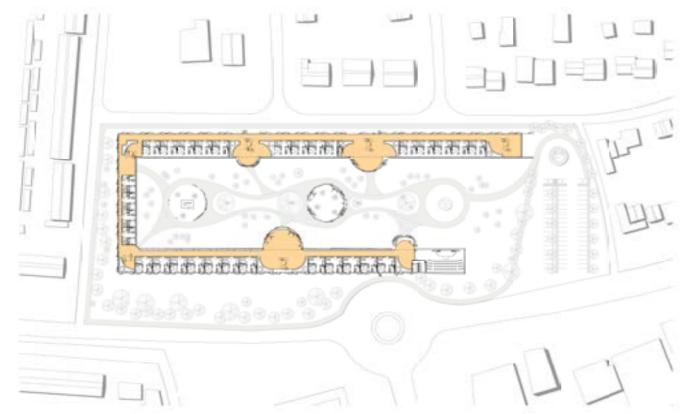


Fig.7.111 Ground floor - circulation areas

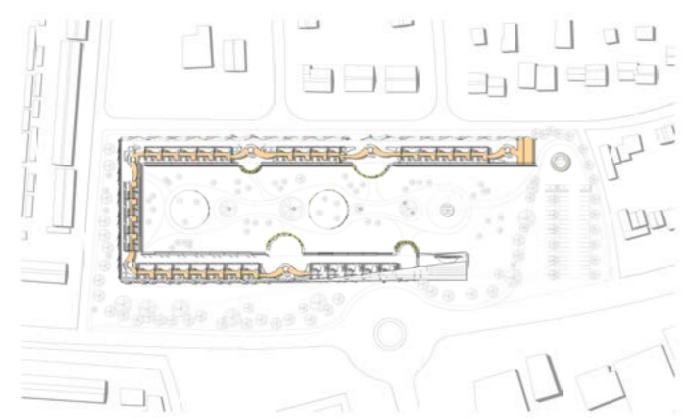


Fig.7.112 Mez floor - circulation areas leading to 1st floor



Fig.7.113 Entrance though social sphere

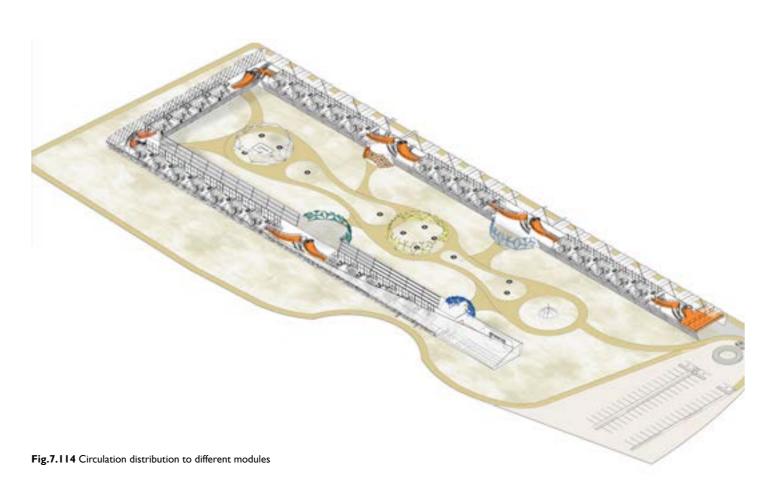
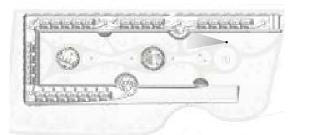
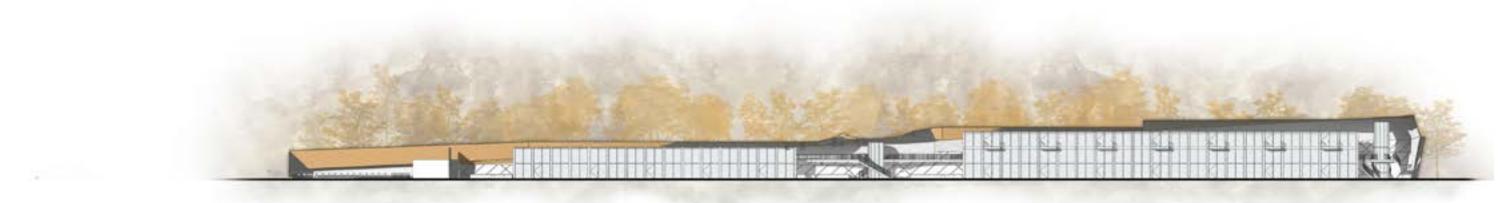




Fig.7.115 Semi-public space, visitor friendly area





Section I

Fig.7.116 Section through south wing



Section II

Fig.7.117 Section through north wing

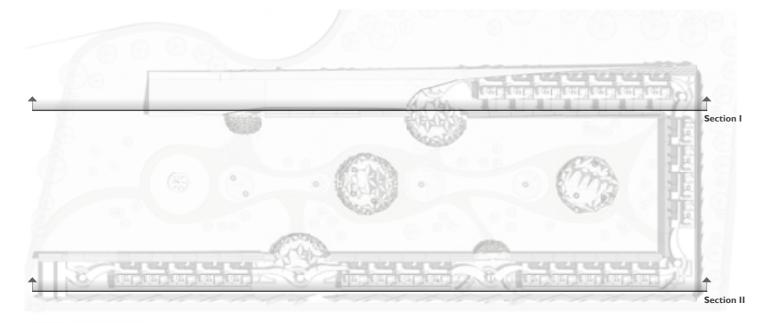


Fig.7.118 Plan diagram with sections.



Fig.7.119 Zoom-in section 2

Main visitors entrance

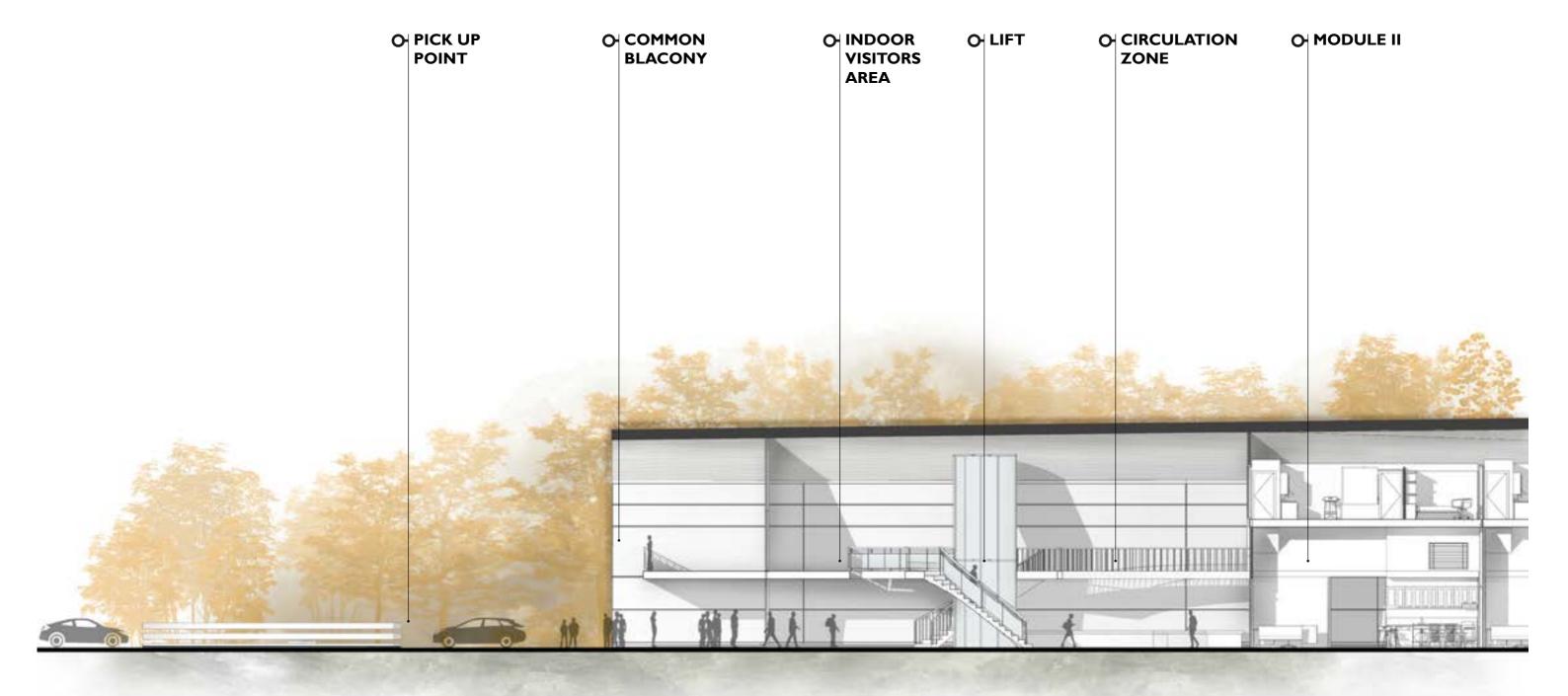
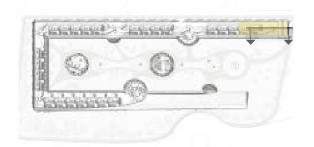


Fig.7.120 Zoom-in section 2/ Main entrance

Section 2



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7.2.6.4 **Social Spaces – Spheres**

comes from the fact that it is the to the main structure will be used most geometrically suitable shape as both entry points and socialising for delivering the highest volume of spaces and will be accessed most light. Light is central to this design frequently by those who live closfocus for its capacity to moderate est to them in the complex. Activithe progression of dementia sympties that take place in these spheres toms through regulating circadian will include things like BBQing, garrhythms.

The spheres will exist as moderaenergy.

The choice of spheres The "attached spheres" connected dening, music playing and listening among some other things.

tors of both light and heat as their Some spheres are reserved for speexterior is comprised of kinetic cific activities and hobbies at cerfacades that respond to thermal tain times and they will occupy a (heat) and electromagnetic (light) mixture of public, semi-public and private spaces.



Fig.7.121 Social engagement and multidisciplinary approach



Fig.7.122 Sort sphere - off-peak



Fig.7.123 Sport sphere-morning activties

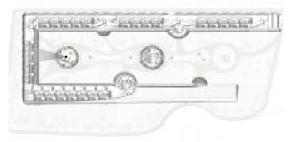




Fig.7.124 East Elevation - different colour as orientation tactic

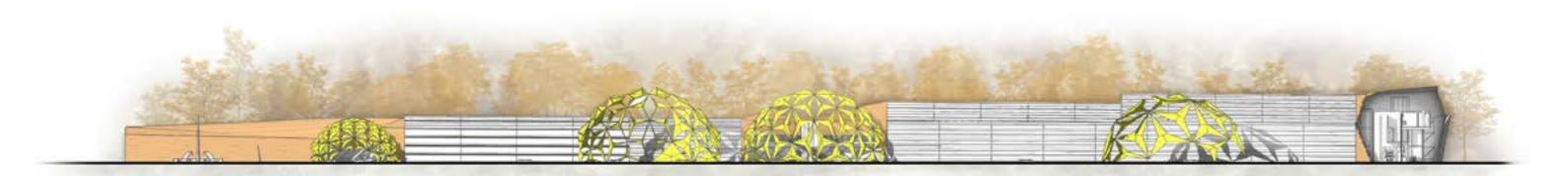


Fig.7.125 Section though court yard

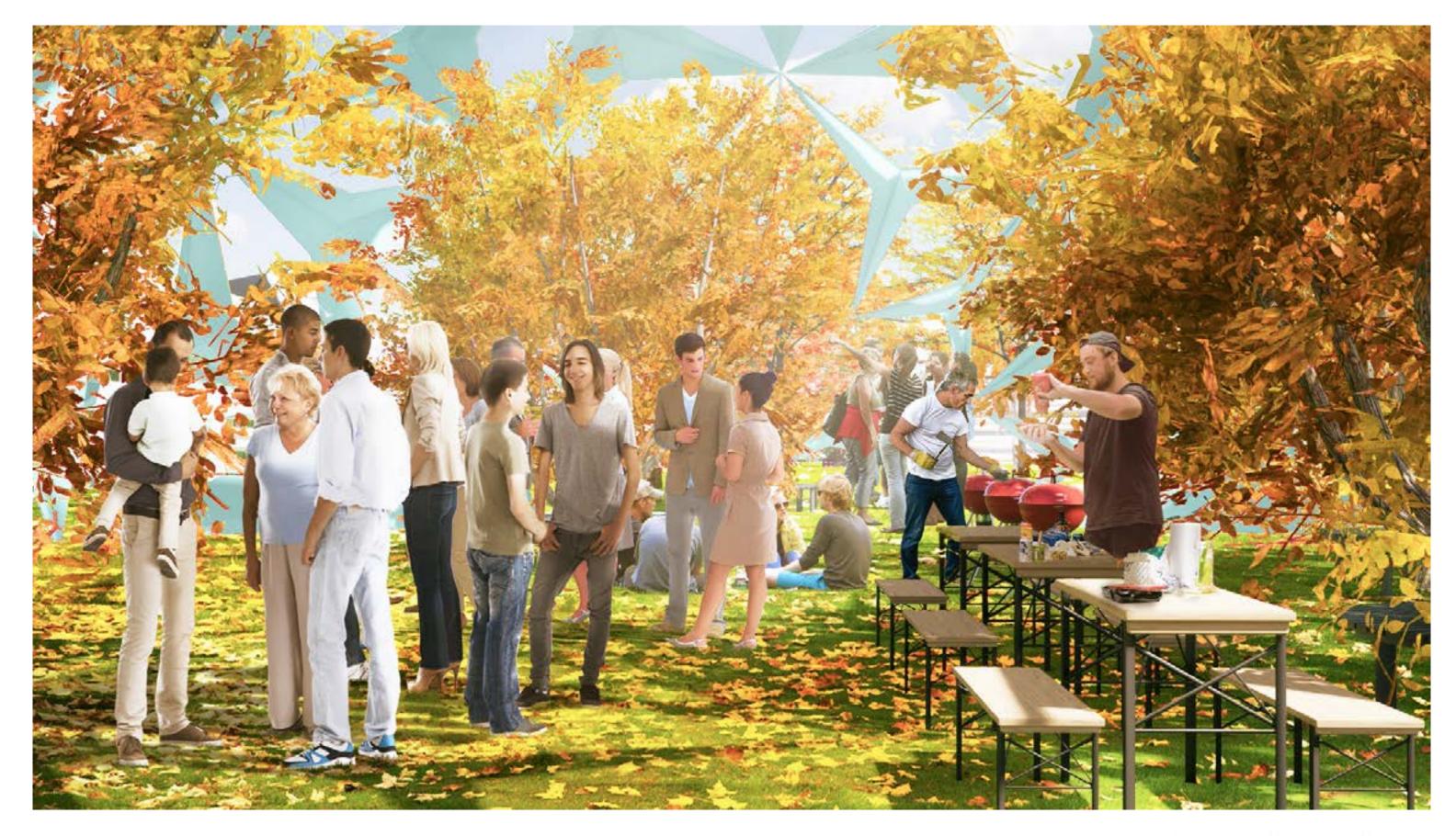
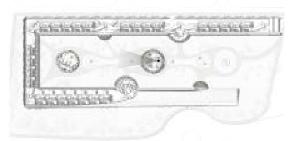


Fig.7.126 Public sphere - social activities - engagement with community and families



7.2.6.5 **Semi-Indoor Nature**

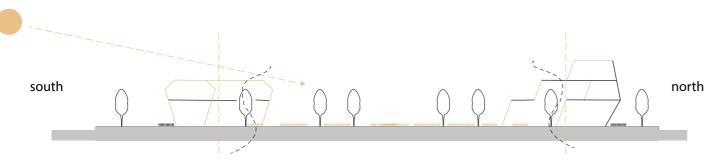


Fig.7.127 Massing section showing idea behing semi-indoor spaces

The aim has been to infuse natural ences like light, flora and fauna. with man-made environments and provide an atmosphere that is con- Semi-outdoor spaces continue with ducive the autonomous, active, and this natural focus by integrating natultimately - happy living within the ural airflow and direct sunlight with facility.

which are used by residents to walk that manage heat, light and airflow between social and private spaces and will offer the residents access or activity and leisure spaces will to social spaces that utilise natural be furnished with natural environ- factors to make the spaces most ments like indoor gardens, small comfortable and most complimen-

If it is not yet clear by now, trees and natural light. The indoor the role of natural spaces and nat- spaces aim to harmonise with naural living is vital to this project. ture and compliment natural influ-

partial coverage and responsive kinetic facades. Semi-outdoor spaces Indoor spaces, particularly ones will be encircled by kinetic facades tary to early stage dementia.



Fig.7.128 Singapour airport, semi-indoor spaces helping travelers to reduce stress

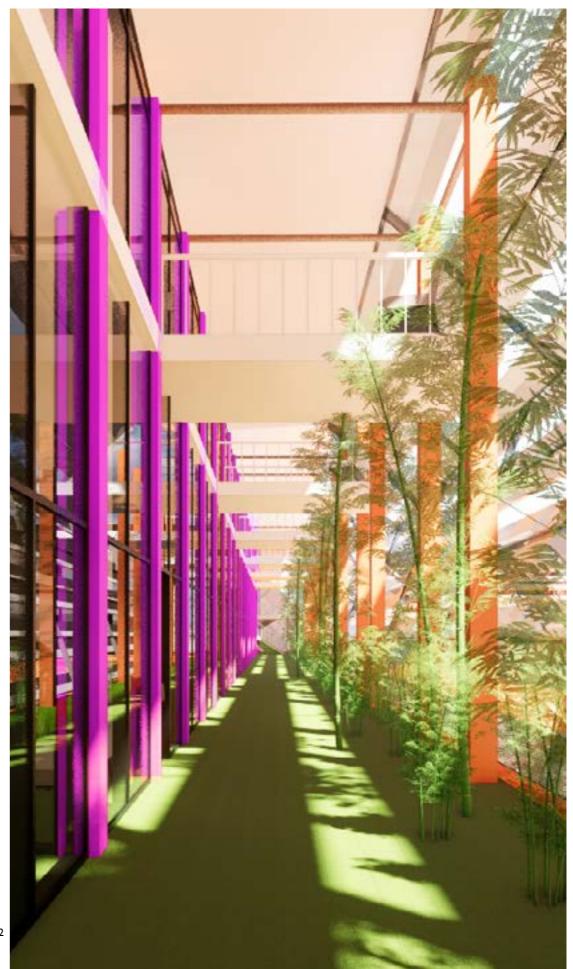
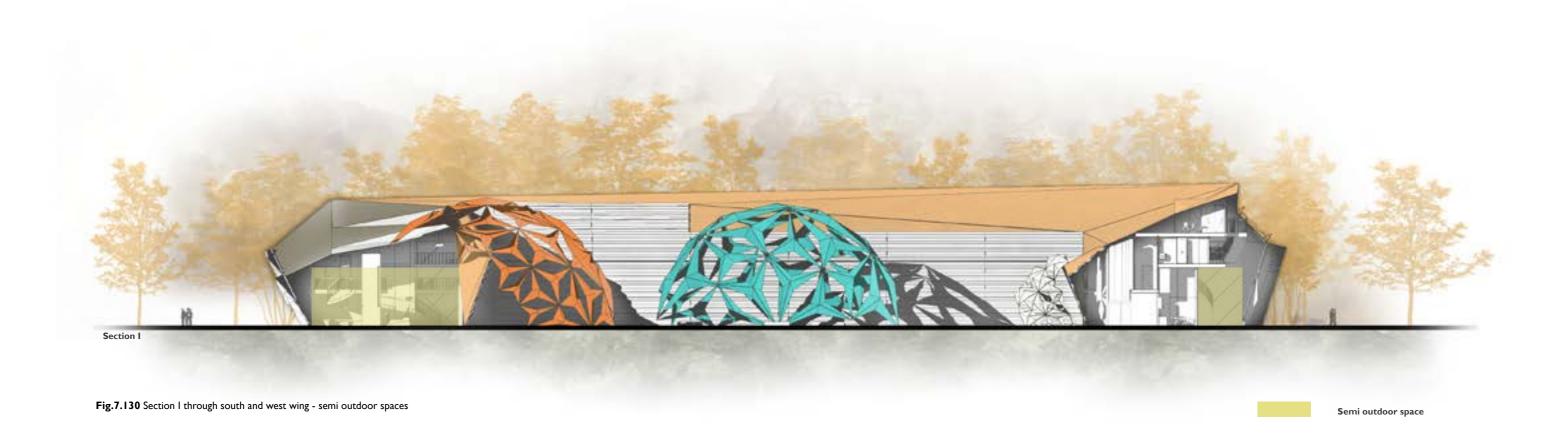
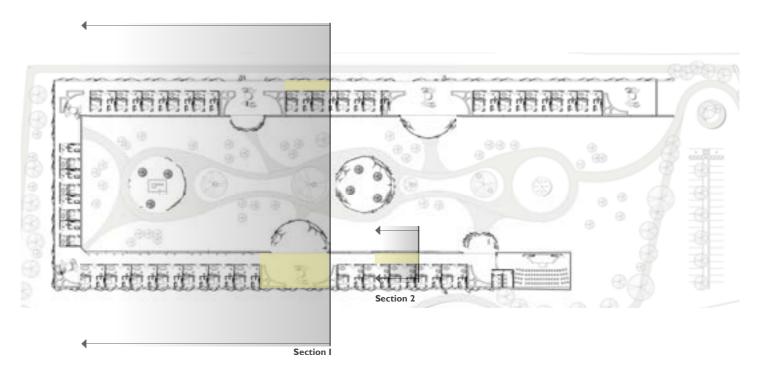


Fig.7.129 Corridor-Type 2



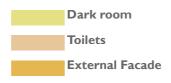




7.1.6.6 **Dark Room**

Within the private sector of the maintain a somewhat regular/norfacility resides the dark room. This offers residents a place to watch or experience live events with the accompaniment of a small amount of blue light that maintains alertness. down. As The Netherlands has very early sunsets in mid-winter, the purpose of this room is to provide an environment that residents can relax in, without falling asleep due to lack of light. This means residents can

mal sleep pattern that allows for normal functioning in day-to-day life, rather than feeling the need to go to bed as soon as the sun goes



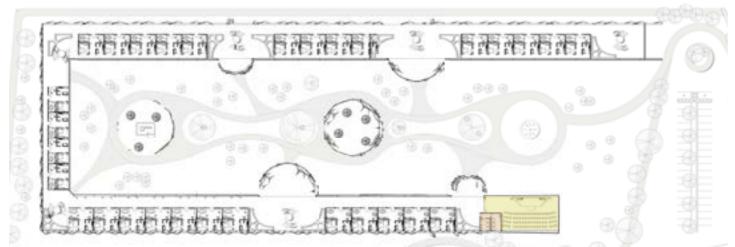


Fig.7.133 Ground floor plan - dark room

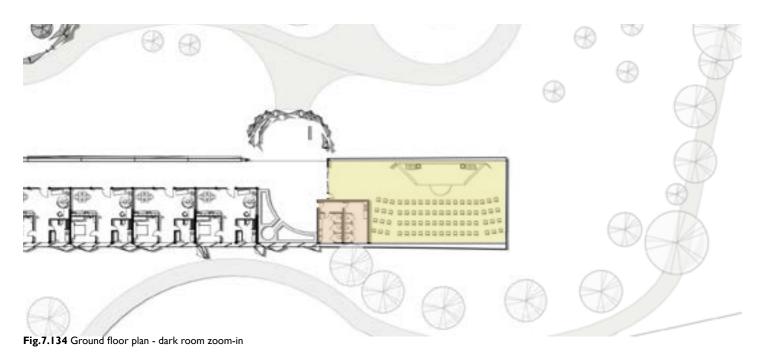




Fig.7.135 Dark room View 1



Fig.7.135 Dark room View II

Conclusion and Future Development

This facility is not built to be a cure for dementia. The existence of this project is to offer those with early-stage dementia a chance at extended autonomous living, with the slowest progression of dementia symptoms. The facility is designed with a targeted approach that focuses on key symptoms of early-stage dementia and key factors that can ease or prevent the progression of these symptoms.

The use of light was consistently relevant and influenced a great variety of features like building location, bedroom location inside buildings and specific design features such as kinetic facades. The aim of this was to stimulate daily patterns, which has been shown to slow the progression of late-stage dementia onset. It is also important to remember that the facility is designed to be pleasant and will thus require the dedicated commitment of restivity engagement and more.

As the facility is aimed at those with early-stage dementia, the role of ficult. monitoring inhabitants is quintesdo not fall into the category of later stage dementia. Given that the fadementia, in the same way, it is imdiagnosis for all residents.

Nonetheless, if residents develop increasingly difficult early-stage symptoms, the facility can account dered unsatisfactory. With commitfor this by offering these residents a home in Module I, which is based on the ground floor and does not require vertical movement between floors. This is helpful when move-

ment from residents and effective

implementation of the proposed

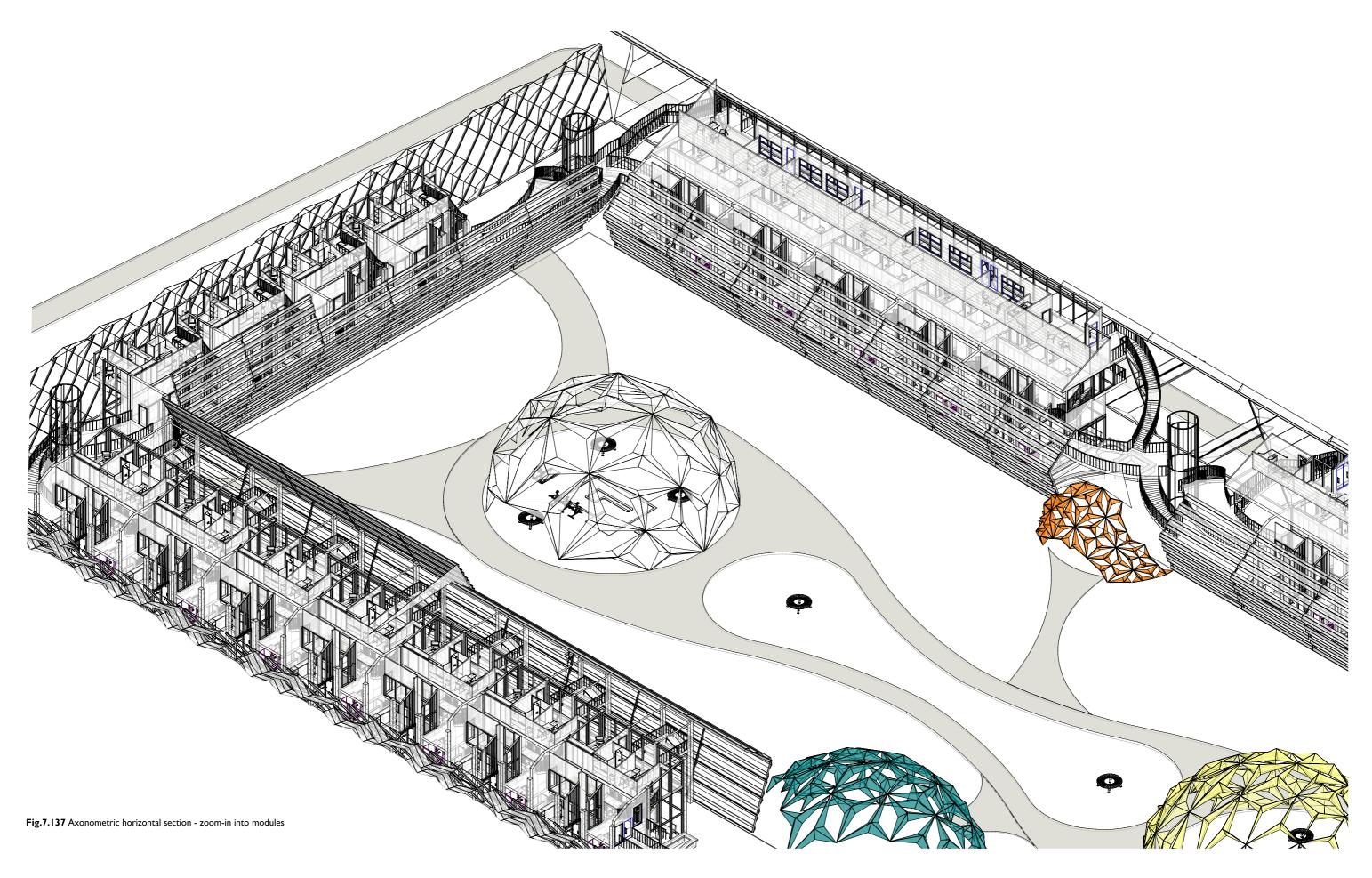
design, the potential to extend au-

tonomous living is rich and encour-

stimulate, but this may not always ment becomes more restricted for certain residents. Moreover, the social nature and social focus of the idents, such as early rising times, ac-facility will help to further highlight when residents progress to later stages because social interactions often become noticeably more difsentially important to ensure they All in all, the facility will be the first of its kind. The focus on many different areas of dementia development cility does not cater for later stage and architectural solutions allows the project to stand alone in its portant to maintain an early-stage multi-disciplinary and novel stature. Residents must be willing and active in their pursuit of a happy and autonomous life, otherwise many features of the project will be ren-

Fig.7.136 Axonometric horizontal section

7.2 Micro Scale



Smart Facades

central design element that will fo- also part of their composition and cus mainly on the regulation of nat- will respond to certain decibel levural light for residents in the home. els to reduce the amount of sound This regulation is of paramount impollution entering the building. Conportance to the circadian rhythm versely, they may encourage sound cycles of those with early-stage dementia living in the facility. If circa- building if it is natural to sound at dian rhythms can be naturally main- a reasonable decibel level. The fitained and encouraged through the nal addition these facades offer is provision of adequate natural light, that they can also help circulate air namely through the help of these through the building depending on kinetic blinds, then their therapeu- wind levels and temperature. In high tic potential becomes unquestiona- winds and low temperatures, they ble.

through smart technology, they ac- to a given limit), they will allow outtively respond to differing levels of side airflow into the building for air natural light. This implies that during circulation. daytime hours, natural light is promoted and allowed to pass through The overarching result of these the morning.

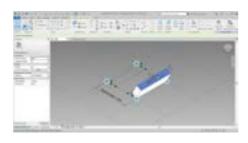
The difference with regular blinds is that they will block out the morning light until someone chooses to open them. This means working to a different body clock than the natural circadian body clock and waking up with an alarm, rather than with the light. When the kinetic façades respond to light in the morning and allow natural light to pass through, this maintains a temporal harmony with the natural circadian rhythm of our body that follows a similar clock to the sun and this has been shown to have positive effects on dementia, slowing its progression.

Further benefits of these facades are their ability to regulate acoustics and air circulation. Similar to

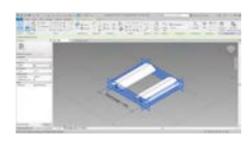
The kinetic façades are a the light sensors, sound sensors are penetration, allowing it to enter the will reduce outside airflow into the buildings. With higher outdoor tem-The idea behind them is that, peratures and reasonable wind (up

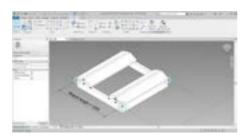
them, as responsive sensors in their facades is a more harmonious relaexterior regions encourage the tionship with nature that results in façade to open. As the evening ar- a well-regulated living environment rives, they will close and remain so for residents in both indoor and until the light begins to rise again in semi-indoor locations around the premises.











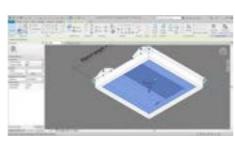
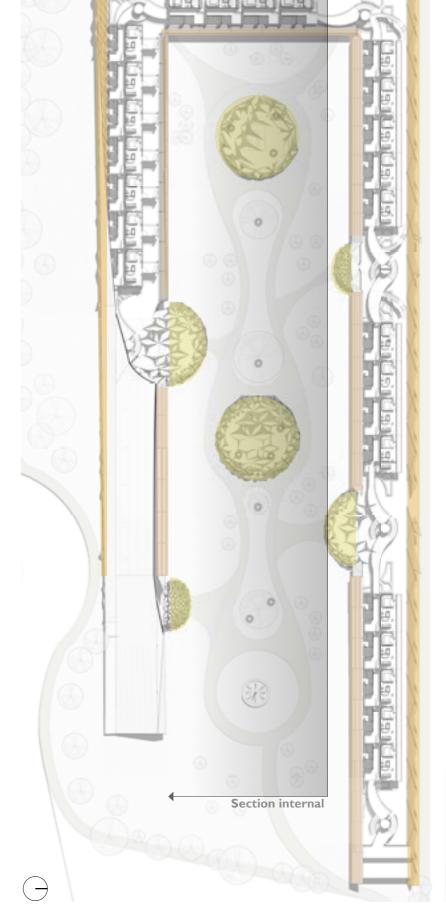


Fig.7.138 Revit facade development

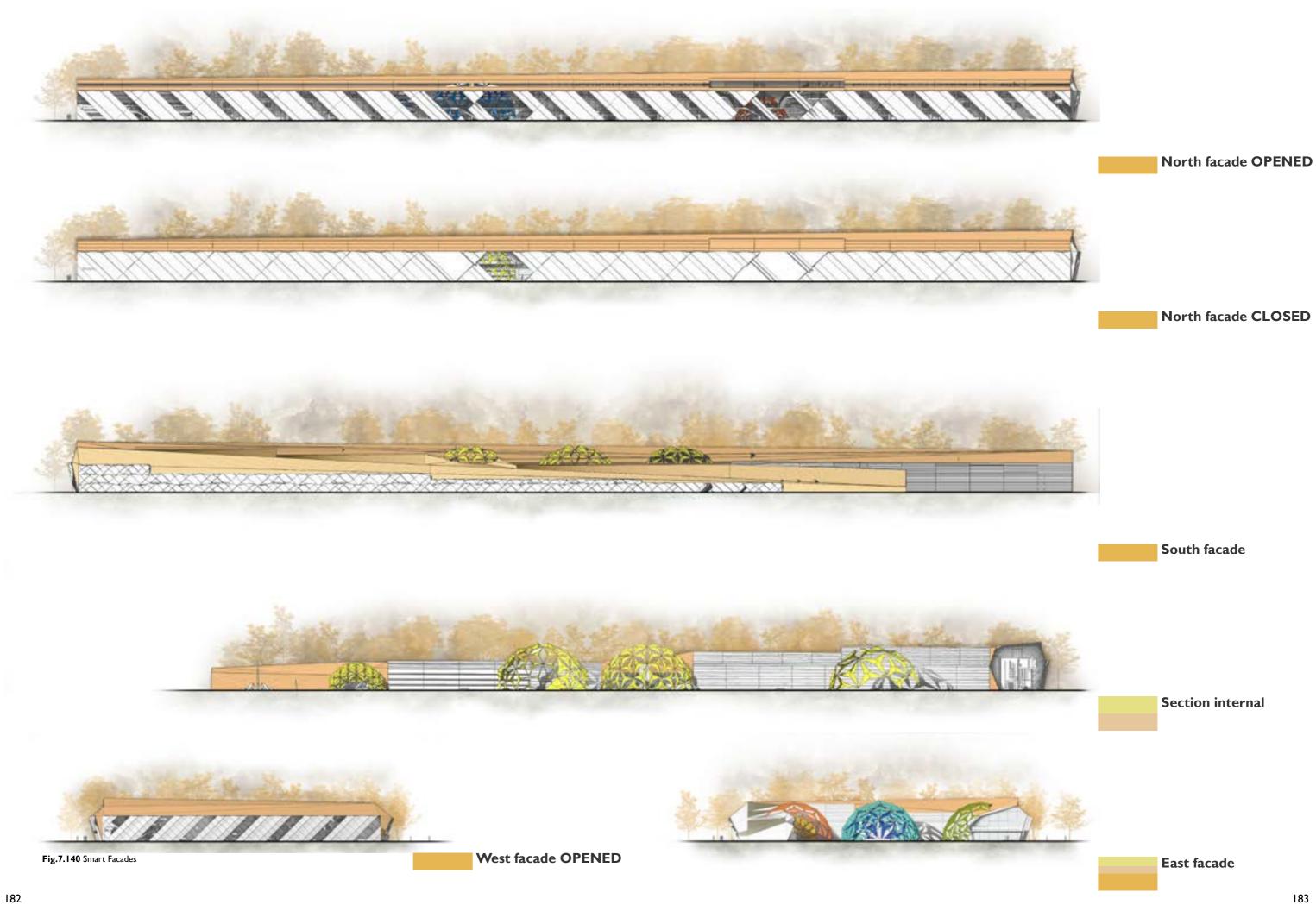


External Facade

Mashrabiya facade

Internal facade

Fig.7.139 Facade planning



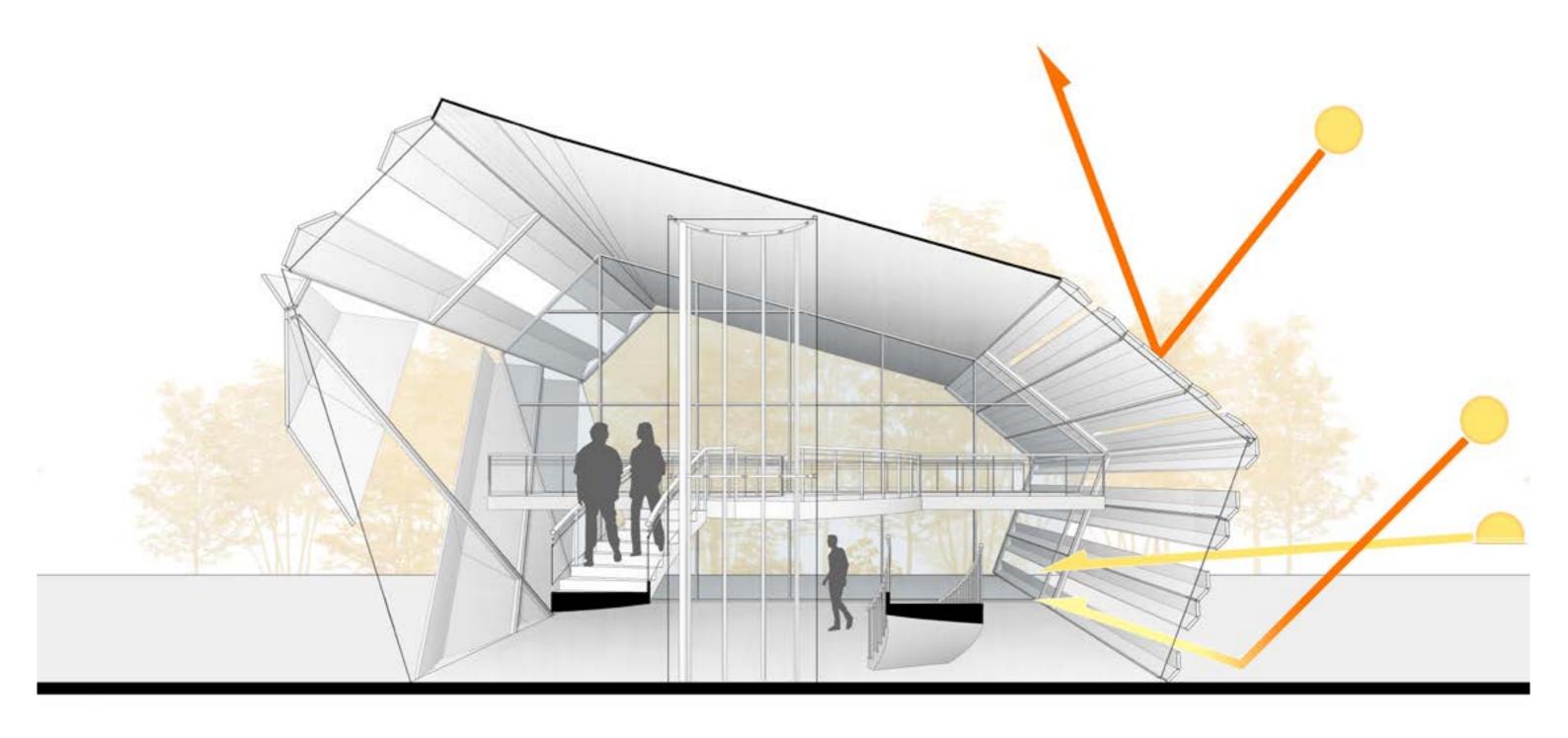


Fig.7.141 Smart Facades Section

7.2.2.1 Mashrabiya

Mashrabiya intelligent facades have been applied on half a sphere as shape and technology proven in The Al Bahar Towers that shading and internal temperature is well controlled. The performance and applied materials are extremely long-lasting.

Fig.7.142 Mashrabiya Facades

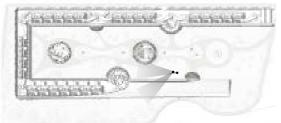
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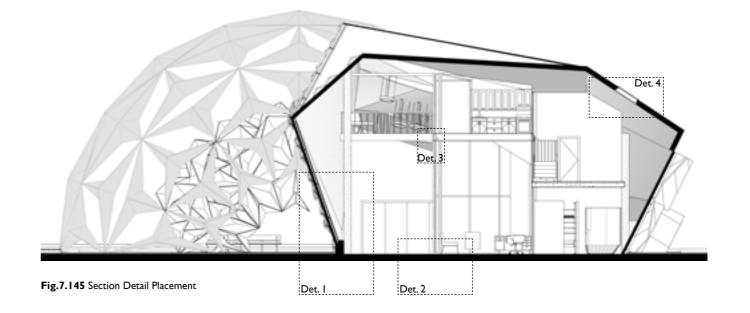
Fig.7.143 Social Sphere- outside



Fig.7.144 Social Sphere & Smart Facades (opened/closed)



7.2.3 Detailing



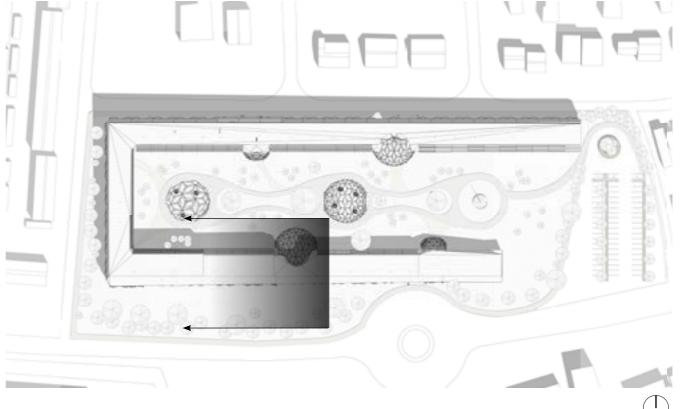
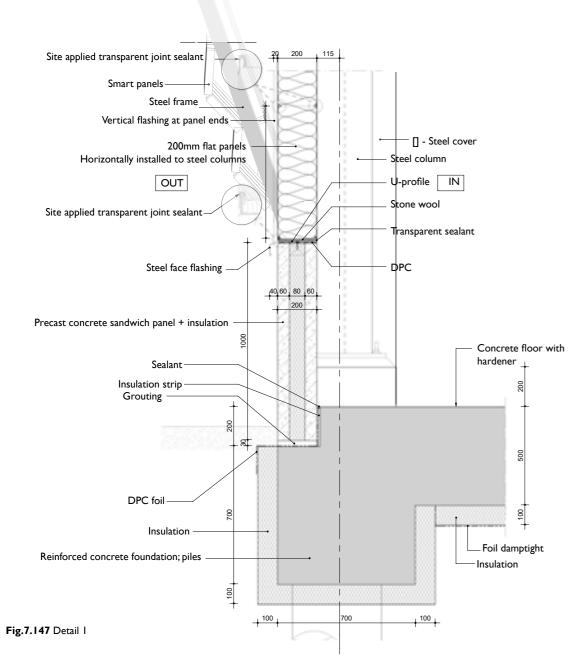


Fig.7.146 Plan - Section Detail Placement

Detail I



Detail 2

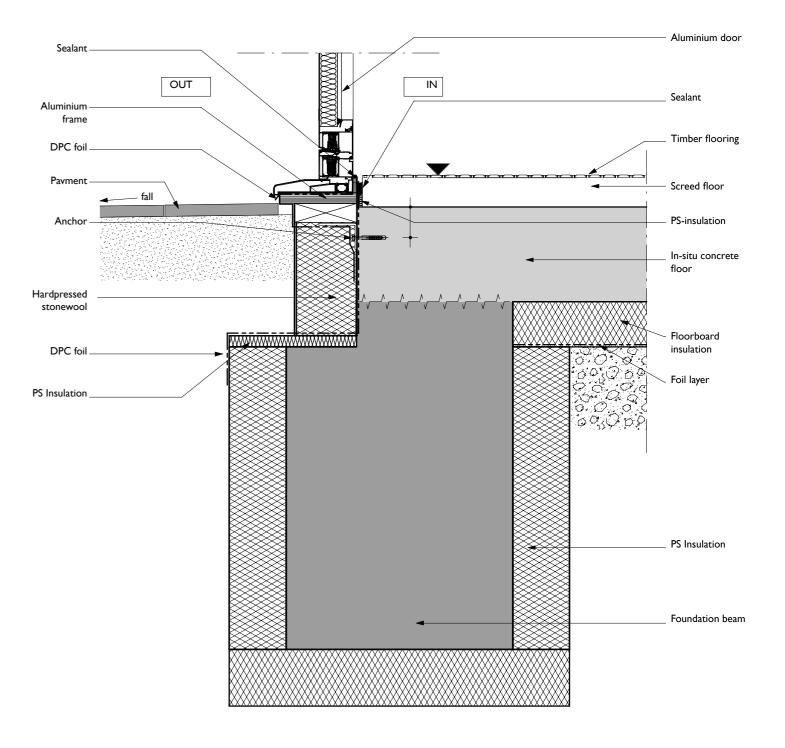
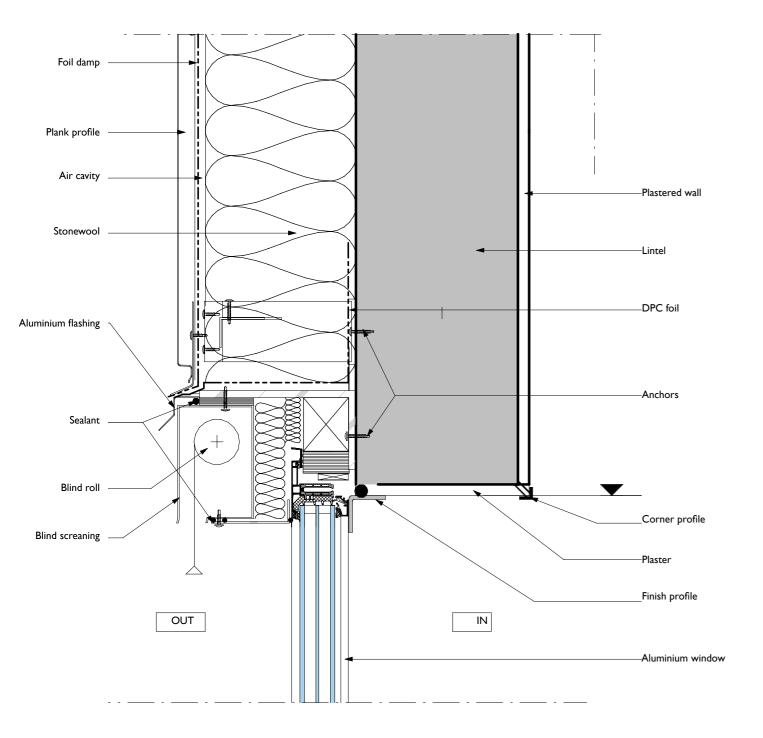


Fig.7.148 Detail 1- Scale 1:10

Detail 3



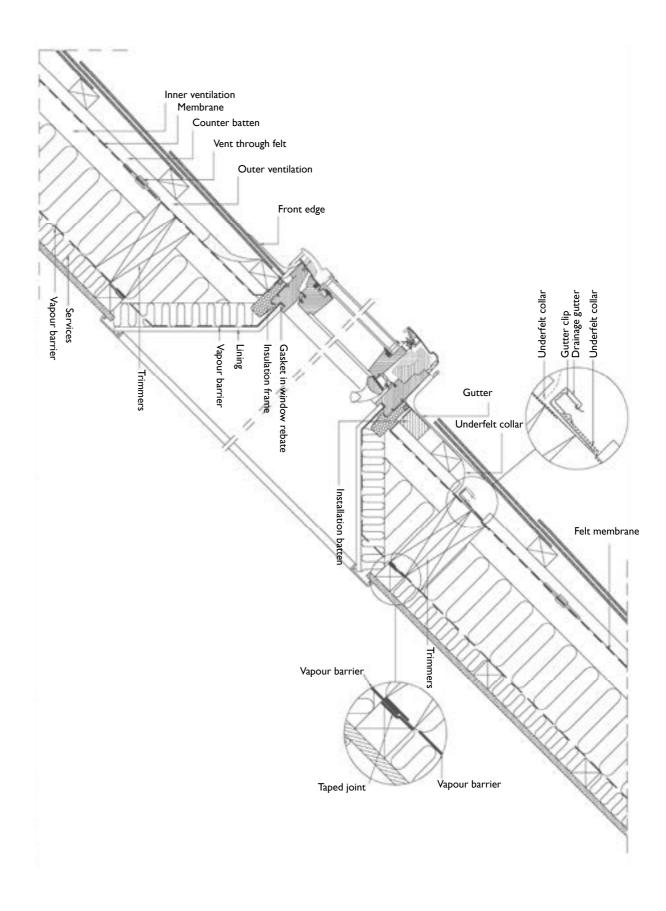


Fig.7.150 Detail 4- Scale 1:10

Detail 4

Fig.7.149 Detail 3 Scale 1-5

Chapter SEVEN References & more

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List of Figures

from Fig.7.1 to Fig.7.107 Kotwas, M [2021]

Fig.7.108 https://www.lamela.com/en/proyec-

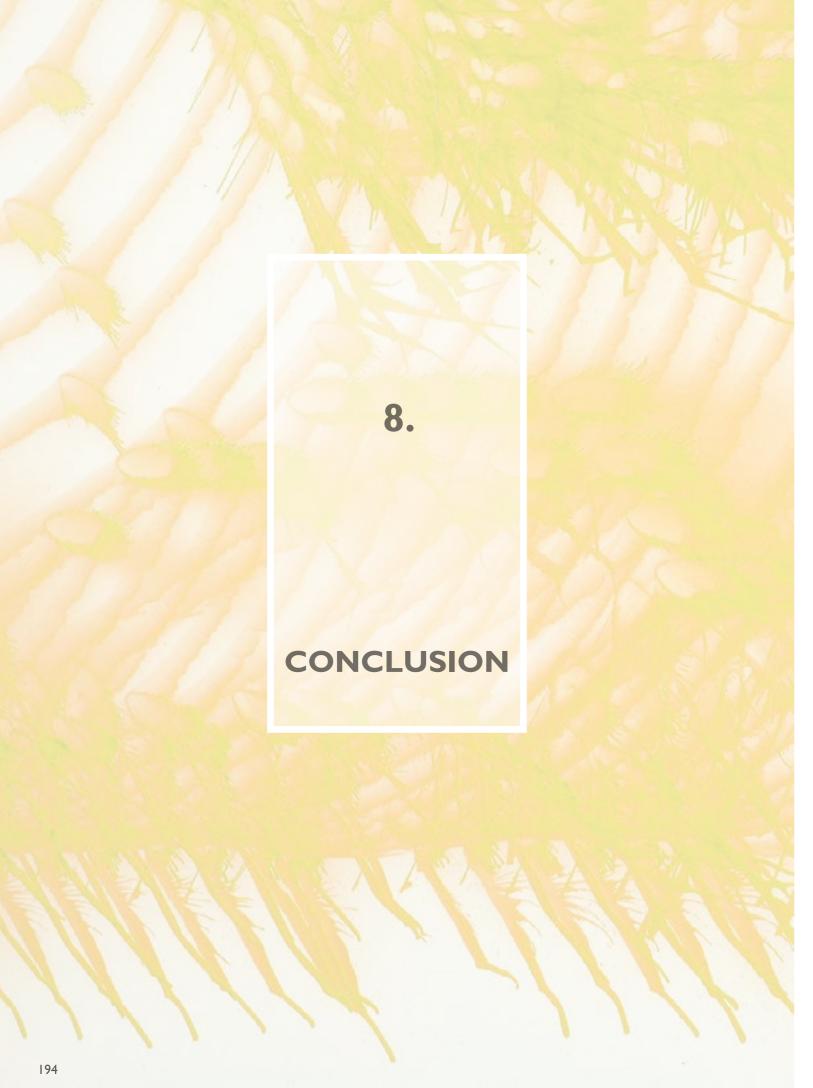
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from Fig.7.109 to Fig.7.127 Kotwas, M [2021]

Fig.7.128 https://www.todayonline.com/singapore/jewel-changi-airport-shortlist-

ed-2019-world-architecture-festival-award

from Fig.7.129 to Fig.7.150 Kotwas, M [2021]



Predictions for future capabilities of healthcare to deal with the increasing burdens of dementia are not promising. The issue is fuelled and compounded by an ageing population and an understaffed healthcare sector respective to dementia care. If little is done, there will be a great volume of people that face a huge amount of suffering. The suffering will not only occur on the part of those who have dementia but equally, on the part of those who must stress and strain to care for them, within a system that is nowhere near capable of managing that demand.

Dementia remains a disease that is very difficult to treat, particularly as it progresses into later stages. Given the problem outlined, the most feasible solution available is to prevent progression to later stages as much as possible. My solution was therefore centred around those with early-stage dementia and is aimed at preventing the progression of this stage into later stages. The idea behind this was to forestall the number of people with later-stage dementia, which is more difficult to treat and alleviate the potential burden faced by those in the healthcare sector while reducing the suffering of those with the disease.

As the prevalence of smart technology is abundant in contemporary society, medicine and architecture, it seemed natural to investigate a means of integrating smart technology into architectural solutions aimed at early-stage dementia. The purpose of these smart technologies was to reduce the burden on the labour force associated with dementia, add to the available data on dementia and provide a living environment for those in the early stages of the disease that could most effectively maintain their autonomy.

Based on the existing literature, eight sections were targeted as pressure points for the development and progression of early-stage dementia. These pressure points were aligned with six focal architectural implementations/designs that have a counter-balancing effect on the progression of early-stage dementia.

By aligning the central assets of early-stage dementia with core design solutions that integrate architecture and smart technology, the outcome was an architectural solution to a bio-social problem that has the potential to massively reduce suffering and promote novel ways of combating dementia's negative effects.

I hope that through this thesis, I have built on the existing literature and approaches, but also offered a solution that follows a more interdisciplinary pathway than that which is currently available. For a disease whose causes can be so wide in range, the importance of an interdisciplinary approach, such as the one outlined in this thesis, cannot be under-emphasised. I wish to push the existing standards further, now more than ever, because the potential risk posed by this disease in the near future may be devastating. While architecture is not often thought of for its medicinal value, my hope is that with this proposal, architecture and its involvement with smart technology will be seriously considered for future solutions to extend early dementia stages.