PEOP related environmental factors and occupational performance of persons with spinal cord injury in Saudi Arabia

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Declaration of Own Work

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I, Yarmon Moonsamy declare that the Master's Degree research dissertation that I herewith submit for the Master's Degree qualification in Occupational Therapy at the University of the Free State is my independent work, and that I have not previously submitted it for a qualification at another institution of higher education.

I furthermore waive copyright of the dissertation in favour of the University of the Free State.

Name:	Yarmon Moonsamy
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Dedication

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This research study is dedicated to my mother Catherine, who gave me the gift of education and is my greatest inspiration.

I also dedicate this study to my loving wife Aadila and two beautiful boys Zaid and Mika. Your unwavering love, support and patience during this arduous journey served as my greatest motivation to complete this study.

The culmination of this research study proves that whatever your background or previous life experiences, education has the power to transform your entire life.

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Concept Clarification

Barriers: Any factor that may hinder or have a negative influence on occupational performance (Christiansen & Baum 2005).

Easily: Without difficulty or effort (Soanes & Stevenson, 2004)

Facilitators: Any factor that may enable or support occupational performance (Christiansen & Baum 2005).

Occupations: All the activities that a person will perform throughout their lives (Law, Baum, & Dunn, 2016).

Occupational performance: The “doing of occupation” in order to satisfy life’s needs (Law et al., 2016).

Occupational Therapy: Occupational Therapy (OT) is a client-centered health profession concerned with promoting health and well-being through occupation (WFOT, 2012).

Tetraplegia: refers to partial or complete paralysis of all four limbs and are commonly found in persons with cervical spinal cord injuries (O’Sullivan, Schmitz, & Falk, 2014).

Paraplegia: refers to partial or complete paralysis of both lower limbs and is commonly found in persons with thoracic and lumbar spinal cord injuries (O’Sullivan et al., 2014).

Complete lesions: No sensory or motor function preserved in the lowest sacral segments S4/5 (ISNCSCI worksheet, 2015).

Sensory Incomplete lesions: Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-5 (light touch or pin prick at S4-5 or deep anal pressure) AND no motor function is preserved more than three levels below the motor level on either side of the body (ISNCSCI worksheet, 2015).

Motor Incomplete lesions: Motor function is preserved at the sacral segments S4-5 OR the patient meets the criteria for sensory incomplete status (sensory function preserved at S4-S5) and has some sparing of motor function more than three levels below the neurological level on either side of the body (ISNCSCI worksheet, 2015).

List of Acronyms

ADL : Activities of daily living

ASIA : American Spinal Injury Association

IADL : Instrumental activities of daily living

ISNCSCI : International Standards for Neurological Classification of Spinal cord injury

KFMC : King Fahad Medical City

KSA : Kingdom of Saudi Arabia

LE : Lower extremities

MVA : Motor vehicle accident

NSCI : Non-traumatic spinal cord injury

OT : Occupational Therapist

OTPF : Occupational Therapy Practice Framework

PEOP : Person-Environment-Occupation-Performance Model

ROM : Range of Motion

RTA : Road traffic accident

SBC : Saudi Building Code

SCI : Spinal cord injury

TSCI : Traumatic spinal cord injury

UE : Upper extremities

US : United States

Abstract

Background

This study focused on the environmental factors as identified by the PEOP Model that influence the occupational performance of persons living with spinal cord injuries in Saudi Arabia. Spinal cord injury is a devastating and life-disrupting condition and the person living with SCI will face many impairments and complications as a consequence of their injury. Impaired performance of daily activities e.g. activities of daily living, leisure, home maintenance, vocational and educational activities is a prevailing reality for the person living with SCI. Limited research has been conducted on the impact of the environment on the occupational performance of persons living with SCI in Saudi Arabia. The aim of the study was thus to determine which environmental factors as identified by the PEOP model influence the occupational performance of persons living with SCI in Saudi Arabia. The research was conducted at a tertiary care medical facility in Riyadh, Saudi Arabia.

Methods

The objectives of this research study was to identify and describe the environmental factors as identified by the PEOP model which are either barriers or facilitators of occupational performance of persons with SCI, and to compare the identified barriers or facilitators of occupational performance as it relates to the time since previous inpatient rehabilitation. A descriptive quantitative research approach was used, and convenience sampling was selected as the most appropriate sampling method. One hundred and twenty-one participants were included in the research study over a three-month period (April to June 2019). A questionnaire was developed by the researcher based on the environmental factors as described in the PEOP model of practice. Data was gathered during a structured interview with participants.

Results

The results are presented in three sections namely the demographic description, the known environmental factors that act as barriers or facilitators of occupational

performance and the barriers or facilitators of occupational performance since previous inpatient rehabilitation.

The physical layout shows that the home is a facilitator in nine self-care activities and a barrier of occupational performance of the remaining three self-care activities.

Results show that three of the six components of the design properties of the home are facilitators of occupational performance. The remaining three are barriers of occupational performance.

The geographical location of the home and type of terrain is a facilitator of occupational performance however climate is a barrier of occupational performance. All participants indicated that their religious beliefs and customs or traditions are facilitators of occupational performance.

The results show that social acceptance and social prejudice by others is a barrier of occupational performance. Participants also indicated that social interaction and the social support by others is a facilitator of their occupational performance.

The participants indicated that there was a significant change in their economic status after their injury and that their current economic status is a barrier of occupational performance. Access to health care services was also identified as a barrier of occupational performance.

Conclusion

The results confirm that certain environmental factors are either barriers or facilitators of occupational performance, participation and well-being of persons living with SCI. A few limitations were identified by the researcher during the research study. Recommendations that arose from the outcomes of this study were provided on the impact for OT practice, institutional level, governmental level and opportunities for future research. Furthermore, it is the hope of the researcher that the recommendations gained from this study will aid relevant stakeholders and policymakers to ease the plight of persons living with SCI in Saudi Arabia.

CHAPTER ONE: INTRODUCTION

"…*of the many forms of disability which can beset mankind, a severe injury or disease of the spinal cord undoubtedly constitutes one of the most devastating calamities in human life"*

Sir Ludwig Guttman (1899-1980; pioneer in 20th century spinal cord injury)

1.1 Introduction

Spinal cord injury (SCI) is a devastating and life-disrupting condition (Alshahri, Cripps, Lee & Al-Jadid, 2012; Abdul-Sattar & Godab, 2014). The person living with a SCI faces many challenges and obstacles throughout their lives. Diminished physical abilities, the inability to move around independently, inability to perform daily activities, confusion, depression and loss of self-esteem are only a few examples of the many challenges the person living with SCI may face. Every facet of their lives may therefore be affected (Radomski & Latham, 2014). Vasquez, Velasco, Farina, Marquez, & Salvador de la Barrera (2017) further state that SCI may have dire consequences not only for the individual but also their family, as well as society in general. Many barriers can be expected in society that may negatively affect the person with SCI, who are often left dependant and destitute as they battle to come to terms with their "new-found" reality.

Spinal cord injuries (SCI) may be caused by either traumatic or non-traumatic factors. Traumatic spinal cord injuries (TSCI) are commonly caused by motor vehicle accidents (MVA), falls and violence (Ge, Arul, Ikpeze, Baldwin, Nickels & Mesfin, 2017). Non-traumatic spinal cord injuries (NSCI) are commonly caused by conditions such as infection or cancer (Ge et. al., 2017).

The symptoms of SCI depend on the severity of the injury and the specific location in the spinal cord (WHO, 2013). The clinical picture of SCI may include both motor and sensory impairments and may result in partial or complete loss of sensory and motor control of the upper and/or lower extremities (O'Sullivan, Schmitz, & Falk, 2014). This

impairment results in either tetraplegia or paraplegia. Secondary complications, e.g. deep vein thrombosis, urinary tract infections, muscle spasms, osteoporosis, pressure ulcers, chronic pain, and respiratory complications, may occur and can be life threatening for the person with SCI (WHO, 2013).

The research was conducted at a tertiary care medical facility in Riyadh, Saudi Arabia where the researcher is currently employed. This medical facility is one of the largest hospitals in Saudi Arabia and the Middle East. It is comprised of four interconnected hospitals that are responsible for general health, children's health, women's health and rehabilitation respectively (KFMC 2020). This medical center was designed to cater for the entire continuum of health care of an admitted patient from acute care to rehabilitation, if required. The rehabilitation hospital provides comprehensive rehabilitation services to both inpatients and outpatients. The multidisciplinary medical team providing services to patients include physicians, nurses, occupational therapists, physical therapists, speech therapists, orthotists, prosthetists, psychologists, art therapists and recreational therapists. Patients that require significant intervention are admitted for inpatient rehabilitation services and are provided with individual and group sessions by the medical team to improve or restore functional independence in daily activities. Outpatients are provided with individual rehabilitation services on a weekly or monthly basis. Patients are seen on a referral basis by the allied health staff with the physician as the head of the medical team. Physician clinics are run on a weekly basis by physician consultants on an outpatient basis for different diagnoses including SCI. According to the scope of service of the Rehabilitation hospital, patients seen in the SCI physician clinic include newly referred SCI patients from other facilities in Saudi Arabia, previously admitted rehab inpatients and outpatients that did not require inpatient admission. As per the scope of service, these patients are followed up on an annual basis or as the physician deems appropriate until the patient achieves their functional goals and is discharged. Occupational Therapy forms an integral part of the rehabilitation journey of persons living with SCI seen at the Rehabilitation hospital

The Kingdom of Saudi Arabia (KSA) is the largest country in the Middle East with a

population of over 28 million people (WHO, 2013). The official language of Saudi Arabia is Arabic, and the dominant religion is Islam. Culture and traditions are conservative and is rooted in Islamic teachings (Alghamedi 2014). Saudi Arabia has a relatively high level of healthcare and the Saudi health care system is ranked 26th among 190 of the world's health systems (AlMalki, Fitzgerald & Clark, 2011). Despite the high level of healthcare, Saudi Arabia faces a rising burden of MVAs (Memish, Jaber, Mokdad, AlMazroa, Murray & Rabeehah, 2014; DeNicola, Aburizaize, Siddique, Khwaja, & Carpenter, 2016). As a consequence of the high rate of MVAs, Saudi Arabia has one of the highest incidences and prevalence rates of SCI as compared to other countries.

The person living with SCI will require the intervention and support of many different health care professionals to overcome the myriad obstacles that they may face (Lude, Kennedy, Elfstrom, & Ballert, 2014). The Occupational Therapist (OT) will share this process with the person living with SCI, while facilitating their independence in their daily occupations (Radomski & Latham 2014). The person living with SCI commonly presents with impaired occupational performance of their daily occupations e.g. activities of daily living (ADL), leisure, home maintenance, vocational and educational activities (Atchison & Dirette, 2016; Murad, Idris, Kannan & Danis, 2016). These occupations however do not exist in isolation, but are also affected by the environment the person finds themselves in. Certain factors in the environment may either present a barrier or facilitator of occupational performance (Christiansen & Baum, 2005; Turpin & Iwama, 2011).

The topic of the study stems from interactions that the researcher had with people living with SCI during treatment sessions at the Occupational Therapy outpatient unit at the facility where the researcher is employed. The researcher noticed that a large number of patients with SCI were still very dependant on their caregiver for assistance to perform daily activities despite undergoing a comprehensive rehabilitation program previously. The researcher further observed that the longer the time period was since the receiving inpatient rehabilitation, the lower the functional level of the patient. This sparked the researcher's interest in the possible factors in the environment that may

either support or facilitate the performance of daily activities of persons living with SCI in Saudi Arabia.

1.2 Statement of Problem

As stated above, Saudi Arabia has one of the highest rates of motor vehicle accidents (MVA) in the world and MVAs are the leading cause of SCI in Saudi Arabia (Abdul-Sattar & Godab, 2014; Cifu, Kaelin, Kowalske, Lew, Miller, Ragnarsson & Worsowicz, 2016). SCI imposes limitations on the daily occupations of people diagnosed with this condition. Persons living with SCI also commonly present with an impairment of the performance of their daily occupations (Atchison & Dirette, 2016; Murad, 2016).

Occupational performance does not exist in isolation. A transaction occurs when an individual act within their environment in the performance of their daily occupations (Christiansen & Baum, 2005; Turpin & Iwama, 2011). Occupations and occupational performance therefore cannot be separated from the context and environment that the person finds themselves in. It is thus clear that persons with SCI require an environment that supports occupational performance and participation in daily occupations.

The problem is that this aspect has not been adequately explored and limited information and research is available on the impact of the environment on the occupational performance of people with SCI in Saudi Arabia (Robert & Zamzani, 2013).

It is these environmental factors and their effect on occupations and occupational performance which this study aims to explore further.

1.3 Research question, aim and objectives

1.3.1 Research question

Which environmental factors (as identified by the PEOP model) influenced the occupational performance of persons living with SCI at a rehabilitation hospital in Saudi Arabia?

1.3.2 Aims

The aim of this study was to determine which known environmental factors as identified in the PEOP model, influences the occupational performance of persons living with SCI.

1.3.3 Objectives

- To distinguish which known environmental factors as identified by the PEOP model are either a barrier or facilitator of occupational performance of persons with SCI.
- To describe the environmental factors as identified by the PEOP model which are either a barrier or facilitator of occupational performance of persons with SCI.
- To compare the identified barriers or facilitators of occupational performance as it relates to the time since rehabilitation.

1.4 Methodology

A detailed description of the research methodology will be described in Chapter Three. A brief overview of the methodology is presented below.

A quantitative research approach with a descriptive design was used in this study. The type of quantitative research design chosen is influenced by the manner in which the researcher chose to answer the research question (Grove, Gray & Burns 2015). Descriptive research was used as it allowed the researcher the ability to examine the relationship between environmental factors (as identified in the PEOP model) and the occupational performance of the research participants (Grove et al., 2015). Descriptive research also allows the research to be conducted with a large number of participants with no manipulation of the situation (Grove et al., 2015). In this study, data was collected from the participants during a specific data collection period (April to June 2019). Grove et al., (2015) state that a convenience sample method is most appropriate if the sample size is small and if the researcher has limited access to the population. A convenience sampling method was therefore selected as the most

appropriate sampling method that could be used for this research study to guarantee as much participants as possible. The research participants had to adhere to certain inclusion and exclusion criteria (cf 3.4.3) to be included in the study, this was to ensure that the data gained was appropriate for the research study.

The target population (cf. 3.4.1) were persons living with SCI that receive regular outpatient follow up appointments at the King Fahad Medical City (KFMC) Rehabilitation Hospital in Saudi Arabia where the researcher is employed. One hundred and twenty-one participants were included in the research study over a three-month period (April to June 2019).

During an extensive literature review, the researcher could not find any similar studies and found limited studies in literature on persons with SCI on the Saudi population (Robert & Zamzani, 2013). Also, limited evidence was found in literature regarding the impact of environmental barriers on the occupational performance on daily living activities of people living with SCI (Reinhardt, Ballert, Brinkhof & Post, 2016). Many studies used the Craig Hospital Environmental Factors Inventory Short Form (CHIEF-SF) and featured US samples of people with traumatic SCI. The CHIEF-SF form, however, does not include important environmental barriers that the researcher wanted to include in this study. No suitable data collection tool was therefore found to address the research problem. A questionnaire was developed by the researcher and was based on the environmental factors as described in the PEOP model (Christiansen & Baum, 2005). The 12 guidelines as proposed by Leedy and Ormrod (2013) to develop a valid and reliable questionnaire was used. The following environmental factors from the PEOP model were included in the questionnaire:

- The built environment
- The natural environment
- The cultural environment
- Social factors
- Social and economic systems.

The ADL tasks included in the questionnaire were selected from the FIM measurement

system (cf 2.4.1) used at the facility where the researcher is employed. The ADL tasks that were included in the questionnaire are as follows:

- Feeding
- Grooming
- Bathing
- Dressing (upper and lower body)
- Toileting

A trained Arabic speaking field worker conducted the structured interviews with all participants were Arabic speaking. This field worker was a qualified Occupational Therapist and assisted the participants to complete the questionnaire. The fieldworker asked the questions and noted the answers on the questionnaire. The researcher was present during all interviews. The field worker was trained by the researcher beforehand to conduct the interviews with the participants using an approach as identified by Leedy and Ormrod (2013).

A pilot study was conducted where the measurement tool was pilot tested in both English and Arabic to ensure the clarity of questions, effectiveness of instructions, time required to complete the questionnaire, and success of the data collection techniques (Grove et al., 2015). The questionnaire was pilot tested with four participants. The pilot study was also performed to enhance the validity and reliability of the measurement tool.

After receiving the completed questionnaires, the researcher was responsible for encoding the questionnaires using a predetermined coding system. The data gathered was then processed and analysed by a biostatistician from the University of the Free State (UFS) biostatistics department.

The data collected enabled the researcher to draw conclusions and recommendations regarding the effect of environmental factors (as identified in the PEOP model) on the occupational performance of persons with SCI in Saudi Arabia.

1.5 Ethical Considerations

Ethical approval was granted by the Health Science Research Ethics Committee (HSREC) of the Faculty of Heath Sciences of the University of the Free State (ethical clearance number: UFS-HSD2019/0208/2304). Ethical clearance was also granted by the Institutional Review Board (IRB) in Saudi Arabia (IRB registration number: H-01-R-012). The Medical Director of the KFMC Rehabilitation Hospital also granted permission to conduct the research study on the Rehabilitation Hospital premises.

Participation was voluntary and participants had the right to withdraw from the study at any time. Informed consent was provided by the participants prior to the commencement of data collection. The study posed no known risks to the participants and no remuneration was provided. All information gathered was treated as confidential by assigning a number to each questionnaire instead of using the participant's name.

The results of the study will only be used for educational purposes and not for any personal gain. The results of the research study will also be published in an academic journal to enhance the body of knowledge in the field of Occupational Therapy.

1.6 Importance and Value of the Study

The primary significance of this study was to identify and describe the effect of environmental factors (as identified by the PEOP model) that are either barriers to or facilitators of occupational performance for persons living with SCI in Saudi Arabia. The recommendations stemming from this study may be incorporated into the rehabilitation programme at KFMC, to address possible environmental factors that may be barriers or facilitators of occupational performance. This in turn may lead to improved functional outcomes for all persons living with SCI. The data may also enable stakeholders in Saudi Arabia to better understand the plight of persons living with SCI and to provide a more supportive environment for them.

The results of the study will be communicated to peers through the means of a research dissertation, as well as a research article that will contribute towards the

burgeoning body of knowledge in the field of SCI rehabilitation in the field of Occupational Therapy.

This study will attempt to identify and describe the effect of environmental factors, as described in the PEOP model, on the occupational performance of persons with SCI in Saudi Arabia. Through this study, the researcher aims to highlight the plight of persons with SCI in Saudi Arabia and draw attention to the environmental factors that may have an influence on the occupational performance of their daily occupations.

1.7 Outline of the Chapters

The outline of the chapters is mentioned here to present the reader with an overview of all subsequent chapters in this dissertation.

Chapter One: Introduction and Orientation

The purpose of this chapter was to provide an overview to the reader of the background, type and structure of the study. The chapter provided a brief overview of the problem statement, aim, objectives, methodology and ethical implications related to the study.

Chapter Two: Literature perspectives

This chapter provides a comprehensive literature review of the all concepts addressed in the study. The main concepts addressed are SCI, SCI in the Saudi Arabian context, occupation and occupational performance, the PEOP model and the impact of the environment on occupational performance.

Chapter Three: Methodology

Chapter Three provides a detailed description of the research design and method of data collection used in this study. The following are concepts also discussed: the research population, sampling, inclusion and exclusion criteria of the participants, the measurement tool, data collection procedures, measurement errors and the pilot study.

Chapter Four: Results

Descriptive statistics are used to provide meaning to the results obtained. The results are presented in the form of figures and tables.

Chapter Five: Discussion

In this chapter the researcher discusses the results, and the implications it may hold for the stakeholders and the profession of Occupational Therapy.

Chapter Six: Conclusion and recommendation

In this chapter a summary of the results, recommendations, and the value of the study are discussed. The limitations of the study, a reflection of the questionnaire, and the data collection process is also addressed.

1.8 Summary

This chapter served as a general orientation of the study and presented the background and framework of the dissertation. Saudi Arabia has one of the highest incidence and prevalence rates of SCI in the world. With such a large number of people afflicted by SCI, it is important to better understand the obstacles and challenges that they may experience in their environment and in society. Literature confirms that people with SCI commonly present with an impairment in the occupational performance of their daily occupations. The study will attempt to answer the question “Which environmental factors (as identified by the PEOP model) influence the occupational performance of persons with SCI at a rehabilitation hospital in Saudi Arabia?”

The following chapter will aim to explore the relevant national and international literature of the all concepts addressed in the study through a comprehensive literature review.

CHAPTER TWO: LITERATURE REVIEW

This chapter displays an in-depth literature review discussing and describing the literature relevant to the aim and objectives of the research study. The search engines used to obtain sources for the literature review included Ebscohost, PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL) and Google Scholar. The literature included dates from 1998 to 2019. The key words used in different combinations during literature searches were as follows: spinal cord injury, spinal cord injury in Saudi Arabia, prevalence spinal cord injury, incidence of spinal cord injury, causes spinal cord injury, ASIA scale, occupations, occupational performance, occupational therapy models of practice, PEOP model.

2.1 Introduction

SCI is a traumatic event that changes the life of an individual (Radomski & Latham 2014). The person with SCI may present with many symptoms including sensory and motor loss of the upper and/or lower extremities, bladder and bowel incontinence and many other secondary complications (Abdul-Sattar & Godab, 2014). The person living with SCI may place a great burden of care on their caregivers and the health system. It is therefore important for the person living with SCI to be able to perform their daily activities (taking into account their functional level) as independently as possible to alleviate the burden of care on others. Through therapeutic intervention the OT will attempt to enable people living with SCI to participate in their daily activities as independently as possible. It is imperative for the OT to understand the factors that may influence the performance of these daily activities and to integrate these in their therapeutic interventions to enhance the participation and well-being of persons living with SCI.

This chapter will highlight relevant theoretical perspectives of this research study by reviewing literature of spinal cord injury, the Saudi Arabian context, occupational therapy intervention and conceptual models of practice used in the field of Occupational Therapy.

2.2 Spinal Cord Injury (SCI)

SCI is a devastating event and may result in tremendous changes in an individual's life (Radomski & Latham, 2014). It may lead to altered mobility, impairment in the performance of ADL and a change in participation in their social and work activities (O'Sullivan et al., 2014). The person living with SCI may be plagued by feelings of despair, confusion and uncertainty about their future (Radomski & Latham, 2014). The condition however affects not only the person living with SCI, but also their immediate and extended family members. These family members may become responsible to provide care for the person living with SCI and they may be unable to perform this task. The person living with SCI and their families, will therefore require intervention and support by different health professionals to overcome the many obstacles they will face in their daily lives (Lude, Kennedy, Elfstrom & Ballert, 2014). The OT is uniquely placed to understand the complexities and barriers that the person living with SCI and their families may face. The OT will thus share this burden and attempt to facilitate independence, participation and well-being in their daily lives (Radomski & Latham, 2014; WFOT, 2012).

2.2.1 Epidemiology

According to the World Health Organisation (WHO, 2013) 250 000 to 500 000 people suffer from SCI annually worldwide. Annual incidence rates of SCI recorded in developed countries are the highest in the US, with approximately 56 cases per million followed by Canada with 53 cases per million, Spain with 24 cases per million, France with 19 cases per million and the Netherlands, Qatar, Ireland and Finland with between 12 to 14 cases per million (Cifu et al., 2016). Cifu et al. (2016) further state that the prevalence of traumatic spinal cord injuries (TSCI) in the US is approximately 1298 cases per million, Australia at 681 cases per million and Finland at 280 cases per million.

Apart from a few single samples – hospital-based retrospective studies – no official statistics of the incidence and prevalence rates of SCI in Saudi Arabia were found in literature (Robert & Zamzani, 2013). Abobat (1999) estimated the incidence of SCI in Saudi Arabia to be 62.37 per million population. The study reported that between 1990

and 1994, the prevalence of SCI in Saudi Arabia was 627 per million. Al Shammari (2011) showed the SCI incidence rate in Saudi Arabia to be 38 per million from 2000 to 2010. No other recent figures were found in literature by the researcher. Although outdated these figures show that compared to other countries the incidence and prevalence rates in Saudi Arabia are found to be at the higher end of the spectrum. It is therefore important that the Saudi Arabian health ministry attempt to quantify the true extent of the incidence and prevalence rates of SCI found in their country.

2.2.2 Causes

SCI may be either of a traumatic (TSCI) or non-traumatic (NSCI) origin (Cifu et al., 2016). According to Ge et al. (2017), TSCI are more commonly caused by motor vehicle accidents (MVA), falls and violence. Cifu et al. (2016) concurs that the leading causes of TSCI are MVA, falls, violence and sport injuries. MVA is the cause of 50% of SCI in Europe; 40% in the United States (US) south-east Asia and the Mediterranean. Falls are the cause of 40% of SCI in south-east Asia and the Mediterranean, whereas 30% of SCI in the US and Europe are caused by falls (Cifu et al., 2016). Cifu et al. (2016) further state that although MVAs are the leading cause of SCI in the US, falls are the leading cause of SCI for persons over the age of 60 years old. In literature no official statistics of the causes of SCI in Saudi Arabia are available. Single center hospital-based studies however report that approximately 80% of SCI patients sustained their injuries through MVA or falls. MVA followed by falls, are therefore regarded as the major causes of TSCI in Saudi Arabia among young adults (Robert & Zamzani, 2013).

Non-traumatic spinal cord injuries (NSCI) are commonly caused by spinal stenosis, ischaemia, tumours, infection and congenital diseases (Radomski & Latham, 2014). Ge et al. (2017) confirm that NSCI are commonly caused by non-traumatic causes e.g. infection or cancer. In a literature search the researcher could not find any data on NSCI causes in Saudi Arabia.

2.2.3 Classification of SCI

SCI are typically divided into two functional categories: tetraplegia and paraplegia (O'Sullivan et al., 2014). Tetraplegia refers to a paralysis of upper and lower extremities as well as the trunk and respiratory muscles that results from lesions of the cervical segment of the spinal cord. Paraplegia refers to the paralysis of a part of the trunk and both lower extremities that results from lesions of the thoracic, lumbar and/or sacral segment of the spinal cord (O'Sullivan et al., 2014).

It is important for a person living with SCI to be diagnosed correctly following the injury (Weidner, Rupp, & Tansey, 2017). Determining the correct lesion level will guide the medical team to determine the goals and the expected functional outcomes following rehabilitation. The diagnosis of SCI can be made by performing a neurologic examination (Cifu et al., 2016). The universally accepted measure used to diagnose persons living with SCI is the American Spinal Cord Association (ASIA) or International Standards for Neurologic Classification of Spinal Cord Injury (ISNCSCI) impairment scale also known as the ASIA scale (O'Sullivan et al., 2014). The ISNCSCI was published in 1994 by the American Spinal Cord Injury Association (ASIA) in an effort to standardise the manner in which the severity of SCI was classified by physicians (Van Middendorp et al., 2001; Cifu et al., 2016). The ISNCSCI introduced standards that are used to determine the neurological level, as well as the sensory and motor level of the person living with SCI (Weidner et al., 2017). This procedure includes a thorough investigation of all dermatomes and myotomes of the trunk, upper and lower extremities (Cifu et al., 2016). The purpose of the ASIA scale (Figure 2.1) is to standardise the method used to determine the degree of impairment and the functional neurological level of the person living with SCI and to determine whether the injury is "complete or incomplete". This is an important distinction that has tremendous prognostic implications and may provide an idea of the expected functional outcomes of the person living with SCI following rehabilitation interventions (Cifu et al., 2016; Roberts, Leonard & Cepela, 2017).

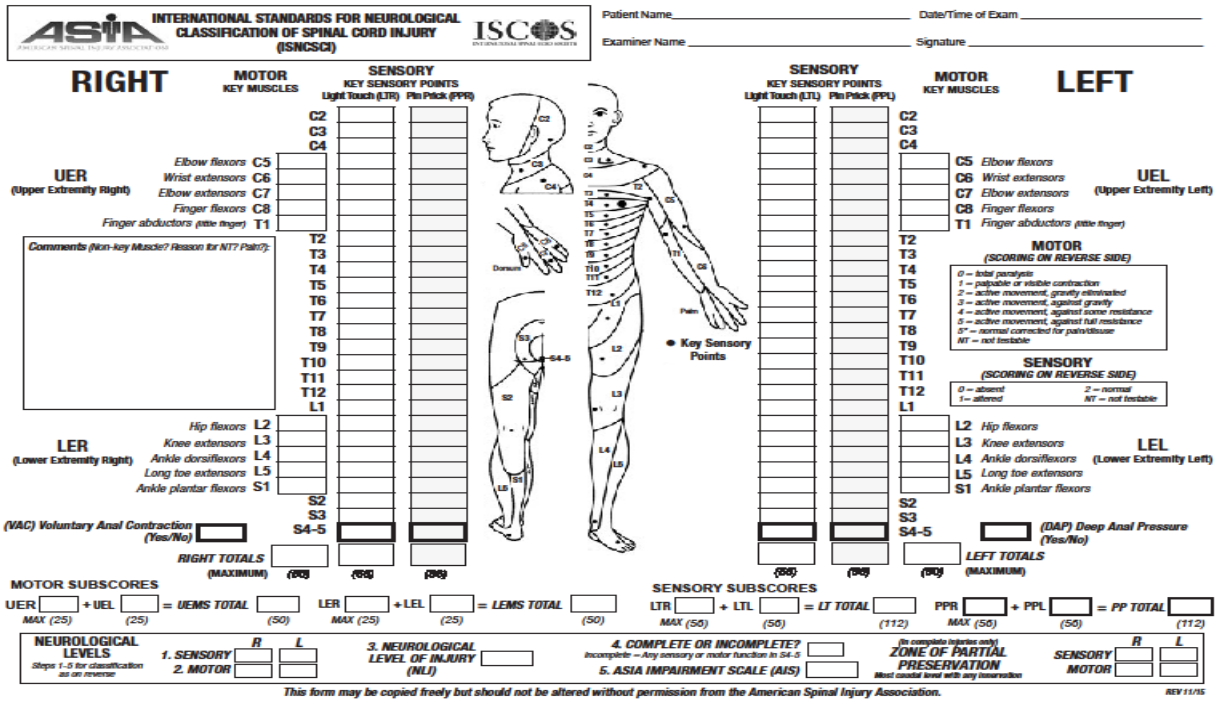

Figure 2.1: ASIA scale – motor and sensory examination (O'Sullivan et al., 2014)

By using the ASIA scale, the neurological level of SCI is defined as the most caudal segment with intact sensory and motor innervation bilaterally (O'Sullivan et al., 2014). The motor level is determined by testing the innervation of ten key muscles bilaterally and the sensory level is determined by testing the innervation of 28 key sensory points bilaterally (Radomski & Latham, 2014). The sensory level is tested by determining the sensitivity of light touch and pinprick. Scoring of sensation is based on an ordinal scale where 0 = absent, 1 = impaired, 2 = intact/normal. The motor level is determined by testing the muscle strength of the ten key muscles bilaterally. Scoring of the motor level is based on a 6-point scale (0-5), commonly used to test the manual muscle strength by health care professionals (O'Sullivan et al., 2014). All scores are entered onto the ASIA scale form (Figure 2.1) and the final neurological level of the SCI is determined (Cifu et al., 2016). The ISNCSCI also includes a scale of impairment called the ASIA impairment scale (AIS) which classifies the severity of the injury into five categories based on the severity of the motor and sensory level (Cifu et al., 2016). The

AIS scale thus determines whether the injury is “complete or incomplete” (Winter, Pattani, & Temple, 2014).

If the injury is AIS level A (complete) there will be no sensory or motor innervation below the neurological level, as well as no sensory and motor innervation in the most caudal segment of the spinal cord S4-S5 (Cifu et al., 2016). If the injury is AIS level B (incomplete), the person with SCI will have sensory and/or motor innervation in the S4-S5 spinal segments, intact sensory abilities only and no motor function at least three segments below the neurological level (Cifu et al., 2016). If the injury is AIS level C (incomplete), then the person with SCI will have sensory and/or motor innervation in the S4-S5 spinal segments, and more than half of the key muscles below the neurological level will have a muscle strength grade less than 3/5 (Cifu et al., 2016). If the injury is AIS level D (incomplete), then the person with SCI will have sensory and/or motor innervation in the S4-S5 spinal segments, and more than half of the key muscles below the neurological level will have a muscle strength grade greater than or equal to 3/5 (Cifu et al., 2016). If the injury is AIS level E (incomplete), then the person with SCI will have normal sensory and motor innervation. AIS level A is regarded as a complete spinal injury and AIS level B to AIS level E are regarded as incomplete spinal injuries (Cifu et al., 2016).

The clinical picture of the person with SCI will be determined by the neurological level as well as the “completeness” of the injury (AIS scale A to E) (O’Sullivan et al., 2014). Guidelines published by The Consortium of Spinal Medicine (1999) details the expected functional outcomes of persons living with SCI based on their ASIA scale neurological level after rehabilitation. The higher the neurological level the more assistance and assistive devices the person living with SCI requires to complete their ADL’s. Therefore, tetraplegics will require more assistance from others to complete their ADL than paraplegics. This concept will be expanded later in the chapter.

2.2.4 Impairments caused by spinal cord injuries (SCI)

The person with SCI will face many impairments and complications as a consequence of their injury. The OT will educate the person with SCI and their caregivers to be able to deal with these complications and live a safe and healthy life (Radomski & Latham, 2014). The most common complications are outlined below.

Autonomic dysreflexia is a life threating condition and is associated with spinal injuries above T6 level (O'Sullivan et al., 2014). It is a sympathetic response to noxious stimuli below the lesion level. The most common causes are a distended bladder or bowel, urinary tract infection, kidney stones, blocked catheter and irritation of the bladder during catheterisation. The most common symptoms are hypertension, bradycardia, headache, increased spasticity, vasoconstriction below the level of lesion, vasodilation above the level of the lesion, constricted pupils and blurred vision (O'Sullivan et al., 2014).

Spastic hypertonia is often a result of spinal injury. It increases over time and results in an increased tone, as well as tonic and clonic spasms triggered by sensory stimuli such as touch, infection or irritation (Radomski & Latham, 2014).

Persons living with SCI may present with impaired respiratory function due to impaired innervation of the respiratory muscles, depending on the level of their injury. This is especially true for individuals with cervical and thoracic lesions of the spinal cord (Radomski & Latham, 2014).

Persons living with SCI may present with impaired temperature regulation that may lead to hypothermia or heat stroke (O'Sullivan et al., 2014).

Bladder and bowel dysfunction pose a serious medical complication for the person with SCI. Individuals with AIS scale A and B are especially affected. The goal of a good bowel and bladder programme, is to enable the person with SCI to develop a routine that supports health, reduces complications and supports participation in life roles or occupations that promote well-being (Radomski & Latham, 2014).

The need for sexual gratification does not diminish after SCI. The person with SCI will

have questions regarding sexual needs, as well as reproduction, that need to be answered by the medical team (Radomski & Latham, 2014).

2.2.5 Secondary complications of SCI

The person living with SCI may experience many secondary complications of SCI. The most common secondary complications found in literature will be discussed below.

Pressure ulcers are a serious and dangerous condition that may lead to infection and even death in the person living with SCI (O'Sullivan et al., 2014). Pressure ulcers are ulcerations of the skin caused by unrelieved pressure and shearing forces on vulnerable skin areas of the person living with SCI. It is most commonly found in persons living with SCI with impaired or absent sensory innervation below the neurological level (Radomski & Latham, 2014).

Deep vein thrombosis is another serious secondary complication of SCI that may even lead to death. Deep vein thrombosis may result from a thrombus developing in a vein. Persons living with SCI are at risk due to a lack of movement and mobility of their lower extremities (O'Sullivan et al., 2014).

Orthostatic hypotension may be caused by a sudden drop in blood pressure as soon as the person living with SCI assumes an upright position. It is most commonly found in persons with a SCI above the T6 neurological level. Symptoms may include light headedness, dizziness and fainting (Radomski & Latham, 2014).

Chronic pain is a common occurrence in both the acute and chronic stages of recovery following a SCI. Nociceptive pain of the upper extremity joints of the shoulders are common in persons living with SCI. Another type of pain is neuropathic pain that may develop as a result of SCI to the central and peripheral nervous system. Neuropathic pain may occur above or below the neurological level of the person living with SCI (O'Sullivan et al., 2014).

Contractures is another secondary complication that may develop, secondary to a prolonged shortening of the structures surrounding a joint due to an impaired active range of motion. Persons living with SCI with severe spasticity are also at risk for

developing contractures of upper and lower extremity joints (O'Sullivan et al., 2014).

Heterotopic ossification may occur when abnormal bone growth occurs near joints (O'Sullivan et al., 2014). It is a condition characterised by calcification of connective tissue around a joint causing impaired range of motion of the joint (Radomski & Latham, 2014).

Persons living with SCI may experience a decline in bone density that results in osteoporosis. The reduction of bone density then places them at risk for skeletal fractures.

The OT will need to be aware of these complications that may affect the person living with SCI, as this might affect their intervention strategies. The OT, in collaboration with other health practitioners, will ensure that the person living with SCI is educated about the dangers of these complications and how to lead a healthy life (Radomski & Latham, 2014).

2.2.6 Consequences of spinal cord injuries (SCI)

The impairments of SCI may have devastating and life changing consequences for the person living with SCI. Atchison and Dirette (2016) suggest that the impairments of the person living with SCI will result in difficulty engaging in their daily activities. Their performance of activities such as work, play, leisure as well as activities of daily living (ADL) will therefore be affected. Biering-Sorenson, Scheuringer, Baumberger, Charlifue, Post, Montero, Kostanjsek, & Stucki (2006), concur that people living with SCI experience a wide range of activity and participation restrictions in their daily lives due to their impairments. Common restrictions may be found in areas of mobility, self-care activities (ADL), difficulties in regaining work, maintaining social relationships, participating in leisure activities and being active members of the community. Biering-Sorenson et al. (2006) further state that restrictions of daily activities for persons living with SCI are highly dependent on the environmental factors surrounding them. Whiteneck, Meade, Dijkers, Tate, Bushnik, & Forchheimer (2004), concur that environmental factors influence participation and quality of life as well as functional outcomes of persons with SCI.

2.3 Saudi Arabia

The Kingdom of Saudi Arabia (KSA) is the largest country in the Middle East and occupies four-fifths of the Arabian Peninsula with a population of over 28 million people (WHO, 2013). Saudi Arabia is regarded as a high-income country with a high GDP rate per capita (WHO, 2013). The majority of Saudi residents (83%) live in urban areas, with the remaining 17% residing in rural areas (World population review, 2019). Saudi Arabia is characterised by a desert climate with extreme summer temperatures and a low annual rainfall (Hasanean & Almazroui, 2015). The official language of Saudi Arabia is Arabic, and the dominant religion is Islam. Culture and traditions are considered to be conservative rooted in Islamic teachings and Arab customs (Alghamedi 2014). The kinship principle is important in Saudi society, and the extended family is a strong social support unit within the community (Britannica 2020). Socializing is generally centered around the family and the home. Typical homes are built two stories high with and open courtyard enclosed with high walls and arabic (squat) toilets (Babsail & Al-Qawasmi, 2015). The building of homes is regulated by the Saudi building code (SBC) adopted in 2007. It includes the minimum requirements that all buildings should adhere to (SBC, 2007).

Almalki, Fitzgerald and Clark (2011) state that Saudi Arabia has a relatively high level of healthcare and the Saudi health care system is ranked 26th among 190 of the world's health systems. This view was based on a report by the WHO in 2000 that ranked the effectiveness of health care services among 191 countries. The Saudi health care system was ranked higher than many international health care systems such as Canada (30th), Australia (32nd), Unites States of America (37th), New Zealand (41st), South Africa (175th) and other health care systems in the Middle East region such as the United Arab Emirates (27th), Qatar (44th) and Kuwait (45th). All healthcare services are provided free of charge for all citizens and residents (Almalki et al., 2011). The Ministry of Health (MOH) is responsible for providing 60% of all healthcare services in Saudi Arabia, and the remaining 40% are provided by other government services (armed forces, security forces and national guard), and the private sector (Alshahri et al., 2012; Memish et al., 2014). In recent decades the government of Saudi Arabia has placed a greater importance on health, and it is seen as an important part of the

development of Saudi Arabia (Robert & Zamzani, 2013). This commitment is seen in the fact that health has featured prominently in all national development plans in Saudi Arabia since 1970 (WHO, 2013). Due to the significant investments made by the government, Saudi Arabia has seen major improvements in their healthcare system, but despite this they still face several health challenges (Memish et al., 2014).

One of the major health challenges faced by Saudi Arabia is the rising burden of MVA's (Memish et al., 2014; DeNicola et al., 2016). In a report by the WHO (2013), MVA's are listed as the leading cause of death, injury and disability among adult males aged 16 to 36 years in Saudi Arabia. The main cause of the high rate of MVAs is the non-adherence of traffic laws and regulations (Memish et al., 2014). Speeding, disobeying traffic rules, driver error and overtaking from the wrong side are reasons for the high rate of MVAs in Saudi Arabia (Mansuri, Al-Zalabani, Zalat & Qabshawi, 2015; DeNicola et al., 2016). The cost of treating people affected by MVA's are significant, and it was estimated that in 2002, the cost amounted to approximately 652.5 million Saudi riyals (WHO, 2013). Robert and Zamzani (2013) and Mahmoud et al. (2017), concur that Saudi Arabia has one of the highest MVA rates in the world and as a consequence, one of the highest rates of SCI worldwide. No official statistics could be found in literature to substantiate this claim except for a few single samples – hospital-based retrospective studies. Ansari, Akhdar, Mandoorah and Moutaery (2000) reported that between 1971 and 1997 one medical facility in Saudi Arabia found that 79.2% of all SCI patients admitted were as a result of MVAs. Another study found that between 2003 and 2008 85% of all admitted SCI patients were caused by MVAs (Alshahri et al., 2016).

In literature, a vast amount of research has been published on SCI, however the majority of this research only considers a few developed countries. Currently, there is limited research available on SCI and the impact it has on the population in Saudi Arabia (Robert & Zamzani, 2013). According to the International Perspectives of Spinal Cord Injury (WHO, 2013), only a few developed countries can provide national statistics of SCI, therefore it is very difficult to provide an accurate global picture on the incidence and prevalence of SCI worldwide. Data on the incidence and prevalence

rate of SCI in Saudi Arabia is also very limited and no official published incidence and prevalence rates were found in literature (Alshahri et al., 2016; Robert & Zamzani, 2013). This can be ascribed to the lack of maintaining a national registry of SCI statistics in Saudi Arabia (Robert & Zamzani, 2013). As mentioned above (cf. 2.2.1), the estimated incidence rate of SCI in Saudi Arabia was approximately 38 to 62.37 per million population and the prevalence rate was 627 per million (Abobat, 1999). The figures mentioned above, although outdated, reveal that Saudi Arabia has one of the highest incidence and prevalence rates of SCI as compared to other countries.

Robert and Zamzani (2013) state that in Saudi Arabia, more men are at risk for SCI than women. Previous studies reported that more than 80% of persons with SCI in Saudi Arabia are men. This can be ascribed to the fact that the ban on women driving was only recently lifted by the King of Saudi Arabia in September 2017. The frequency of injury for SCI in Saudi Arabia was found to be the highest in the 21-30 age group and a few studies reported that the most common neurological level of persons with SCI in Saudi Arabia was cervical injuries followed by thoracic and lumbar injuries (Robert & Zamzani, 2013).

From the information mentioned above, it is clear that the high rate of MVAs and resultant SCI injury is a major public health challenge in Saudi Arabia (Memish et al., 2014). This confirms that more research should be conducted to better understand this phenomenon and the resultant effects that SCI has on the Saudi population. It may then be assumed that people living with SCI in Saudi Arabia will face many challenges with regards to their occupations and the performance of their occupations, compared to their counterparts in other countries. In an attempt to answer the research question of this study, the following section will delineate the terms “occupation” and “occupational performance” and their importance in Occupational Therapy, as well as their relevance to persons living with SCI.

2.4 Occupational Therapy

Since the birth of Occupational Therapy, there has been an uncertainty of how best to describe the profession (Curtin, Molineux, & Supyk-Mellson, 2010). It is widely known that many definitions for Occupational Therapy exist. This is evidenced in a document published by the World Federation of Occupational Therapy (WFOT, 2012). In this document, more than 40 definitions of Occupational Therapy from Occupational Therapy member organisations worldwide are listed (Janse van Rensburg, 2015). WFOT (2012, n.p.) defines Occupational Therapy as follows:

> *Occupational Therapy (OT) is a client-centered health profession concerned with promoting health and well-being through occupation. The primary goal of OT is to enable people to participate in the activities of everyday life. Occupational Therapists (OT's) achieve this outcome, by working with people and communities to enhance their ability to engage in the occupations they want to, need to, or are expected to do, or by modifying the occupations or the environment to better support their occupational engagement.*

Kramer and Hinojosa (2010) state that the overall concern of OT, is to ensure that a person can function in society and can participate in purposeful activities and occupations. Christiansen and Baum (2005) further state, that OT's offer services to maintain, improve or restore occupational performance that may have been affected by illness or disease. It is thus clear from the definition above, that occupations and the performance of occupations are viewed as central concepts within the domain of Occupational Therapy (American Occupational Therapy Association, 2014; Wong & Fisher, 2015). It is therefore important to understand the constructs of occupation and occupational performance and its immense value within the field of Occupational Therapy.

2.4.1 The constructs of occupation and occupational performance

It is important to define what the term "occupation" represents in the field of Occupational Therapy. The occupational therapy practice framework (OTPF-3) published by American Occupational Therapy Association (2014) was developed to guide OT's in their professional practice. The OTPF-3 outlines the importance and focus of the central concept of occupation in the field of Occupational Therapy. In the

OTPF-3 framework, occupation is defined as all the daily activities that people engage in. The occupations of a person is futher defined as the activities of daily living (ADLs), instrumental activities of daily living (IADL), rest and sleep, education, work, play, leisure and social participation (American Occupational Therapy Association, 2014). Many sources in literature share the view of the OTPF-3 in the way occupation is defined in the field of Occupational Therapy. Wong and Fisher (2015) view occupation as the central concept within the domain of Occupational Therapy. Law and collegues (2016) describes “occupation” as all the daily activities that a person will perform throughout their lives. Kang (2017) further describes occupations as any meaningful activity that people do in the context of their own environment. Daud, Judd, Yau and Barnett (2016) agree that occupation includes the activities of ADL, work, education, play, leisure, rest and sleep, and social participation. It is therefore clear from the above that occupation is an important concept in Occupational Therapy and describes all the daily activities that a person may perform.

The second important construct to be considered is the performance of occupations. Occupational performance is described by Law et al. (2016), as anything one does to satisfy life’s needs. It is regarded as a dynamic relationship between the person, their occupations and the environment (Perneros, Tropp, & Sandqvist, 2014). Occupational performance is also seen as the ability to carry out ADLs, IADLs, education, work, play or leisure (Radomski & Latham, 2014). Understanding the effect of occupational performance on health and well-being and the focus on helping people participate in their daily occupations within their respective environments, distinguishes the OT from other healthcare practitioners (Christiansen & Baum, 2005). OTs focus on what the client can do, and offer services to improve, maintain and restore occupational performance that may have been challenged due to illness or disease. The satisfaction gained by the client in the performance of their occupations may have an impact on their overall state of physical, cognitive and emotional health (Christiansen & Baum, 2005).

Persons living with SCI will usually not be able to perform all their occupations, depending on the functional status following their injury (Atchison & Dirette, 2016).

They may therefore present with problems in their occupational performance. Taking the ASIA scale (cf 2.2.3) into consideration the occupational performance problems of a person living with SCI with an AIS level A neurological level will be outlined below:

Quadruplegia (C1-C4)

Persons living with SCI C1-C3 AIS A level will be ventilator dependant and require total assistance for all their ADLs. Persons living with SCI C4 AIS A level also require total assistance for all ADLs but will not be ventilator dependant and will be able to instruct caregivers. They will require 24-hour caregiver assistance and high-tech assistive devices for ADLs and wheelchair mobility (Pendleton & Shultz-Kron, 2013; Radomski & Latham, 2014).

Quadruplegia (C5-C6)

Persons living with SCI C5 and C6 AIS A level require assistance for the performance of ADLs and wheelchair mobility. They require 6 to 10-hours of caregiver assistance for ADL performance. They will also require assistive devices for ADL performance and a electric wheelchair for mobility (Pendleton & Shultz-Kron, 2013; Radomski & Latham, 2014).

Quadruplegia (C7-C8)

Persons living with SCI C7 and C8 AIS A level require less assistance for the performance of ADLs and wheelchair mobility due of the presence of some handfunction ability. They require 6-hours of caregiver assistance for ADL performance. They may require some assistive devices for ADL performance and a manual/electric wheelchair for mobility (Pendleton & Shultz-Kron, 2013; Radomski & Latham, 2014).

Paraplegia (T1-T9)

Persons living with SCI T1 to T9 AIS A level should be able to perform their ADLs independently. They only require caregiver assistance of 3 hours per day for homemaking tasks. They require a manual wheelchair for mobility (Pendleton &

Shultz-Kron, 2013; Radomski & Latham, 2014).

Paraplegia (T10-L1)

Persons living with SCI T10 to L1 AIS A level are able to perform their ADLs independently. They only require caregiver assistance of 2 hours per day for homemaking tasks. They may require assistive devices e.g. a walker or forearm crutches for indoor mobility (ambulation) and a manual wheelchair for outdoor mobility (Pendleton & Shultz-Kron, 2013; Radomski & Latham, 2014).

Paraplegia (L2-S5)

Persons living with SCI with L2 to S5 AIS A level are able to perform their ADLs independently. They require only 0-1 hour of caregiver assistance for homemaking tasks. They may require assistive devices e.g. a walker or forearm crutches for indoor and outdoor mobility (ambulation). They may also require a manual wheelchair at times for outdoor mobility (Pendleton & Shultz-Kron, 2013; Radomski & Latham, 2014).

The goal of the OT in the rehabilitation of persons living with SCI is to restore occupational performance (as much as possible) in their daily occupations. This in turn will promote their health and well-being (Radomski & Latham, 2014). The OT achieves this by firstly evaluating the current abilities of the person living with SCI and developing an occupational profile (Radomski & Latham, 2014). The OT in collaboration with the person living with SCI will determine the treatment plan and the goals of intervention. At the facility where the researcher is employed, the OT will commence intervention by using occupation as a therapeutic medium to achieve the following:

- Restore performance of ADLs
- Prescribe needed assistive devices to improve the performance of ADLs
- Prescribe an appropriate wheelchair for mobility (if required) and provide training
- Provide education to the person living with SCI and their caregiver on preventing complications

- Provide advice on home modifications

Measurement of occupational performance may be either quantitative or qualitative in nature (Law et al, 2005).

To monitor the occupational performance changes with their patients, clinicians and health facilities often use specific measurement instruments. According to (Christiansen, Baum and Bass, 2014) any measure that can document changes as a planned intervention may be used as a tool to measure therapeutic outcomes. To ensure evidence-based practice, the OT is required to use a valid measurement instrument that highlights the effectiveness and efficacy of occupational therapy intervention (Law et al, 2005). A commonly used outcome measure is the Functional Independence Measure (FIM) developed by the Uniform Data System for Medical Rehabilitation (UDMSR). This system is currently used at the facility where the researcher is employed to document occupational performance outcomes. The FIM measurement system quantifies the measurement of ADL tasks of 18 different items covering 6 domains (self-care, sphincter control, transfer, locomotion, communication, and social cognition). Each item is rated on a scale from 1 (complete dependence) to 7 (complete independence) (Graham et al., 2014).

It is clear from the literature above that Occupational Therapy is a scientific profession that has organised it's constructs of occupations and occupational performance over time. In the 1970s, a few authors attempted to document the fundamental beliefs of Occupational Therapy and clearly define approaches to therapeutic interventions. These belief systems were referred to as frameworks (Turpin & Iwama, 2011). The frameworks later evolved in the 1980s into models of practice that conceptualised the basic ideas and philosophies of Occupational Therapy into a schematic manner (Turpin & Iwama, 2011). Important conceptual models of practice in the field of OT are further discussed below.

2.4.2 Conceptual models of practice

Most research studies have implicit or explicit theory which underpin the phenomenon under study (Grove, Gray, & Burns, 2015). Theories are linked to conceptual models of practice and informs the clinician of all the factors that contribute towards the health and well-being of an individual. It is therefore important that the researcher evaluate all models of practice and selects the most appropriate as the theoretical foundation of the research study. The researcher has decided to only consider Occupational Therapy models of practice as the framework of this model. The researcher is aware of the International Classification of Functioning, Disability and Health (ICF) framework designed by the WHO (WHO 2002). However, the researcher chose to only consider models with the focus on occupation and occupational performance as these themes form a fundamental part of this research study.

Occupational Therapy models were developed from the 1980s to support a move away from an impairment-based focus towards an occupational-based focus, with a goal of understanding the needs of people (Joosten, 2015). The field of Occupational Therapy therefore acknowledges the importance of models, theories and frames of reference to guide OT clinicians in their everyday practice and intervention with their clients. Occupational Therapy models are thus viewed as an essential part of the profession (Davis-Cheshire, Davis, Drumm, Neal, & Norris, 2019). Evidence based models provides OTs with an organisational structure to reduce personal bias and provide a common language to communicate, document and act on the evidence and professional process of problem-solving during treatment interventions with clients (Turpin & Iwama, 2011). Models of practice serve as a means to view and define occupation with the focus on the person's occupational performance (Pendleton & Shultz-Kron, 2013). The main purpose of a model of practice is to determine the analysis of the occupational profile and to consider the outcomes of therapeutic interventions with clients (Pendleton & Shultz-Kron, 2017). Many models of practice exist in the field of OT (Wong & Fisher, 2015) e.g. the Occupational Performance Model (OPM), the Model of Human Occupation (MOHO), the Canadian Model of Occupational Performance (CMOP), the Canadian Model of Occupational Performance and Engagement (CMOP-E), Person-Environment-Occupation (PEO)

model and the Person-Environment-Occupational-Performance (PEOP) model and the Kawa Model (Davis-Cheshire et al., 2019; Joosten, 2015; Wong & Fisher, 2015). Each of these models possess unique characteristics but focus on the concepts: the person, occupations, occupational performance and the environment (Joosten, 2015).

These models have been labelled by some authors as occupational based models and by others as ecological models (Davis-Cheshire et al., 2019). The inconsistent use of these terms has resulted in differing perceptions within the research community (Davis-Cheshire et al., 2019). It is thus important to be consistent with terminology, and in this research study these models will be referred to as occupation-based models.

2.4.3 Occupation-based models

Each of the occupation-based models demonstrate the strong interaction between the person, occupations and the environment (Turpin & Iwama, 2011). Although similar themes are present, not all models were created equally and these models differ greatly from each other (Pendleton & Shultz-Kron, 2013). After an extensive literature review, the researcher found a few studies that reported the use of occupation-based models in practice. A study by Ashby and Chandler (2010), found that in 65 Occupational Therapy programmes across Australia, Canada, the United Kingdom and the United States, the top three occupation-based models of practice included in curricula were the CMOP-E, the MOHO and the PEOP model. A more recent study by Davis-Cheshire et al. (2019), investigated the value and utilisation of Occupational Therapy models and found that 219 Occupational Therapy practitioners in the United States preferred to use the PEOP and MOHO models, with the PEOP model the most popular amongst participants. A decision was made by the researcher to limit the number of models for critical review. Based on the results from the studies mentioned above, the researcher chose to review the CMOP-E, the MOHO and the PEOP model. The goal of this review will aid the researcher to ultimately determine which model will form the contextual basis of this research study.

2.4.3.1 The CMOP-E

The Canadian Model of Occupational Performance (CMOP) was developed by the Canadian Association of Occupational Therapists (CAOT). In 2007, the model was expanded to include the concept “engagement” as the desired outcome, becoming the Canadian Model of Occupational Performance and Engagement (CMOP-E) (Wong & Fisher, 2015). The CMOP-E attempts to describe the dynamic interactive relationship between the person, occupations and the environment. These three concepts also form the basis of the model (Townsend & Polatajko, 2007).

The person is depicted at the centre of the model with three performance components: cognitive, physical and affective, with spirituality at the centre. Occupation is seen as the bridge between the person and the environment (Turpin & Iwama, 2011). This indicates that the person acts in the environment through occupation. The model identifies three occupational purposes: self-care, productivity and leisure. The person is found in the environment that indicates that each individual functions within their own environmental context (Turpin & Iwama, 2011).

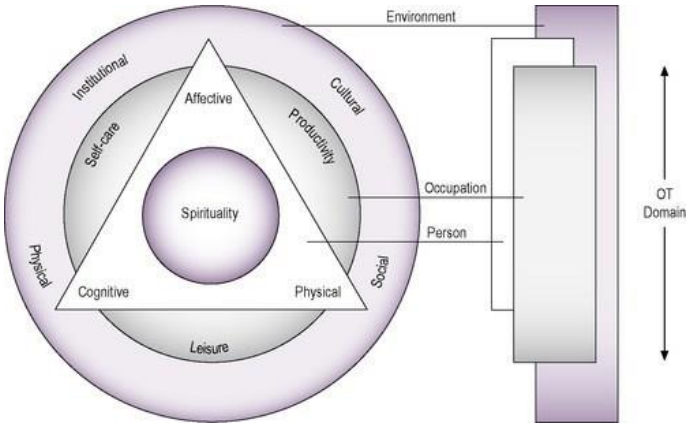

Figure 2.2: Canadian Model of Occupational Performance and Engagement (CMOP-E) (Townsend & Polatajko, 2005).

The CMOP-E is based on six assumptions that underpin the model (Turpin & Iwama, 2011). The model also promotes the notion of client centred practice within the profession (Townsend & Polatajko 2007).

2.4.3.2 The MOHO

The MOHO was developed by Kielhofner and Burke in the 1970s and published in 1980. It has undergone several revisions in 1995 and 2002, with the latest version published in 2008 (Christiansen & Baum, 2015). The MOHO conceptualises how people perform occupations and ultimately participate in occupations that are meaningful to them within their environments. The process of occupational participation is supported by three internal concepts: volition, habituation and performance capacity (Christiansen & Baum, 2015). Volition refers to the person's values, interest and personal capacity. Volition is the person's thoughts and feelings including their occupational choices (Pendleton & Shultz-Kron, 2017). Habituation refers to the habits and roles of the person. Habits are the learned ways of doing an occupation (Christiansen & Baum, 2015). Roles define how people see themselves (Christiansen & Baum, 2015). The onset of injury or disease may disrupt the roles and habits of a person (Pendleton & Shultz-Kron, 2017). Performance capacity refers to the person's lived experience of their body, based on their physical and mental capabilities. Personal capabilities include the musculoskeletal, neurological and cardiopulmonary systems, that enable the person to perform their occupations (Kielhofner, 2008).

The environment can offer opportunities and resources, and place demands or constraints on occupational performance (Christiansen & Baum, 2015). The environment includes the physical, social, cultural, economic and political aspects that influence the occupational performance of a person (Kielhofner, 2008).

Volition, habituation, personal capacity and the environment influence how a person will perform their occupations in their daily lives (Kielhofner, 2008). It is assumed that injury or disease may cause a disruption of any of the four concepts mentioned above, and in turn influence the occupational performance of the person.

The MOHO model also promotes the notion of client centred practice within the profession (Kielhofner, 2008).

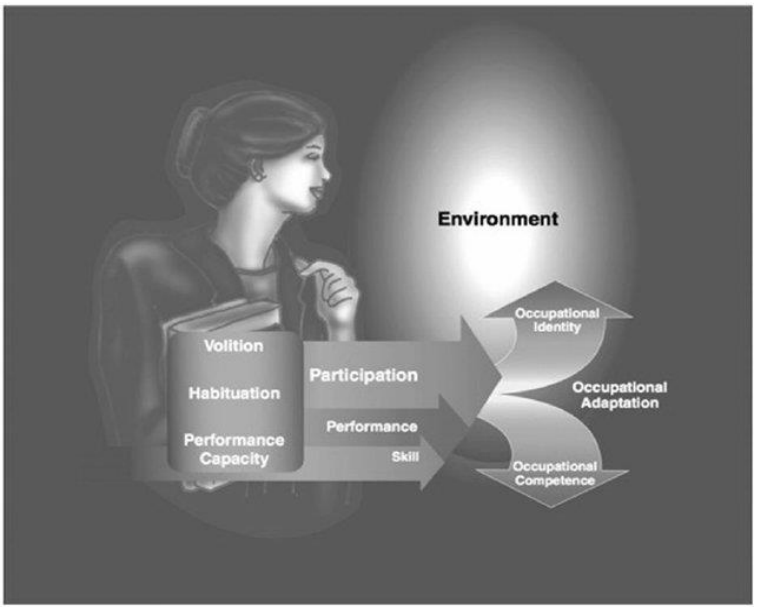

Figure 2.3: Model of Human Occupation (MOHO) (Kielhofner, 2009)

Taking the above models into account, the researcher found that the following model to be discussed, distinguishes itself by the emphasis it places on the role of occupations and occupational performance in the participation of daily occupations. The focus on the environment and the external factors that influence occupational performance and participation in daily occupations, are more extensive than the previously discussed occupation-based models (Turpin & Iwama, 2011). The PEOP model also has the most simplified view of occupational performance and participation (Wong & Fisher, 2015). It requires the OT to employ a top down approach to intervention, where occupational performance issues limiting participation are identified and factors that enable (facilitators) and/or restrict (barriers) occupational performance are identified and addressed (Christiansen & Baum, 2005; Wong & Fisher, 2015). It is this emphasis on the environment, and its influence on occupations, occupational performance, participation and well-being, that persuaded the researcher to adopt the PEOP model as the theoretical foundation that will underpin this research study. A more detailed review of the PEOP model is found below.

2.4.3.3 The Person-Environment-Occupational-Performance (PEOP) model

In their seminal work, Christiansen and Baum (2015) outlined the Person-Environment-Occupational-Performance (PEOP) model (Figure 2.4). Christiansen and Baum (2015) are of the opinion that the PEOP model provides the OT a framework to better understand and assist clients and their families to achieve their occupation related goals. The model is thus organised to improve the performance of everyday occupations of individuals, organisations and populations in the participation in the world around them (Christiansen & Baum, 2015; Turpin & Iwama, 2011).

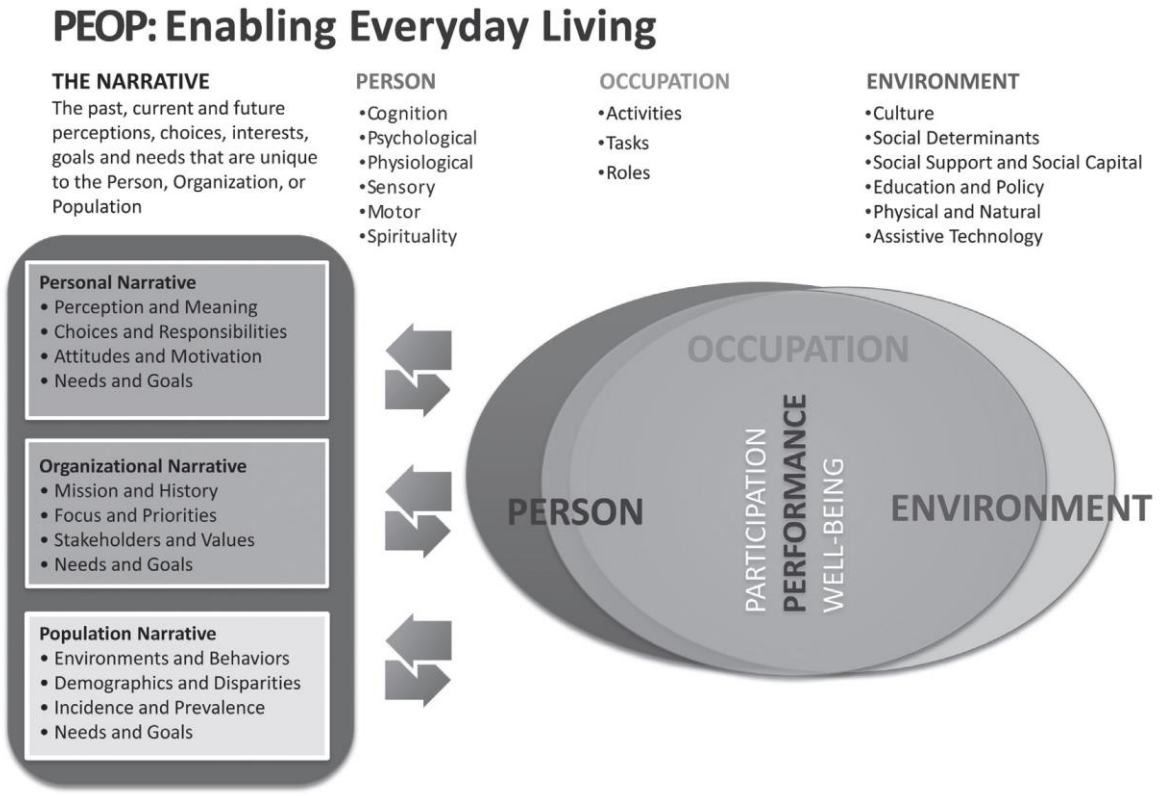

Figure 2.4: Person-Environment-Occupational-Performance model (Christiansen & Baum, 2015)

The PEOP model was conceptualised in 1985 by Charles Christiansen and Carolyn Baum. It was first published in 1991 and has subsequently been updated several times (Christiansen & Baum, 2015; Wong & Fisher, 2015). The 1991 version was referred

to as the “Person-Environment-Performance” framework and was not referred to as a model. In 1997, the framework was renamed the “Person-Environment-Occupational Performance model”. In 2005, the model was named the “Person-Environment-Occupation-Performance model” and provided with the acronym PEOP (Turpin & Iwama, 2011). The most recent version published in 2015 retains the name and acronym of the previous version. Although some definitions and terminology may have changed in the subsequent revisions of the model, the fundamental philosophies remain consistent with previous versions (Christiansen & Baum, 2015). The concepts of the person, environment and occupation appear to be central concepts of all the previous versions of the model (Christiansen & Baum, 2005, 2015; Turpin & Iwama, 2011).

The PEOP model was originally developed in response to a need for more occupation-focused models in Occupational Therapy (Wong & Fisher, 2015). The PEOP model can be described as a client centred model with a top down approach (Christiansen & Baum, 2015). The PEOP model is a systems model proposing that the factors involved in occupational performance include the environment and person factors. Systems model theory proposes that each component of the model has the ability to influence the other components and the function of the system as a whole (Christiansen & Baum, 2015). Therefore, any component of the environment or person factors may affect the person as a whole.

The PEOP model supports client centered practice. The client and OT practitioner relationship are regarded as the most important stakeholders in the PEOP model. The client participates with the OT practitioner to define and set goals that support occupational performance, participation and well-being (Christiansen & Baum, 2015). The PEOP model employs an evidence-based approach in that problems in occupational performance can be traced to problems in person or environmental factors, which in partnership with the client and OT practitioner can improve occupational performance and ultimately enhance participation and well-being (Christiansen & Baum, 2015).

The PEOP model is conceptually similar to other occupation-focused models but

differs in the importance placed on occupational performance and participation in an individual's daily life (Wong & Fisher, 2015). The PEOP model demonstrates that the ultimate goal of occupational performance is to enable participation in the world that individuals exist in (Wong & Fisher, 2015).

As the name suggests, the PEOP model consists of three interrelated domains (Christiansen & Baum, 2015, p. 245).

- **Person factors**: are "factors that describe capacities and help identify impairments".
- **Environment factors:** are "factors that enable or create barriers of what and how people do what they do".
- **Occupations:** "(activities, tasks and roles) all the activities that people want or need in their daily lives".

The PEOP model is depicted by a diagram (Figure 2.4), which includes the different interrelated components. It can be described as a transactive model (Wong & Fisher, 2015). The model reflects the complex interactions between the person factors (intrinsic factors) and their environment factors (extrinsic factors) to achieve occupational performance and the desired level of participation (Christiansen & Baum, 2015; Turpin & Iwama, 2011). These factors may either support, enable or restrict participation in the performance of occupations. The person and environment factors are further explored below:

Person factors: These are the underlying skills and abilities that the individual requires to perform their daily occupations. These are commonly referred to as the "performance enablers" of occupational performance. The person factors are organised into the following six categories (Christiansen & Baum, 2015):

a) **Sensory factors:** Sensory factors are one of the factors that underpin the ability of a person to perform their occupations. Sensory factors refer to a person's ability to see, hear, touch and interact with the environment that surrounds them (Christiansen & Baum, 2015). The ability to control movement, modulate sensory input, to coordinate and integrate sensory information and to compensate for

sensory deficits are important enablers of occupational performance (Christiansen & Baum, 2005; Turpin & Iwama, 2011).

A person living with SCI may present with impairments of sensation depending on their neurological level (Radomski & Latham, 2014). The impaired sensory feedback may result in further injury or development of pressure ulcers for the person with SCI (Pendleton & Shultz-Kron, 2017).

b) **Motor factors:** The ability to move is essential to perform all the occupations that a person is engaged in (Christiansen & Baum, 2015). Sensory and motor systems underlie all motor performance. Motor factors interact with other person factors and environmental factors to support or restrict occupational performance (Christiansen & Baum, 2015). By using interventions based on neurobehavioural principles, OTs can improve the occupations and occupational performance of individuals (Turpin & Iwama, 2011).

A person living with SCI diagnosed with tetraplegia may present with impairments of motor factors. Depending on their neurological level of injury, they may be unable to ambulate and use their hands functionally (Pendleton & Shultz-Kron, 2013). Tetraplegics will require more assistance from caregivers to perform their daily occupations. Caregiver assistance may range from six to ten hours for ADL activities and one to six hours for home care. Electric or manual wheelchairs may be required for independent mobility (Radomski & Latham, 2014).

The person living with SCI diagnosed with paraplegia may also present with impairment of motor factors. Depending on their neurological level of injury, they may be unable to ambulate but will be able to use their hands functionally (Pendleton & Shultz-Kron, 2013). Paraplegics will require less assistance from caregivers to perform their daily occupations. They may be independent in the performance of ADL activities and may require only one to three hours of assistance with occupations of home care (Radomski & Latham, 2014). Manual wheelchairs may be required for independent mobility (Radomski & Latham, 2014).

c) **Physiological factors:** “Adequate physiological functioning underlies the capacity

of an individual to perform daily occupations" (Christiansen & Baum, 2015, p. 245). These factors relate to a person's health and fitness (Turpin & Iwama, 2011). Abilities such as endurance, flexibility, muscle strength, body composition and cardiorespiratory function are important components of physical fitness (Christiansen & Baum, 2015). Physiological factors contribute and sustain health and well-being, which in turn support successful occupational performance (Turpin & Iwama, 2011).

Persons living with SCI may present with a range of impaired physiological factors. Depending on the level of the injury they may experience limited or absent passive and active range of motion (ROM) of the upper extremities (UE) and/or lower extremities (LE) (Radomski & Latham, 2014). Persons living with SCI may experience a loss of muscle strength in the UE and/or LE depending on the level of the injury and poor endurance (Radomski & Latham, 2014).

d) **Cognitive factors:** Cognition is defined as "the mental processes used to acquire, process and to use information to direct our actions towards desired goals" (Christiansen & Baum, 2015, p. 245). Cognitive factors include the basic cognitive skills of attention and memory, and executive awareness and function (Christiansen & Baum, 2015). Cognitive factors are essential to learning, communicating, moving and observing. The link between occupations and cognitive factors should always be considered by OTs during their interventions with their clients (Turpin & Iwama, 2011).

Impairments of cognitive factors may influence learning and communication, as well as the occupational performance of persons living with SCI. If the person living with SCI experienced a head trauma or a traumatic brain injury, they may experience impairments in cognitive factors e.g. attention, concentration, memory and perceptual abilities, etc. (Radomski & Latham, 2014). The impaired cognitive factors may restrict or be a barrier to the occupational performance of the person with SCI.

e) **Psychological factors:** Psychological factors include identity, self-concept, self-esteem, affect, mood, emotional regulation, motivation and coping processes used

by the individual to influence occupational performance and a sense of self (Christiansen & Baum, 2005, 2015). Psychological factors affect the choice of occupation, the interpretation of meaning and how a person thinks of themselves, this in turn affects their occupational performance (Christiansen & Baum, 2015).

SCI is a traumatic event and people living with SCI may experience many impairments of psychological factors. These may include confusion, anxiety, loss of hope, grief, depression and helplessness (Radomski & Latham, 2014). Successful occupational performance is greatly influenced and shaped by psychological factors. Successful occupational performance may also improve the overall well-being of the person living with SCI (Christiansen & Baum, 2015; Turpin & Iwama, 2011).

f) **Spirituality**: This aspect deals with the shared or common belief of our shared experience. Experiences of other people before us validate the meaning and understanding that we have of our existence. Meaning is both shared and individual (Christiansen & Baum, 2015). The meaning attached by society to a situation influences the meaning an individual attaches to the same situation (Turpin & Iwama, 2011). This shared understanding may be represented in our language, culture and symbols that are commonly used (Christiansen & Baum, 2005).

Spirituality may either be a barrier or facilitator of occupational performance of the person with SCI while participating in their daily occupations (Turpin & Iwama, 2011).

The next component of the PEOP model that will be explored is the “environment factors” also known as the “extrinsic factors”. These factors have an equal importance to person factors in contributing to successful occupational performance (Christiansen & Baum, 2015). Christiansen and Baum (2015) state that occupational performance is always influenced by the environment the person is surrounded with. In the PEOP model, the environment is therefore seen as an integral part of the person’s existence (Christiansen & Baum, 2015; Turpin & Iwama, 2011; Wong & Fisher, 2015). As mentioned above, the environment factors may either support or restrict occupational performance.

Environment factors are organised into the following categories (Christiansen & Baum, 2015):

a) **The physical and natural environment:** The environment includes physical aspects that include the built environment, products and technology and the natural environment (Christiansen & Baum, 2015). The physical properties and design of environments may prove to be a barrier or facilitator of the occupational performance of an individual (Turpin & Iwama, 2011). Physical environments must be considered for accessibility, manageability, safety and aesthetics. All these design considerations of an individual's environment should enable or accommodate occupational performance. These design considerations should also be considered in the patient's home environment and living space (Christiansen & Baum, 2005, 2015).

Persons living with SCI may require many adaptations to their home and work environment to accommodate their disabilities. Common examples include ramps at the entrances of buildings, accessible doorways, accessible bathrooms, wheelchair friendly desks and counters, etc. (Verhoef & Roebroeck, 2014). These adaptations will assist the person living with SCI in their occupational performance. It is important for the OT to perform a comprehensive home and work assessment and provide advice and education to the person living with SCI, as well as their family members (Radomski & Latham, 2014). Therefore, it may be assumed that built environment in Saudi Arabia may be either a barrier or facilitator for persons with SCI in Saudi Arabia. As mentioned previously (cf 2.3) the Saudi building code (SBC) adopted in 2007, includes accessibility regulations that include the minimum requirements that all buildings in Saudi Arabia should adhere to (SBC, 2007). Furthermore, a position paper on universal accessibility published by the Prince Salman Center for Disability research, provides recommendations of building standards specifically aimed at people with disabilities in Saudi Arabia (Universal accessibility KSA, 2010). The SBC however only provides a general statement that "buildings and facilities should be accessible" for people with disabilities (SBC, 2007, p. 9/2). It does not stipulate the exact specifications and measurements to ensure accessibility for people with disabilities

(Mulazadeh & Al-Harbi, 2016). No official document that outlines accessibility and home modifications for people with disabilities in Saudi Arabia could be found in a literature search.

The natural environment includes aspects such as the terrain, hours of sunlight, climate and air quality. The natural environment may either be a barrier or facilitator in occupational performance of an individual with impairments (Turpin & Iwama 2011).

Persons living with SCI that reside in Saudi Arabia may be greatly influenced by the natural environment with its desert landscapes and extreme temperatures. The impaired temperature regulation of persons living with SCI is seen as a medical emergency for a person with SCI (O'Sullivan et al., 2014). It can therefore be assumed that the high temperatures in Saudi Arabia may be a barrier of occupational performance for a person with SCI.

b) **The cultural environment:** Christiansen and Baum (2015) state that the cultural environment includes the values, beliefs, customs and behaviour of an individual that is passed on from one generation to the next. It also includes their norms, cultural orientation and preferences. Culture shapes a person's perspective and attitude towards their choice of an occupation (Turpin & Iwama, 2011). Culture also includes power, decision-making, organisational practices and economic considerations (Christiansen & Baum, 2015). OTs need to understand the influence of culture and the cultural beliefs of individuals with whom they provide interventions (Turpin & Iwama, 2011).

As mentioned previously (cf 2.3) the dominant religion in Saudi Arabia is Islam and culture and traditions are considered to be conservative and rooted in Islamic teachings and Arab customs (Alghamedi, 2014). Cultural beliefs may determine the level of assistance that the person living with SCI may accept (Christiansen & Baum, 2015). It may also affect the occupational performance of certain ADL activities. A common example in Saudi Arabia, is that feeding in Islam is encouraged with the right hand due to religious reasons. People living with SCI might refuse to perform feeding with the left hand, even if it is more functional than the right hand. Another example

may be that men may accept less assistance in the performance of occupations of daily living than a woman might accept. These aspects amongst others, should be acknowledged by OTs and their effect on the individual's occupational performance should be defined and taken into consideration during treatment interventions.

c) **Social support and social capital:** "Social support is central to a person as they engage in the complexities of life" (Christiansen & Baum, 2015, p. 251). Christiansen and Baum (2005) state that individuals are social beings and they require social interaction with others. Social support is experienced rather than observed. The amount of social support required by an individual differs from person to person (Turpin & Iwama, 2011). Social support influences the outcomes of occupational performance and contributes to health and well-being of any individual. OTs need to understand how to facilitate the use of social support with their clients.

Social acceptance is sought by all people and social rejection and isolation can have devastating effects on an individual with an impairment (Christiansen & Baum, 2005). To be effective, social support should be received as positive, supportive and helpful by the individual (Christiansen & Baum, 2015). Social capital is viewed as an important part of social support factors. Christiansen and Baum (2015) define social capital as the extent to which members of the community or society cooperate and support one another in ways that provide benefits to all. Social support and social capital may have a major impact on the occupational performance of individuals of their daily occupations.

The use of social support may be used to overcome occupational performance barriers in people with SCI (Christiansen & Baum, 2005; Turpin & Iwama, 2011). Robert and Zamzani (2013) state that persons living with SCI in Saudi Arabia experience a low quality of life due to social isolation. This may be ascribed to poor social support from family members or the community (Robert & Zamzani, 2013). This is in contrast to previously mentioned literature (cf 2.3) which states that kinship is important in Saudi society, and the extended family is a strong social support unit (Britannica 2020). It will be interesting to explore this concept with this research study.

d) **Social determinants:** Social and public policies in the external environment can provide support or restrict occupational performance of an individual (Christiansen & Baum, 2015). Economic conditions and the availability of resources forms part of the social landscape and are important factors for an individual with a disability. It influences the availability and access to much needed health services (Christiansen & Baum, 2015). The economic well-being of the person may also be threatened by the disability. Therefore, the OT's responsibility is to consider the impact of this component on the occupational performance and well-being of their clients (Christiansen & Baum, 2005).

Robert and Zamzani (2013), state that the quality of life of persons living with SCI in Saudi Arabia is affected by their declining financial status, lack of employment opportunities and the availability of appropriate equipment. Health services are mostly located in urban areas and may affect the access that the person with SCI has to health services in Saudi Arabia. Health services are usually located in urban rather than rural areas. These aspects among others, should be acknowledged by OTs and their effect on the individual's occupational performance should be defined and taken into consideration during treatment interventions.

e) **Assistive Technology:** Technology forms an important part of a person's daily occupations. It has the ability to simplify occupations through enhancing or replacing personal, physical, sensory or cognitive capacities (Christiansen & Baum, 2015). Assistive technology (AT) is an important component of technology situated in the environment factors of the PEOP model. This is congruent with the importance of AT, with the International Classification of Functioning (ICF) proposed by the WHO (Christiansen & Baum, 2015). AT may be defined as any product, instrument or equipment adapted or specially designed for improving the function of a person with disabilities (Christiansen & Baum, 2015). AT may therefore be regarded as a barrier or facilitator of occupational performance for a person with disabilities e.g. persons with SCI (Christiansen & Baum, 2015).

The literature above confirms the importance of models of practice to guide OTs in their everyday practice and therapeutic interventions. Moreover, models of practice in Occupational Therapy serve as a means to view and define occupation with the focus on occupational performance (Pendleton & Shultz-Kron, 2013). After careful consideration the researcher has decided to select the PEOP model as the contextual framework for this study. The PEOP model distinguishes itself from other models of practice by the emphasis it places on the role of occupations and occupational performance in the participation and performance of daily occupations (Christiansen et al., 2005).

2.4.4 The impact of the environment on occupations and occupational performance

The OTPF-3 states that a person engages in their occupations within a social and physical environment (Pendleton & Shultz-Kron, 2017). The environment is extrinsic to the person in the context of which their occupations occur (Christiansen & Baum, 2015). Occupational performance thus occurs from the complex interaction of the person, activity and their environment (Christiansen & Baum 2005). As mentioned in the PEOP model above (cf. 2.4.3.3), the environment includes the physical elements (e.g. built and natural environment) and social influence (e.g. policy, culture, support and attitudes). The environment in which occupations take place is important, as it can either facilitate or act as a barrier to occupational performance (Christiansen & Baum 2005; Lude et al., 2014). This is confirmed by the *World report on disability* (2011), that stated physical, social and attitudinal environments can either disable people with disabilities or foster participation and inclusion. People living with SCI thus require an environment that supports occupational performance and participation in their daily occupations.

It is these environmental factors (and their impact on occupations and occupational performance) which this study aims to explore further. Identifying the environmental barriers and facilitators of occupational performance of persons with SCI, will aid OT practitioners and other stakeholders during the development of interventions and social planning to create a supportive environment that facilitates participation and

well-being. This concept has not previously been explored in Saudi Arabia and the outcomes gained from this study will provide invaluable information to OT practitioners and other stakeholders.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

In the previous chapter the researcher reviewed relevant literature and explored key concepts addressed in the research study. It is thus clear that SCI imposes significant limitations on the occupational performance of persons with SCI. Occupational performance cannot be separated from the environment. This led to the research question: “Which environmental factors (as identified by the PEOP model) influenced the occupational performance of persons with SCI at a rehabilitation hospital in Saudi Arabia?”.

This chapter delineates the study design and provides a detailed description of how the research methodology attempted to answer the research question.

3.2 Research Aim and Objectives

3.2.1 Aim

The study aimed to determine which known environmental factors (as identified by the PEOP model) influenced the occupational performance of persons with SCI.

3.2.2 Objectives

- To distinguish which known environmental factors (as identified by the PEOP model) were either a barrier or facilitator of occupational performance of persons living with SCI.
- To describe the environmental factors (as identified by the PEOP model) which were either a barrier or facilitator of occupational performance of persons living with SCI.
- To compare the identified barriers or facilitators of occupational performance as it relates to time since inpatient rehabilitation.

3.3 Research Study Design

Grove et al. (2013), state that a research design is the blueprint for maximising control over factors that could interfere with a study's results and desired outcome. The research design provides greater control and ensures the validity of the study. The choice of the research approach is important as it directs the manner in which data will be collected, the selection and sampling of the research participants, as well as the manner in which the data will be analysed. It is important that the researcher chooses the most suitable research approach.

A quantitative research approach was used for this study. Quantitative research is a formal, rigorous, systematic process. It is conducted to describe new information and events, as well as the relationships between different variables (Grove et al., 2015). Quantitative researchers endeavour to seek explanations and predictions that can be generalised to other members of the population (Leedy & Ormrod, 2013). Through this study, the researcher attempted to gain more insight into the environmental factors influencing the occupational performance of persons with SCI. The context was an outpatient setting at KFMC rehabilitation hospital in Riyadh, Saudi Arabia.

Grove et al. (2015) identifies four different types of quantitative research.

- Descriptive
- Correlational
- Quasi-experimental
- Experimental

The type of quantitative research design chosen is influenced by the manner in which the researcher chooses to answer the research question (Grove et al., 2015). This study ascribed to a descriptive quantitative design type and as such only the descriptive design will be discussed. Descriptive studies are often used in occupational therapy to characterize functional aspects of a disability and are useful in understanding occupational challenges faced by certain populations (Kielhofner, 2006). Descriptive research examines the relationship between different variables of everyday situations and is crafted to gain more information about different variables

within a particular field of study (Grove et al., 2013). The purpose of a descriptive study is to observe, describe and document aspects as it occurs naturally (Polit & Beck, 2012). Through descriptive research, the researcher will attempt to discover new meaning, describe what exists and determine the frequency with which something occurs in different settings (Grove et al., 2015). Descriptive research is usually conducted with a large number of participants with no manipulation of the situation (Grove et al., 2015). It provides a broad or overall picture of the phenomenon that researcher is interested in (Salkind, 2018).

In this study, data was collected from participants during a specific data collection period. A cross sectional study method was therefore used. Cross sectional research involves the collection of data over the same data collection period. It describes the status of phenomena at a specific point in time (Polit & Beck, 2012). Taking the above into account, this study can thus be classified as a quantitative, descriptive cross-sectional study design.

3.4 Research participants and Sampling

3.4.1 Research population

The research population is a group of individuals that forms the focus of the research (Grove et al., 2015). It is a group of potential participants to whom you want to generalise the results of the study (Salkind, 2018). Quantitative studies usually refer to the population in the study as subjects or participants (Grove et al., 2015). In this study the population of the study are referred to as participants.

The population of this study were persons living with SCI that attended regular outpatient follow up appointments at the King Fahad Medical City (KFMC) Rehabilitation Hospital where the researcher was employed. This facility is the largest public rehabilitation hospital in Saudi Arabia and receives the majority of referred persons living with SCI from other health care facilities. As mentioned previously (cf 2.3), outpatients are followed up on an annual basis by a consultant physician as part of the rehabilitation programme at this facility until the patient achieves their functional goals or is discharged from the programme. The outpatients followed up included

incomplete as well as complete spinal cord injuries with varying neurological levels according to the ASIA classification system.

3.4.2 Sample

Sampling involves choosing certain people, events, objects and other elements to conduct a research study. A sample defines the selected group that the study will be performed on (Grove et al., 2015). A sample can be regarded as a subset of the population that is representative of the entire study population (Polit & Beck, 2012; Salkind, 2018).

It is important for a researcher to define the criteria of who to include in the study (Polit & Beck, 2012). This is accomplished by establishing the sampling criteria. The sampling criteria includes the inclusion and exclusion criteria and is responsible for selecting the sample from the research population participants (Grove et al., 2015).

The research was conducted over three months at the medical facility mentioned above (cf 3.4.1). All participants meeting the inclusion criteria that consented to participate in the study was included. In the end the sample included 121 outpatients that provided consent to participate in the study

3.4.3 Sampling method

To obtain a sample from the population, the researcher must use a specific sampling method to select the participants. Sampling methods outline the strategies used to select the sample population and the sampling process may include probability or non-probability sampling methods (Grove et al., 2015). The sample for this study was selected using a non-probability method. In non-probability sampling not every member of the population has an equal chance to be included in the sample. A disadvantage of this method is that it decreases the sample's representativeness of the entire population (Grove et al., 2015). However, non-probability sampling is commonly used in circumstances where the researcher has no control over whether all the elements of the population will be available at a specific time (Leedy & Ormrod, 2013).

Grove et al., (2015) identifies five types of non-probability sampling methods: convenience sampling, quota sampling, purposive or purposeful sampling, network sampling, and theoretical sampling. Grove et al., (2015) futher state that a convenience sample method is most appropriate if the sample size is small and if the researcher has limited access to the population. From the researcher's experience there is a high no show rate in all the outpatient clinics. One reason is that some patients from rural areas travel over 1000km to attend an appointment. Therefore, the convenience sampling method was the most appropriate sampling method that could be used for this research study to guarantee as much participants as possible.

Leedy and Ormrod (2013) state that the general rule of sampling is the larger the sample the better. However, this is an oversimplification. The SCI outpatient clinic accommodates a maximum of 18 patients per week. Over a three-month period, a maximum of approximately 216 outpatients are available to be included in the sample. Leedy and Ormrod (2013) identifies general guidelines for sample size selection:

- For smaller populations, 100 or less, there is little point in sampling. Therefore, survey the entire population.
- If the population size around 500, 50% should be sampled.
- If the population size is around 1,500, 20% should be sampled.
- Beyond a certain point (about 5 000), the population size is almost irrelevant and a sample size of 400 will be adequate.

3.4.4 Inclusion and exclusion criteria

The research participants had to meet the following inclusion criteria.

3.4.4.1 Inclusion criteria

- Persons living with SCI over the age of 18.
- Persons living with SCI with resultant intrinsic impairments due to a spinal injury.

Research participants with the following criteria were excluded from participating in the research study.

3.4.4.2 Exclusion criteria

- Persons living with SCI under the age of 18 years old.
- Persons living with SCI that had any intellectual difficulties or disabilities, aphasia or apraxia that would prevent the participant from completing the questionnaire.
- The participants were only included in the study once, regardless of the amount of follow up sessions they attended during the data collection period.

3.5 Measurement and Data collection

Researchers strive for objectivity. This objectivity is achieved through using a systematic way to measure the variables identified in the study. Leedy and Ormond (2013) define measurement as limiting the data of any variable so that the data may be interpreted. Measurement provides an important tool with which data may be inspected, analysed and interpreted so that the meaning may be probed under the surface.

3.5.1 Measurement tool

A component of the data collection process is the development of a tool that will be used to measure a specific variable in the study (Grove et al., 2015). This study made use of a self-designed questionnaire as a data collection tool. During a review of literature, the researcher was unable to find a suitable data collection tool to address the research question. Therefore, a questionnaire was developed by the researcher. The tool was based on the literature found in the PEOP model that was discussed in the literature review section (cf. 2.4.3.3) (Christiansen & Baum 2005; Christiansen et al., 2015).

By making use of the questionnaire, the researcher attempted to identify the barriers to and facilitators of environmental factors on the occupational performance of the participants. The 12 guidelines as proposed by Leedy and Ormrod (2013) to develop a valid and reliable questionnaire was used. The guidelines and how it was ensured in the questionnaire are illustrated below:

Table 3.1 Guidelines for developing questionnaires (Leedy & Ormrod, 2013)

Guidelines (Leedy and Ormrod, 2013)	Questionnaire
Keep questions as brief as possible	Researcher attempted to phrase all questions as brief as possible
Keep the questionnaire simple and easy to understand	Researcher made questions simple and easy to understand by using layman's language and terminologies
Provide straightforward simple instructions	Clear instructions were presented on the questionnaire to the fieldworker at the different sections
Use simple, clear understandable language	Simple language was used throughout No open-ended questions were included in the questionnaire
Provide a reason for any items that might be unclear	Terms (occupational performance, barriers) were clarified in the questionnaire.
Check for unwarranted assumptions	No unwarranted assumptions could be detected by the researcher, fieldworker and Arabic speaking colleague
Code the questions beforehand	This was not necessary as excel sheets were used after the interview to insert data
Check for consistency	Consistency was checked by the researcher, fieldworker. Translation of the questionnaire was done by a professional translation service from English to Arabic, thereafter the back translation of the questionnaire was performed by an Arabic speaking colleague (cf 3.5.3)
Conduct pilot test to determine the validity	Pilot study was conducted with four participants
Ensure the questions address the research problem	All questions in the questionnaire addressed the research problem confirmed by the researcher, fieldworker and arabic speaking colleague
Ensure that the questionnaire looks professional and attractive	The layout of the questionnaire was both professional and attractive. The questionnaire had a logical flow with headings and numbers for each section and questions.

All the relevant PEOP related environmental factors were selected and included in the questionnaire. The environmental factors included in the questionnaire are listed below:

- **The physical environment (built environment)**
    - Physical and design properties of the home.
        - Access to entrances
        - Access to higher floors
        - Bathrooms
        - Toilets
        - Kitchens
        - Living areas
    - Physical properties and design of public buildings including places of worship (mosques).
        - Access to entrances
        - Access to higher floors
        - Bathrooms
        - Toilets
        - Kitchens
        - Living areas

- **The natural environment**
    - Geographical location
    - Urban or rural
    - Terrain
    - Climate

- **The cultural environment**
    - Values
    - Norms
    - Beliefs
    - Customs of the participant

- **Social support**
    - Social support

    - Standing of the participant in society
    - Social acceptance
    - Social interaction with others

- **Social and public policies**
    - Current economic situation of the participant
    - Access to health services
    - Access to suitable assistive devices
    - Governmental financial aid or support

- **Technology**
    - Type of wheelchair used
    - Suitability of the wheelchair used

The ADL tasks included in the questionnaire were selected from the FIM measurement system (cf 2.4.1) used at the facility where the researcher is employed. The researcher is familiar with the FIM and uses it in his daily practice to document occupational performance changes of ADL tasks with persons living with SCI. The ADL tasks that were included in the questionnaire are as follows:

- Feeding (eating and drinking activities),
- Grooming
    - wash and drying face, hands
    - brushing your teeth/cleaning dentures
    - brushing or grooming hair
    - shaving your beard or applying make-up
- Bathing
    - washing and drying hair
    - washing and drying body
- Dressing (upper and lower body),
- Toileting

3.5.2 Data collection procedures

Data collection is the precise, systematic gathering of information relevant to the research purpose (Grove et al., 2013). As mentioned previously (cf 3.5.1), a self-designed questionnaire was used to gather data in this study. All participants in the study were Arabic speaking, therefore a trained Arabic speaking field worker was trained to assist in the data collection process. The Arabic speaking field worker was a qualified occupational therapist. It was assumed that some participants would be quadruplegic and would be unable to complete a questionnaire due to a lack of handfunction (cf 2.4.1). Therefore, for consistency it was decided that the field worker would complete the questionnaire on behalf of all participants.

Before data collection commenced, the field worker was trained by the researcher on the data collection procedure and process. All the concepts of the questionnaire were discussed and explained to the field worker in English. The researcher ensured that the field worker completely understood each concept of the questionnaire beforehand, by using the following guidelines as outlined by Leedy and Ormrod (2013):

- Identify the questions in advance.
- Find and prepare a suitable location.
- Ensure that the privacy and confidentiality of the participant can be maintained.
- Obtain written permission before the start of the interview.
- Establish and maintain rapport with the participant throughout the interview process.
- Record all the responses of the participants verbatim.
- Do not react to any of the responses given by the participants.
- Restrict each question to a single idea.
- Clarify information when required.

The researcher provided copies of the questionnaire to the field worker before the interviews commenced. The researcher also ensured that a suitable venue was available for use and prepared for the interviews. The venue had suitable chairs and a desk for the participants, as well as the researcher and fieldworker. It was important

to ensure that the venue maintained the privacy and confidentiality of the participants during the interviews.

The researcher recruited all participants of the study (cf 3.4.2). After the completion of the physician outpatient appointment the participant was immediately approached and asked to participate in the research study. If the participant agreed they were taken to the interview room. Each questionnaire was completed separately with individual participant by the fieldworker. Only one questionnaire was completed per participant. The interviews were conducted in the language that the participants chose. If the participants chose to complete the questionnaire in English, then the researcher completed the questionnaire with the participants. All participants chose to conduct the interview in Arabic.

The purpose of the study was firstly explained to each participant by the field worker. The participants were provided with an information letter (Appendix B) detailing the outcomes of the study. The ethical aspects of the study were explained, and informed consent was obtained from each participant.

The field worker explained to the participants in layman's terms what the concepts "occupations and occupational performance" were. The fieldworker ensured that the participants understood all the concepts before completion of the questionnaires commenced. Each question of the questionnaire was stated by the field worker to the participants. The responses provided by the participants were documented verbatim by the field worker on the questionnaire, in the spaces provided. Once the process was completed, the field worker then handed the completed questionnaires to the researcher. The interview process lasted for approximately 30 minutes.

After receiving the completed questionnaires, the researcher firstly checked whether the fieldworker completed the questionnaires correctly. The questionnaires were then encoded using a predetermined coding system that was developed by the researcher. Subsequently the data was input on two separate Microsoft Excel spreadsheets by the researcher. This was to safeguard data error input. The captured data was then processed and analysed by a biostatistician from the University of the Free State

(UFS) biostatistics department. Descriptive statistics, namely frequencies and percentages for categorical data and means and standard deviation or medians and percentiles for numerical data, were calculated per group. The groups were then compared by means of an appropriate statistical test.

3.5.3 Measurement errors

No perfect measure exists. Measurement error is an inherent part of the research process but using instruments that reduce error improves the accuracy of measurement. Two types of errors are commonly found in measurement. Random error and systematic error. To decrease the amount of random error the following factors were considered (Grove et al., 2013):

- Personal factors of the participants such as fatigue, hunger, attention span, health, mood, mental status, and motivation were taken into consideration during the interview process. The researcher or fieldworker would use their clinical judgement to observe if any of the above factors influenced the interview. The participant would then be asked if they required a break before commencing with the interview.
- Situational factors, such as a hot stuffy room and distractions were considered. The venue chosen had adequate lighting and ventilation. The venue was free from unnecessary distractions and noise.
- The presence of significant others was minimised by asking family members not to be present during the interview process so that the participant could provide their own opinions. The participant was also asked if the presence of the researcher was a problem for them. No participant had a problem with the researcher sitting in on the interview.
- It was important that a good rapport was maintained between the participant and the fieldworker throughout the entire interview process. The fieldworker and researcher ensured that all participants were treated with dignity and respect and in a professional manner.
- Variations in the administration of the measurement procedure was minimised, by ensuring that all questions were posed in a similar manner to all participants.

This aspect was covered with the fieldworker during the training session before data collection procedures commenced.

- Data processing errors were minimised by encoding the raw data on two separate Microsoft Excel sheets before it was sent to the biostatistician.
- Both the researcher and the fieldworker were not known to participants beforehand as both are employed in the outpatient Occupational Therapy section which is based at a different location to the inpatient Occupational Therapy section. Therefore, both the researcher and the fieldworker would not have had any previous contact with any participant previously. This reduced any bias in responses that possibly may have occurred due to familiarity between the participants, fieldworker and the researcher.

To decrease the amount of systematic errors the following factors were considered (Grove et al., 2013):

- The questionnaire was translated into Arabic by a professional translation service to ensure that the questionnaire was accurate as compared to the original English version.
- The researcher attempted to reduce systematic errors by performing a back translation of the questionnaire by a native Arabic speaking Occupational Therapist before the pilot study. A third party, not the fieldworker, assisted in the back translation of the questionnaire.
- The researcher attempted to decrease systematic error by pilot testing the measurement tool with four participants (cf 3.5.6) before the implementation of the study (Grove et al., 2015).

3.5.4 Validity

Validity of a measurement is the extent to which the measurement measures what it is intended to. Leedy and Ormrod (2013) identifies different types of validity:

- Construct validity is the extent to which a measurement instrument accurately measures a characteristic that cannot be observed but is assumed to exist based

on patterns in people's behaviour.

- Face validity is the extent to which an instrument looks like it is measuring the characteristic that it is supposed to measure.
- Content validity is the extent to which a measurement instrument is a representative sample of the content being measured.
- Criterion validity is the extent to which the results of an assessment instrument correlate with another related measure.

In this study, certain measures were taken into consideration to ensure the validity of the study. Measures used to ensure the validity of the study are outlined below (Leedy & Ormrod, 2013):

Table 3.2 Measures taken to ensure validity of the questionnaire

Types of validity	Measures taken
Construct validity	• An in-depth literature search was performed to obtain a suitable measurement tool. When no suitable measurement tool was found, a measurement tool was designed based on literature. • The questionnaire was reviewed by an evaluation committee comprised of experts in the fields of occupational therapy, physical therapy, biostatistics, nursing, and human movement studies of the UFS Faculty of Health Sciences who rigorously critiqued the research protocol including the questionnaire. • The questionnaire was reviewed by the Health Science Research Ethics Committee (HSREC) of the Faculty of Heath Sciences of the University of the Free State (cf 3.6.1)
Face validity	• Researchers use different techniques to measure variables in a study e.g. observation, interviews, questionnaires and biological measures. A questionnaire was selected as the best measurement tool for this study, as it is commonly used in descriptive studies to gather specific information from participants in a question-based format (Grove et al., 2013).
Content validity	• an OT who reviewed the questionnaire prior to the commencement of the data collection process to assess whether the focus of the study was covered adequately. • The questionnaire was reviewed by an evaluation committee of the UFS Faculty of Health Sciences who rigorously critiqued the research protocol including the questionnaire.

	• The questionnaire was assessed by an Occupational Therapist before the pilot study, to obtain feedback and suggestions regarding the content. • An Arabic speaking Occupational Therapist with five years' experience assessed the accuracy of the Arabic translated questionnaire to remove any ambiguity that might have occurred. This process occurred prior to the start of the pilot study.
Criterion validity	Criterion validity could not be maintained as no comparable measurement tool was available.

3.5.5 Reliability

Reliability is the consistency with which a measurement tool obtains similar results. In this study, certain measures were taken into consideration to ensure the reliability of the study. Measures to ensure reliability included the following:

- The measurement tool was always administered in a consistent manner. No deviations or rephrasing of questions occurred. The same format of the questionnaire was follow consistently. Standardisation of use was therefore maintained throughout the study.
- The fieldworker was well trained before the data collection process commenced to ensure that similar results were obtained using a consistent procedure.
- Specific criteria for scoring was used to prevent the subjective opinion of the fieldworker by ensuring that the fieldworker transcribed participants responses verbatim onto the questionnaire.
- The questionnaires were coded by using a predetermined method to ensure reliability of the data (Leedy & Ormrod, 2013). See figure 3.1 below:

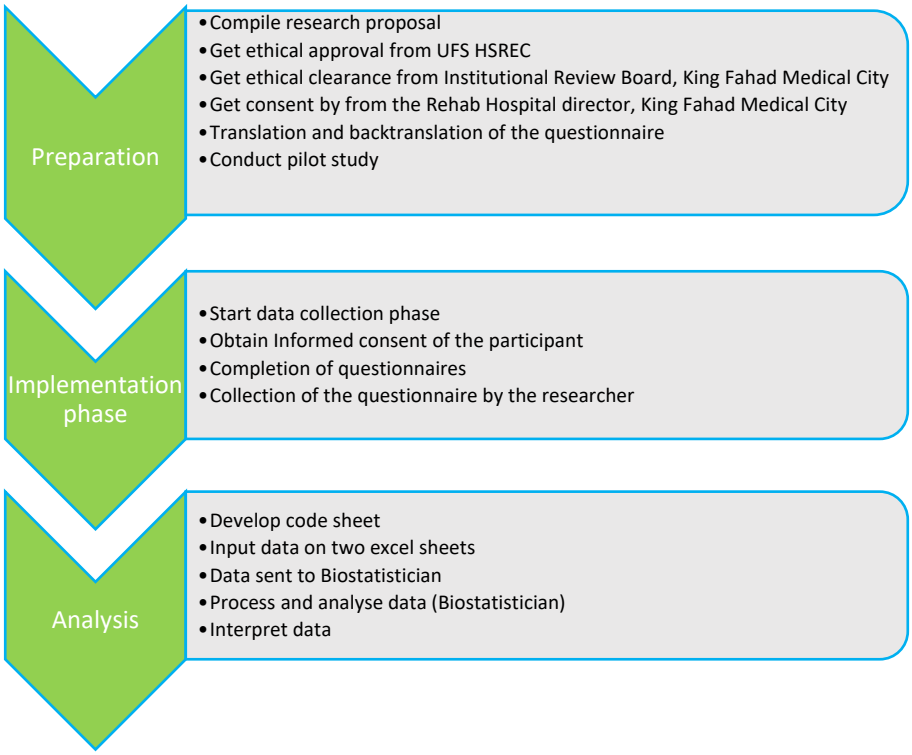

Figure 3.1 Flow diagram of the study procedure

3.5.6 Pilot study

The questionnaire was pilot tested in both English and Arabic to ensure the clarity of questions, effectiveness of instructions, time required to complete the questionnaire, and success of the data collection techniques (Grove et al., 2015). Two Arabic speaking participants and two English speaking participants were included in the pilot study. These participants were selected from the sample prior to the data collection of the rest of the participants commenced. The same data collection procedures as for the main study mentioned in (cf 3.5.2) was followed for these participants with the fieldworker completing all questionnaires.

At the end of each question session, the participants were asked to scrutinise the measurement tool and provide any feedback and suggestions to the fieldworker/researcher. All the participants reported that the questions were clear, and no ambiguity was observed. No other feedback was provided by the participants. The researcher did, however, note a numbering mistake on the questionnaire that was subsequently rectified. This was the only modification made by the researcher to the

questionnaire. The researcher also noticed that the fieldworker did not complete all the motivations for all questions for the first two participants in the pilot study. This was rectified during the data collection process with the following two participants of the pilot study.

The results obtained from the pilot study were not included in the data analysis of the study, because the questionnaire was not correctly completed by the fieldworker for the first two participants of the pilot study. The outcome of the pilot study provided invaluable information, as some measurement errors were identified that may have negatively impacted the results of the study.

3.6 Ethical aspects

Ethical research is essential for generating sound empirical knowledge for evidence-based practice (Grove et al., 2015). All ethical issues in research fall into the following broad categories: protection from harm, voluntary and informed participation, right to privacy and honesty with professional colleagues (Leedy & Ormrod, 2013). All these aspects were considered during the data collection process to ensure good ethical practice. The ethical principles as outlined in the Helsinki declaration was strictly adhered to during this research study (WHO 2001). The following approvals were also obtained before the data collection process commenced.

3.6.1 Approval

- The research was approved by an evaluation committee appointed by the Department of Allied Health Sciences of the University of the Free State. The evaluation committee comprised of experts in the fields of occupational therapy, physical therapy, biostatistics, nursing, and human movement studies.
- Ethical approval was granted by the Health Science Research Ethics Committee (HSREC) of the Faculty of Heath Sciences of the University of the Free State (ethical clearance number: UFS-HSD2019/0208/2304).
- Ethical clearance was also granted by the Institutional Review Board (IRB) in Saudi Arabia (IRB registration number: H-01-R-012).
- The Medical Director of the KFMC Rehabilitation Hospital granted permission to

conduct the research study on the Rehabilitation Hospital premises.

3.6.2 Protection from harm

Researchers should not expose their participants to unnecessary physical or psychological harm (Leedy & Ormrod, 2013). Protection from harm is based on the ethical principle of beneficence, which states that one should do good and, above all, do no harm (Grove et al., 2015). This was achieved through the following:

The participants were not exposed to any known physical or psychological harm during the data collection process. The participants' cultural backgrounds and gender were taken into consideration when phrasing sensitive questions. The fieldworker ensured that all participants were treated courteously, with dignity and respect by being friendly, polite throughout the data collection process.

3.6.3 Voluntary and informed participation

When people are recruited to participate in a research study, they should be informed regarding the nature of the study, as well as given the choice to participate or not (Leedy & Ormrod, 2013). Informed consent implies that the prospective participants participated in the study of their own volition without coercion or undue influence. Formal written consent needs to be obtained by the researcher, before allowing any participation in the study (Grove et al., 2015). This was achieved in the following manner.

Participation of the study was strictly voluntary. The participants were provided with an information letter (Appendix B) by the fieldworker detailing the nature of the study. The participants subsequently provided consent (Appendix D) for participation in the research study. The participants were informed by the fieldworker that they had the right to withdraw from the research study at any point during the data collection process. If a participant of the research study chose to withdraw at any point their data will be removed and will not form part of the final analysis. Fortunately, no participant had requested to withdraw from the research study.

3.6.4 Right to privacy

Any research study involving human beings needs to ensure the participant's right to privacy (Leedy & Ormrod, 2013). Privacy is a freedom that people have to determine when their private information should be shared or withheld from others. Grove (2015) states, that the research participant's right to privacy is protected if consent is gained to participate in the study. The research participant has the right to confidentiality to assume that their data will be kept confidential. Confidentiality is maintained by the researcher when care is taken to safeguard the information of participants (Grove et al., 2015). This was achieved in the following manner.

The participants were informed in the information letter (Appendix B) that their data would remain completely confidential. Confidentiality was maintained by making use of a predetermined coding system using numbers for identification purposes, thereby ensuring that the participants' identities remained confidential. Care was taken by the researcher to ensure that all data gained during the data collection process was safeguarded. Hard copies of data were stored in a locked cupboard and only the researcher had access to this cupboard. Electronic data was stored on a password protected computer that only the researcher had access to.

3.6.5 Honesty with professional colleagues:

Researchers have an ethical duty to report their results in a truthful and honest manner. They should not attempt to mislead or misrepresent their results. They should under no circumstances fabricate any data to support a conclusion, no matter how noble the reason (Leedy & Ormrod, 2013). This was achieved in the following manner.

The use of ideas and information from other sources have been appropriately referenced throughout the research study. At the beginning of the research study, the researcher signed a statement ensuring that no plagiarism or academic misconduct took place during the research study process. Credit and acknowledgement was given to everyone that assisted the researcher during the entire research process. The researcher will endeavour to publish all results in an accredited Occupational Therapy journal.

3.6.6 Data management

The data was managed in a consistent manner to safeguard the privacy of the participants (cf 3.6.4). A predetermined numbering system was used numbers for identification purposes of participant questionnaires. Data was input on two separate excel spreadsheets to mitigate the risk of input error. A data code sheet was developed by the researcher of participant responses and used to input participant data into the excel sheets. The data code sheet was also sent to the biostatistician together with the excel sheets to aid data analysis. Participant data will be kept in electronic form on a password protected computer that only the researcher had access to for a period of five years (cf 3.6.4). The data will be stored for five years by the biostatistician at the UFS Department of Biostatistics on a password protected computer that only the biostatistician has access to (cf 3.6.4). A soft copy of the dissertation will also be kept by the UFS Occupational Therapy Department. The ownership of the intellectual property vests with the UFS.

3.6.7 Compensation

No compensation or incentives were provided to the participants in order to participate in the study.

3.7 Implementation of results

The results of the study will be communicated to peers through the means of a research dissertation as well as a research article that will contribute towards the burgeoning body of knowledge in the field of SCI rehabilitation in the field of Occupational Therapy

3.8 Summary

In this chapter, the researcher attempted to delineate the methodology used in this research study. In order to achieve the research aim, a quantitative, descriptive cross-sectional study design was used. The research population consisted of 121 participants and data was collected over a three-month period. Data collection was done through a questionnaire that was completed by a fieldworker/researcher. The

content of the questionnaire, as well as the pilot study was discussed. Strategies to reduce measurement errors and maintain ethical practices were also highlighted.

In the following chapter, descriptive statistics will be used to provide meaning to the results obtained. The results are presented in the form of figures and tables.

CHAPTER FOUR: RESULTS

4.1 Introduction

This research study endeavoured to identify and describe which known environmental factors (as identified by the PEOP model) are either barriers to or facilitators of occupational performance among persons living with SCI in Saudi Arabia. The results presented in this chapter will describe the aims and objectives as set out in this research study (cf. 3.2)

The results will be presented in three sections. The diagrammatic overview of the chapter is depicted in Figure 4.1 below.

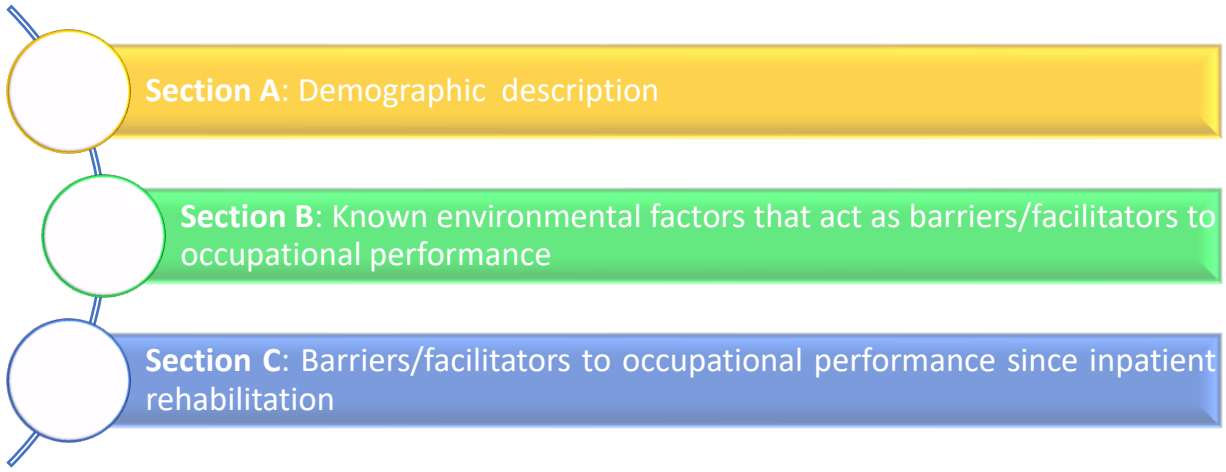

Figure 4.1: Diagrammatic overview of the chapter

All items as outlined in the questionnaire will form part of the results of this research study and will be described under the three sections mentioned above.

4.2 Section A: Demographic description

This section will describe the demographic characteristics of the participants of the research study.

4.2.1 Demographic description of the participants

The data collection was conducted over a three-month period. The research population were sampled from outpatients attending the SCI outpatient follow up clinic. The study included 121 outpatients that met the inclusion criteria and provided consent to participate in the study. Most participants were male (90.08%) with a median age of 29 years. The participant ages ranged between 21 and 48 years old.

Sixty-eight participants (56.2%) indicated that they were married, and 43 participants (35.54%) were single. The neurological level as identified by the participants include: 118 participants that presented with an AIS level A complete injury and three participants presented with an incomplete injury (one AIS level B and two AIS level D level). The date of spinal injury of participants from the date of the interview showed a median range of 4.9 years with a minimum of 2.1 years and a maximum of 17.8 years. The date of spinal injury to date of inpatient rehabilitation received showed a median range of 2.74 years with a minimum of 0.8 years and a maximum of 6.9 years. The date from the last inpatient rehabilitation received to the interview date showed a median of 2.89 years with a minimum of 0.9 years and a maximum of 14.7 years.

Prior to their spinal injury, 53 participants (43.8%) were unemployed, and 36 participants (29.75%) were students. Currently, most participants – 99.17% (n=120) are unemployed, while only one participant (0.83%) is employed.

Table 4.1. below illustrates the home environment of the participants. Most participants 83.47% (n=101) live in urban areas and only 16.53% (n=20) live in rural areas. Ninety-nine participants (81.82%) live in villas and 22 participants (18.18%) live in apartments. Villas are the colloquial term used by local Saudi residents to describe a residential home. Ninety-four participants (77.69 %), live in homes with only one floor, while 27 participants (22.31%) live in homes with two or more floors.

Table 4.1: Home environment

Location	Frequency N (%) 121 (100)	Percent
Urban area	101	83.47
Rural area	20	16.53
Type of home	**Frequency N (%) 121 (100)**	**Percent**
Villa	99	81.82
Apartment	22	18.18
Number of floors	**Frequency N (%) 121 (100)**	**Percent**
One floor	94	77.69
Two or more floors	27	22.31

The overwhelming majority of participants 98.35% (n=119), identified that they are wheelchair users, while only two participants (1.65%) were not wheelchair users. These two participants correlate with the two participants mentioned above (cf 4.2.1) which presented an AIS level D incomplete injury. Forty-eight participants (40.34%) of the wheelchair user group indicated that they are “light active wheelchair” users, 47 participants (39.50%) reported that they are “electric wheelchair” users, 14 participants (11.76%) reported that they are “standard wheelchair” users and 10 participants (8.40%) reported that they are “light standard wheelchair” users. The wheelchairs identified by the participants correlate with the varying levels of occupational performance of the participants according to the neurological levels they presented with (cf 2.4.1).

4.3 Section B: Known environmental factors that act as barriers or facilitators of occupational performance

This section will describe the known environmental factors as identified in the PEOP model discussed previously (cf. 2.4.3.3) i.e. the built environment (physical and design properties of the home and public buildings), the natural environment**,** the cultural environment, social factors (social acceptance and social interaction) and the social and economic systems.

4.3.1 Built environment

The built environment (as described in the PEOP model) (cf. 2.4.3.3) is divided into three components. The results of each component will be described below:

- Physical layout of the home
- Design properties of your home
- Design properties of public buildings which include malls, mosques, government buildings and hospitals.

4.3.1.1 Physical layout of your home

The results of the influence of the physical layout of the home on the occupational performance of the participants during their daily self-care activities are discussed below.

Table 4.2 illustrates the participants' view on the barriers and facilitators of the physical layout of the home on their occupational performance while performing daily self-care activities. During eating and drinking activities, 82 participants (67.77%) identified that the physical layout of their home is a facilitator. The majority of these participants motivated that the home is "well designed" for eating and drinking activities. Thirty-nine participants (32.33%) however indicated that the physical layout of their home is a barrier during eating and drinking activities and the majority of these participants motivated that "the table in their home is too high" to accommodate them.

Table 4.2: Barriers and facilitators of the physical layout of the home while performing self-care activities

Self-care activities	Barrier	Facilitator	Both	Not applicable
Eating and drinking	32.23% (n=39)	**67.77% (n=82)**	0	0
Washing and drying face	**38.84%** (n=47)	61.16% (n=74)	0	0
Washing and drying hands	**38.84%** (n=47)	61.16% (n=74)	0	0
Brushing teeth/cleaning dentures	32.23% (n=39)	67.77% (n=82)	0	0
Brushing or grooming your hair	0	100% (n=121)	0	0
Shaving your beard or applying make up	66.94% (n=81)	33.06% (n=40)	0	0
Bathing and/or showering	**32.23% (=39)**	58.68% (n=71)	9.09% (n=11)	0
Washing and/or drying hair	74.38 (n=90)	0	0	25.62% (n=31)
Dressing upper body	0	**100% (n=121)**	0	0
Dressing lower body	0	**100% (n=121)**	0	0
Performing toileting activities	7.44% (n=9)	**92.56% (n=112)**	0	0
To move around the home	**71.9% (n=87)**	28.1% (n=34)	0	0

More than half of the participants 61.16% (n=74), reported that the physical layout of their home is a facilitator while performing washing and drying of their face and hands. All of these participants motivated that this activity was “not a barrier” for them. Forty-seven participants (38.84%) however indicated that the physical layout of their home is a barrier during the performance of washing and drying of their face and hands. Sixteen participants (34.04%) of the barrier group, indicated that “the basin in their home is too high” and this impedes their performance during the washing of their hands and face.

Seventy-one participants (58.68%) reported that the physical layout of their home is a facilitator for them while performing bathing and/or showering activities. These participants motivated physical layout of their home is suitable for bathing and/or showering activities. Thirty-nine participants (32.23%) stated that the physical layout of their home is a barrier during bathing and/or showering and participants and motivated that their “bathrooms were too small” to accommodate a wheelchair.

All participants 100% (n=121), indicated that the physical layout of their home is a facilitator during dressing of the upper and lower body activities. With regards to the performance of toilet activities, most participants 92.56% (n=112), indicated that the physical layout of their home is a facilitator. Fifty-eight participants (51.79%) of the facilitator group, motivated that they “had a commode chair” at home, and 54 participants (48.21%) motivated that the “toilet layout is large enough for the wheelchair”. Nine participants (7.44%) indicated that the physical layout of their home is a barrier. All the participants who indicated the physical layout as a barrier, motivated that the “toilet layout is not large enough to accommodate a commode”.

When required to move around the home, the majority of the participants 71.9% (n=87) indicated that the physical layout of their home is a barrier. Participants motivated that their “house is too small to move around” with a wheelchair.

4.3.1.2 Design properties of your home

The following section describes the results of the influence of the design properties of the home on occupational performance.

Table 4.3 below outlines the barriers and facilitators of the design properties of the home as reported by participants of their occupational performance. Seventy-three participants (60.33%) indicated that gaining access to the entrance of the front door to their home is a facilitator. These participants (n=31), motivated that there is a “ramp installed at home”. Forty-eight participants (39.67%) indicated that gaining access to the entrance of the front door is a barrier. These participants motivated that there is a “steps at the entrance and no ramp is installed”

Table 4.3 Barriers and facilitators of the design properties of the home on occupational performance

Design properties of your home	Barrier	Facilitator	Both	Not applicable
Gaining access to the entrance of the front door	39.67% (n=48)	**60.33% (n=73)**	0	0
Gaining access to all doors in the home	7.44% (n=9)	**58.68 (n=71)**	33.88% (n=41)	0
Gaining access to the higher floors in the home	12.14% (n=28)	17.36% (n=21)	59.5% (n=72)	0
Design and layout of the bathroom	**47.93% (n=58)**	52.07% (n=63)	0	0
Type of toilet	**16.53% (n=20)**	**83.47% (n=101)**	0	0
Design and layout of the kitchen	**98.35% (n=119)**	1.65% (n=2)	0	0

The participants were asked to indicate whether the entrances of all the doors in their home is a barrier or facilitator in the performance of their daily activities. The majority of the participants (58.68%) indicated that gaining access to all doors to their home is a facilitator. Participants motivated that the "doors were wide enough and suitable" for them to gain access with their wheelchairs.

Sixty-three participants (52.07%) indicated that the design and layout of their bathroom is a facilitator while performing bathing and/or showering activities; this correlates with results from the previous section (cf. 4.3.1.1), where 71 participants (58.68%) reported that the physical layout of their home is a facilitator for them while performing bathing and/or showering activities. Fifty-eight participants (47.93%) indicated that the design and layout of the bathroom was a barrier and motivated that the "layout of the bathroom was too small" for them to complete their selfcare activities. This result also correlates with results from the previous section above (cf. 4.3.1.1), where 39 participants stated that the physical layout of their home is a barrier during bathing and/or showering activities and that their bathroom is too small to accommodate a wheelchair.

Fifty-eight participants (47.93%) reported that they have both Arabic and western toilets in their homes, 41 participants (33.88%) reported that they only have a western toilet and 22 participants (18.18%) reported that they only have an Arabic toilet at home. Taking the type of toilet found in homes into consideration, participants had to identify whether the type of toilet identified above is a barrier or facilitator while performing toileting activities. One hundred and one participants (83.47%) indicated that the type of toilet at home is a facilitator while performing toileting activities. This correlates with the number of participants that indicated that they have western toilets in their homes. Twenty participants (16.53%) indicated that the type of toilet at home is a barrier while performing toileting activities and this correlates with the 22 participants (18.18%) who reported that they only have an Arabic toilet at home.

The overwhelming majority of participants 98.35% (n=119), indicated that the design and layout of the kitchen is a barrier while preparing a meal. All these participants (n=72), motivated that the "kitchen counters and cupboards was too high" for them. It is therefore clear that participants' kitchens are not adapted for wheelchair users and may be a barrier of occupational performance.

4.3.1.3 Design of public buildings (e.g. malls, mosques, government buildings and hospitals)

The following section reflects the influence of the design properties of public buildings on the occupational performance of the participants during the performance of their daily activities. Table 4.4 below outlines participants' access to public buildings and whether it poses a barrier or is a facilitator for them.

Table 4.4 Design properties of public buildings

Access to public buildings	Yes	No
Easily accessed malls in your area	100% (n=121)	0
Easily accessed mosques in your area	100% (n=121)	0
Easily accessed government buildings	90.91% (n=110)	9.09 (n=11)
Easily accessed hospitals	100% (n=121)	0

	Barrier	Both
Access to any of the public buildings	75.21% (n=91)	24.79% (n=30)

As indicated by participants, most public buildings are accessible; however, few pose some challenges during their occupational performance. All participants 100% (n=121), indicated that they can easily access malls, mosques and hospitals in their area, furthermore 110 participants indicated that they are able to access government buildings easily.

Ninety-one participants (75.21%) indicated that access to public buildings is a barrier, while 30 participants (24.79%) indicated that the access to public buildings is both a barrier and facilitator in their daily activities. Twenty-one of the participants (70%) (of the group that indicated that it was both a barrier and facilitator), motivated that “some public buildings had no elevator”, while nine participants (30%) motivated that it is a “barrier if no elevator is present but that most buildings were accessible”.

Fifty-two participants (42.98%) indicated gaining access to the higher floors in public buildings is a barrier of their occupational performance. All these participants indicated that “elevators were not always present”.

Table 4.5 below illustrates the number of participants that indicated whether the design and layout of toilets in public buildings is a barrier or facilitator in their daily activities. An overwhelming majority of participants 98.35% (n=119), indicated that the design and layout of toilets in public buildings is a barrier of their occupational performance. Participants motivated that “not all toilets were large enough to accommodate a wheelchair”. This contrasts with previous results where the majority of the participants (n=101) participants indicated that the type of toilet at home is a facilitator while performing toileting activities. It is thus clear from the results, that the design and layout of toilets in public buildings pose a significant barrier to the occupational performance of persons living with SCI.

Table 4.5: Design and layout of toilets in public buildings

Design and layout of toilets in public buildings	Frequency N (%) 121 (100)	Percent
Barrier	119	98.35
Facilitator	2	1.65

4.3.2 The natural environment

The results describing the influence of the natural environment on the occupational performance of participants during the performance of their daily activities is described below.

The majority of participants (65.29%) indicated that the geographical location of their home is a facilitator of their occupational performance. All these participants motivated that they “live in a city”. It can be assumed that a city has a more developed infrastructure for wheelchair users living with SCI and could therefore be a facilitator of occupational performance.

Sixty-seven participants (55.37%) indicated that they have asphalt on the outside surrounding their homes and 54 participants (44.63%) indicated that they have loose sand surrounding their home. Furthermore, sixty-one participants (50.41%) indicated that the type of terrain is a facilitator of their occupational performance. This correlates with the number of participants that indicated that they have asphalt surrounding their home. In Saudi Arabia, homes with asphalt are usually located in more developed urban areas and homes with loose sand are usually found in more rural areas. The results contrast with the number of participants 83.47% (n=101), who indicated that they live in urban areas (cf. 4.2.1).

Saudi Arabia experiences extreme summer temperatures and it is clear from the results that this is a barrier of occupational performance of persons living with SCI. Sixty-four participants (52.89%) reported that climate is a barrier in the performance of their daily activities. Participants further motivated that it is “too hot to go outside in summer” and that during “summer it was difficult to perform activities outside of the home”.

The table below illustrates the number of participants that indicated whether the natural environment is a barrier or facilitator of the occupational performance in their daily activities.

Table 4.6: The natural environment

The Natural Environment	Barrier	Facilitator	Both
Geographical location of your home	34.71% (n=42)	65.29% (n=79)	0
Type of terrain	49.59% (n=60)	50.41% (n=61)	0
Climate	52.89% (n=64)	30.58% (n=37)	16.53% (n=20)

4.3.3 The cultural environment

Religious beliefs and customs or traditions are two important factors that form part of the cultural environment of persons living with SCI that were included in the study. All participants 100% (n=121), indicated that their religious beliefs is a facilitator in the performance of their daily activities. These participants motivated that their religious beliefs "provides support" for them.

All participants 100% (n=121), also indicated that the customs or traditions that they practice is a facilitator in the performance of their daily activities. Seventy-nine of these participants however motivated however that they are "not able to attend all cultural events". The results show that religious beliefs and the customs and traditions practiced by persons living with SCI in Saudi Arabia, are important facilitators of occupational performance in their daily lives.

4.3.4 Social factors

The influence of social factors on the occupational performance of the participants during the performance of their daily activities is described below. Social acceptance and social interaction are two components of social factors that will be discussed.

4.3.4.1 Social acceptance

Table 4.8 below illustrates the number of participants that reported whether social acceptance by others is a problem for them. Sixty-eight participants (56.2%), indicated that social acceptance by others is a problem for them. Participants motivated that "sometimes they experienced problems" with social acceptance by others.

Furthermore, forty-four of these participants (36.36%) indicated that social acceptance by others is a barrier for them and motivated that "not all people accept him/her".

Table 4.7: Social acceptance by others as a problem for you

Social acceptance by others	Frequency N (%) 121 (100)	Percent
Yes	68	56.2
No	53	43.8
Social acceptance by others	**Frequency N (%) 121 (100)**	**Percent**
Barrier	44	36.36
Facilitator	45	37.19
Both	32	26.45

The table below illustrates the number of participants that reported whether they have experienced social prejudice from others. The vast majority of participants (85.95%), indicated that they have experienced social prejudice from others. Furthermore, fifty-four of these participants (44.63%) indicated that social prejudice by others is a barrier for them in the performance of their daily activities. Participants motivated that "people treat you differently" and that they "feel bad if treated different by others". The results therefore distinguish that persons living with SCI in Saudi Arabia experience social prejudice and that this is a barrier of their occupational performance.

Table 4.8: Experienced social prejudice from others

Social prejudice	Frequency N (%) 121 (100)	Percent
Yes	104	85.95
No	17	14.05
Social prejudice	**Frequency N (%) 121 (100)**	**Percent**
Barrier	54	44.63
Facilitator	9	7.44
Not applicable	58	47.93

4.3.4.2 Social interaction and social support

Social interaction and its influence on the occupational performance of participants during the performance of their daily activities forms part of the social factors and the results of social interaction and social support will now be discussed.

The table below outlines the results of the barriers and facilitators of social interaction and social support on occupational performance. Seventy-eight participants – 64.46% (n=78), indicated that social interaction with others is a facilitator in the performance of their daily activities. Interestingly, 43 participants (35.54%) indicated that social interaction with others is a barrier in the performance of their daily activities. Of these participants, 32 motivated that it is “difficult to transport them to social events”, nine participants motivated that they are “not able to sit on the floor and socialise with others” and two participants motivated that they “did not interact much socially with others”. In a society where culture and traditions form an important part (cf. 2.4.3.3), this is an important barrier to consider for persons living with SCI.

An overwhelming number of participants 90.08% (n=109), indicated that social support by others is a facilitator in the performance of their daily activities. Participants motivated that their “friends were very supportive”.

Table 4.9: Social support and social interaction with others as a barrier or facilitator for you in the performance of your daily activities

Social interaction	Barrier	Facilitator
Social interaction	35.54% (n=43)	64.46% (n=78)
Social support	9.92 (n=12)	90.08% (n=109)

4.3.10 Social and economic systems

This section describes the influence of social and economic systems on the occupational performance of participants during the performance of their daily activities.

The table below illustrates the change in economic status after injury, and the barriers and facilitators of their current economic status on occupational performance. Seventy-two participants (59.5%) indicated that they experienced a change in their economic status after their injury. Furthermore, 86 participants (71.07%) indicated that their current economic status is a barrier of occupational performance. Participants motivated that they are not able to afford everything they need. This correlates to the significant number of participants 99.17% (n=120) that indicated that they are currently unemployed (cf. 4.2.1).

Table 4.10: Economic status

Did you experience a change in your economic status	Frequency N (%) 121 (100)	Percent
Yes	72	59.5
No	49	40.5
Current economic status	**Frequency N (%) 121 (100)**	**Percent**
Barrier	86	71.07
Facilitator	25	20.66
Both	10	8.26

Appropriate access to health care services is important for persons living with SCI, as they will require healthcare intervention for the rest of their lives. Table 4.12 below outlines participants' views on access to health care services and whether access to health care services is a barrier or facilitator of their occupational performance. Sixty-four participants (52.89%) indicated that they are not able to access health care services easily. Furthermore, 72 participants (59.5%) indicated that access to health services is a barrier in the performance of their daily activities. The majority of these participants commented that they "do not get the needed medical care when required". Access to health services is thus regarded as a barrier by most participants living with SCI.

Table 4.11: Access to health services

Access health services	Frequency N (%) 121 (100)	Percent
Yes	57	47.11
No	64	52.89
Access health services	**Frequency N (%) 121 (100)**	**Percent**
Barrier	72	59.5
Facilitator	49	40.5

Table 4.13 below describes whether participants have a suitable assistive device and if access to a suitable assistive device is a barrier or facilitator of occupational performance for them. Ninety-nine participants (81.82%) indicated that they have a suitable assistive device. All participants (n=121), indicated their assistive devices are a facilitator for them in the performance of their daily activities. Sixty-seven of these participants commented that they "received an appropriate wheelchair", 43 participants motivated that their assistive device "enables me to perform my ADL", and 11 participants commented that their assistive device enables them to move around.

Table 4.12: Suitable assistive device

Suitable assistive device	Frequency N (%) 121 (100)	Percent
Yes	81.82	99
No	22	18.18
Access to suitable assistive devices	**Frequency N (%) 121 (100)**	**Percent**
Barrier	0	0
Facilitator	121	100

The following table outlines the number of participants that receive governmental financial aid or support and whether this is a barrier or facilitator of their occupational performance. A significant number of participants 91.74% (n=111), indicated that they receive a form of governmental financial aid or support. Ninety-three of these participants (76.86%) indicated that the governmental financial aid or support received is a barrier in the performance of their daily activities. Participants motivated that the governmental financial aid or support received is "not enough" to afford everything they need.

Table 4.13: Do you currently receive any governmental financial aid or support?

Governmental financial aid or support	Frequency N (%) 121 (100)	Percent
Yes	111	91.74
No	10	8.26
Governmental financial aid or support	**Frequency N (%) 121 (100)**	**Percent**
Barrier	93	76.86
Facilitator	28	23.14

4.4 Section C: Barriers/facilitators to occupational performance since inpatient rehabilitation

The third objective of this study was to compare the identified barriers or facilitators of occupational performance, as it relates to the time since participants received previous inpatient rehabilitation to the date of interview. To quantify the results of time since previous rehabilitation, the data was divided into three time periods post rehabilitation. The time periods are represented below. The time periods will subsequently be referred to as group A, B and C to facilitate the easy reading of the results.

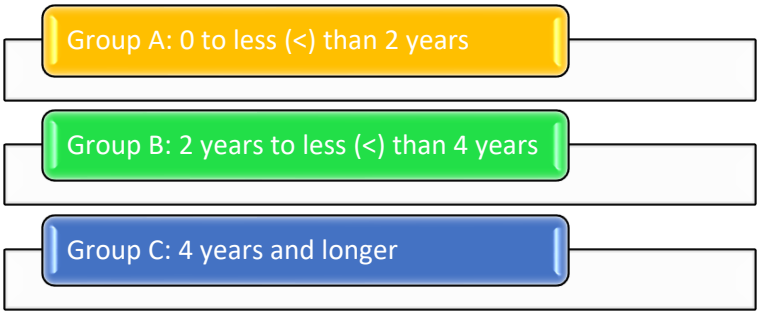

Figure 4.6: Time periods since rehabilitation

The results of each item of the questionnaire were categorised into the three time periods mentioned above. As mentioned previously (cf. 4.2.1) a total number of 121 participants participated in the research study. Thirty-three participants received inpatient rehabilitation 0 to less (<) than 2 years since the interview date, 60 participants received inpatient rehabilitation between 2 years to less (<) than 4 years since the interview date, and 28 participants received previous inpatient rehabilitation 4 years and longer since the interview date.

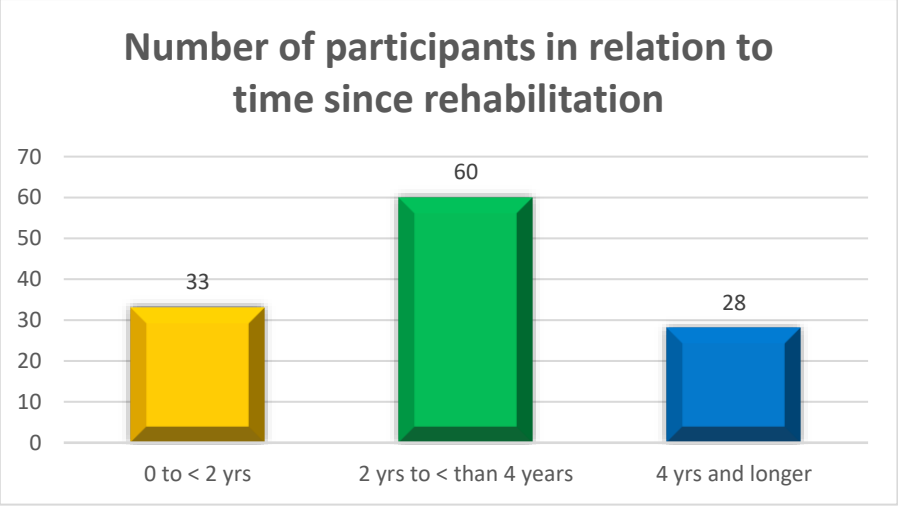

Figure 4.7: Number of participants in relation to time since rehabilitation

The median time period from the date of spinal injury until date of interview for all groups are represented in Figure 4.8 below. The median time period of group A was 3.37 years. The median time period of date of spinal injury of group B was 4.99 years and the median time period of group C was 8.27 years.

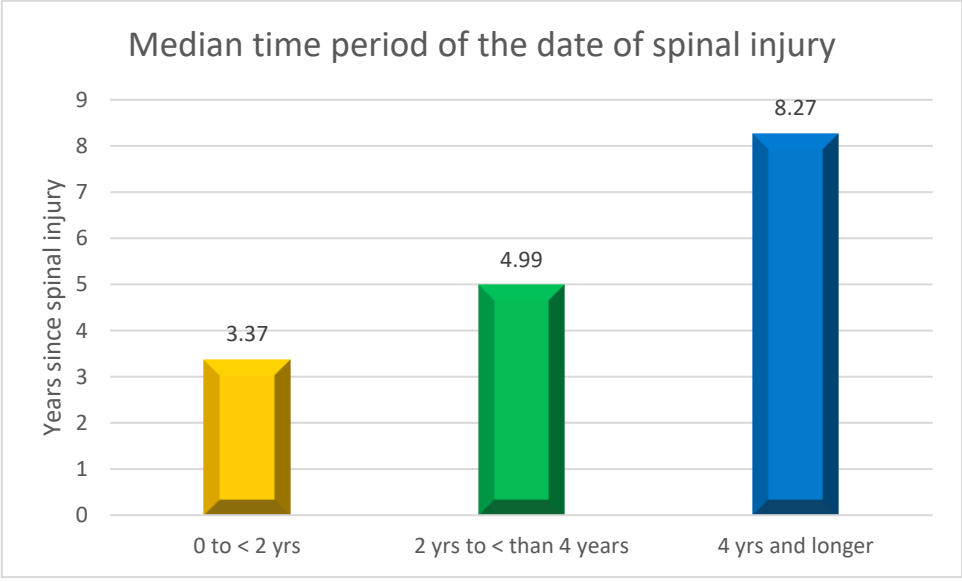

Figure 4.8: Median time period of date since spinal injury

4.4.1 Built environment

4.4.1.1 Physical layout of your home

In this section, the barriers and facilitators of the built environment (identified by the PEOP model) as it relates to the time since previous inpatient rehabilitation is discussed. As in Section B, three components influencing the occupational performance of participants are included, namely physical layout of the home, design properties of the home and the design properties of public buildings which include malls, mosques, government buildings and hospitals. Figure 4.9 below outlines the first component i.e. the influence of the physical layout of the home on the occupational performance of the participants (as it relates to the time since previous inpatient rehabilitation) during their daily self-care activities. Twelve self-care activities were included in this study.

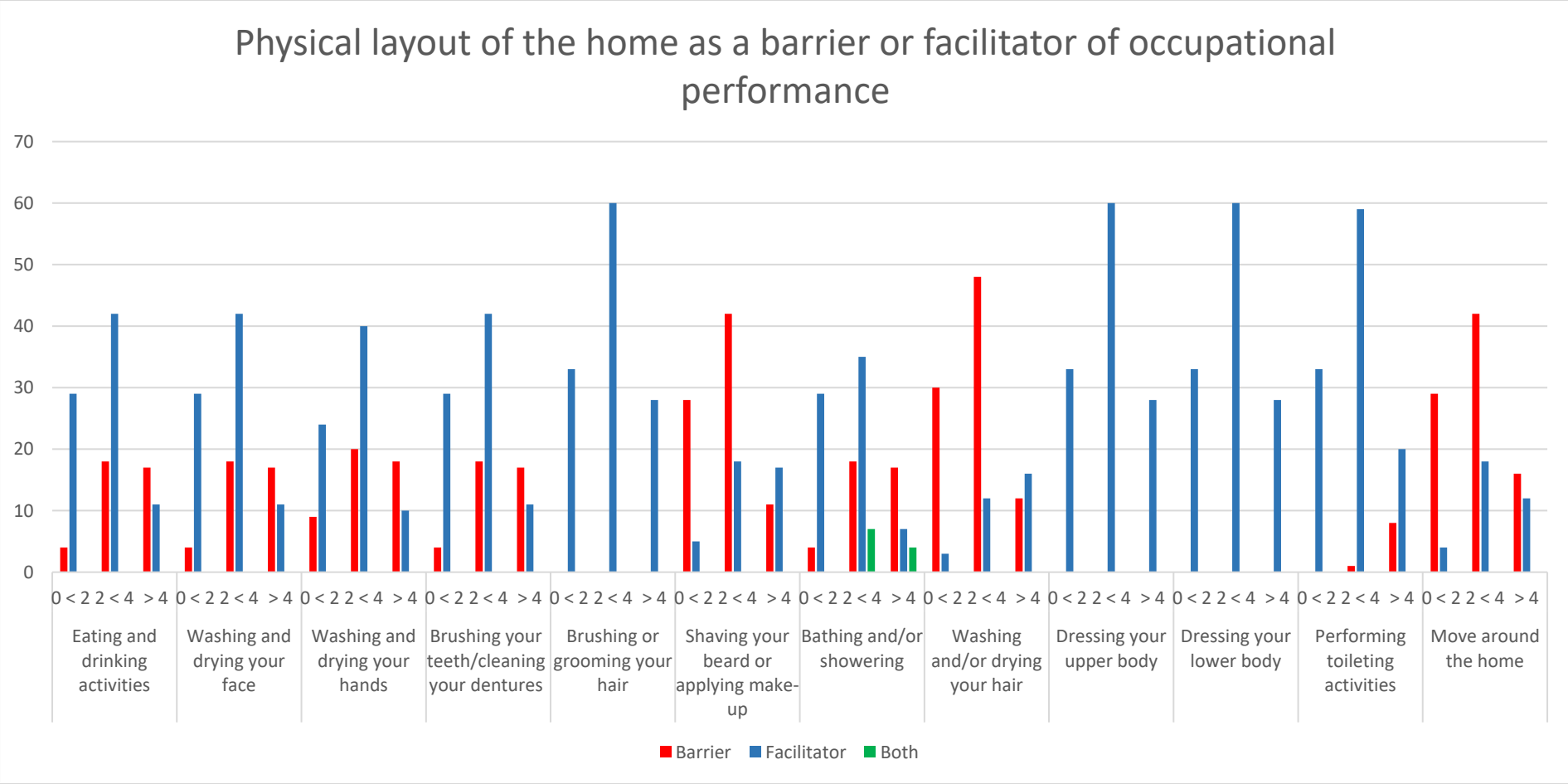

Figure 4.9: Barriers and facilitators of the physical layout of the home during self-care activities

During analysis of participant responses, a few trends were observed among the three time periods. More than half of the participants of group A and B indicated that the physical layout of the home is a facilitator of occupational performance of the following self-care activities:

- eating and drinking activities
- washing and drying your face
- washing and drying your hands
- brushing your teeth/cleaning your dentures
- bathing and/or showering activities.

Consequently, participants of group C indicated that the physical layout of the home is a barrier of the occupational performance of the self-care activities mentioned above. The results show that the physical layout of the home changes from a facilitator to a barrier of occupational performance four years post receiving inpatient rehabilitation for the self-care activities mentioned above.

The second trend observed, was that all three groups indicated that the physical layout of the home remains a facilitator of occupational performance of the following self-care activities:

- brushing or grooming their hair activities
- dressing of their upper body
- dressing of their lower body
- performing toileting activities.

These results are consistent with results mentioned previously (cf. 4.3.1.1) where participants indicated that the physical layout of the home is a facilitator during occupational performance of the same self-care activities mentioned above. These results are supported by comments made by participants (cf. 4.3.1.1), that commode chairs are present at home and that the toilet layout is large enough to accommodate their wheelchair.

4.4.1.2 Design properties of your home

This section reflects the barriers and facilitators of the design properties of participants' homes (as identified by the PEOP model) as it relates to the time since previous inpatient rehabilitation received. Figure 4.10 below describes the influence of the design properties of participants homes on their occupational performance (as it relates to the time since previous inpatient rehabilitation).

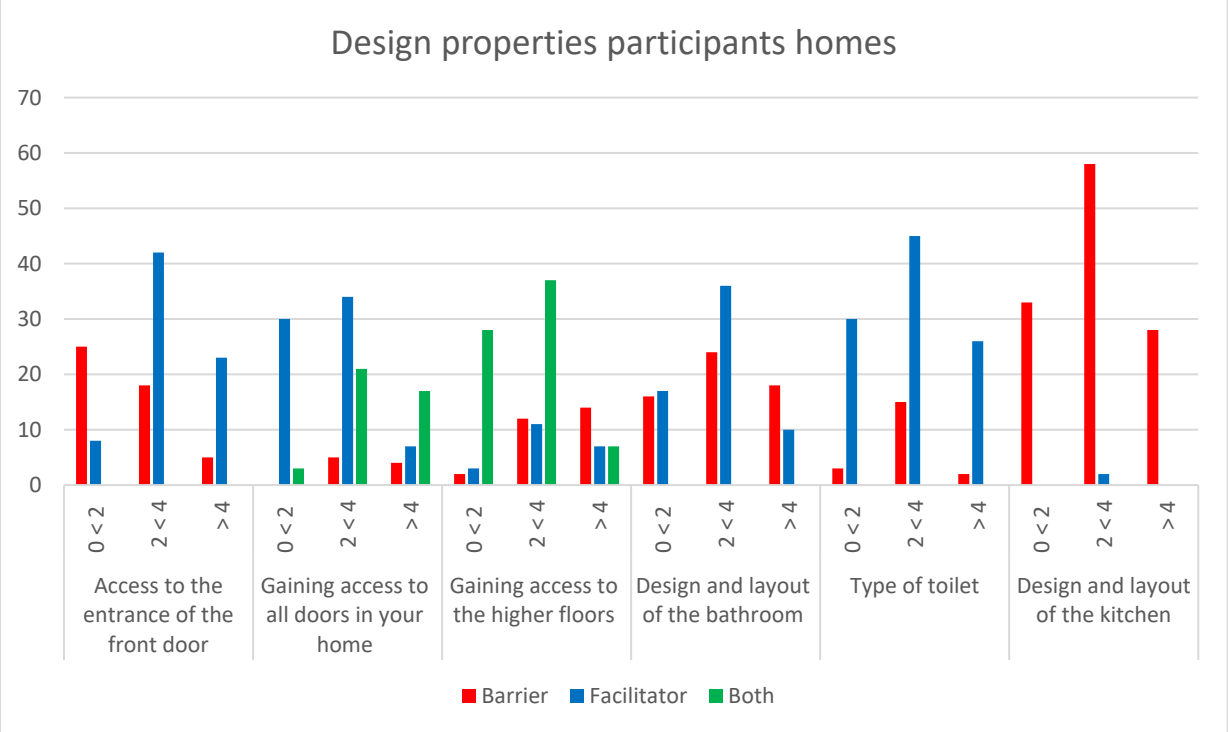

Figure 4.10: Barriers and facilitators of the design properties of participants homes

Seventy-five per cent (n=25) of group A, indicated that gaining access to the entrance of the front door is a barrier for them. Consequently, more than half of participants of group B and group C reported that gaining access to the entrance of the front door is a facilitator for them. The results show that after two years post rehabilitation, participants ability to access to the entrance of the front door moved from a barrier to

a facilitator of occupational performance.

More than half of participants of group A, and group B 51.52% (n=17) and 60% (n=36) respectively, indicated that the design and layout of the bathroom in their home is a facilitator, while more than half 64.29% (n=18) of group C of the participants, indicated that the design and layout of the bathroom in their home is a barrier for them. This correlates with previous results (cf. 4.3.2.1), where more than half of participants 52.07% (n=63), indicated that the design and layout of their bathroom is a facilitator of occupational performance. The results thus show that four years post inpatient rehabilitation, the design and layout of the bathroom moved from a facilitator to a barrier of occupational performance.

Consistent with results reported in the previous section (cf. 4.3.2.1), the overwhelming majority of all groups of the participants 90.91% (n=30), 75% (n=45) and 92.86% (n=26) respectively, reported that the type of toilet in their home is a facilitator during the performance of their toileting activities. This correlates well with the number of participants that indicated that they have western toilets, as well as commodes in their homes (cf. 4.3.2.1).

All groups of the participants 100% (n=33), 96.67% (n=58) and 100% (n=28) respectively, reported that the design and layout of the kitchen in their home is a barrier while preparing a meal. This is consistent with previous results (cf. 4.3.2.1), where most participants 98.35% (n=119), indicated that the design and layout of the kitchen is a barrier while preparing a meal.

4.4.1.3 Design of public buildings (e.g. malls, mosques, government buildings and hospitals)

The influence of the design properties of public buildings on the occupational performance of the participants during the performance of their daily activities is discussed below. Public buildings included in this study are malls, mosques, government buildings and hospitals.

Participants of all groups indicated that they were able to access public buildings easily. The results correlate well with results mentioned in the previous section (cf 4.3.1.3), where the overwhelming number of participants indicated that they are able to access public buildings easily.

Figure 4.11 below outlines the barriers and facilitators of the design of public buildings on occupational performance.

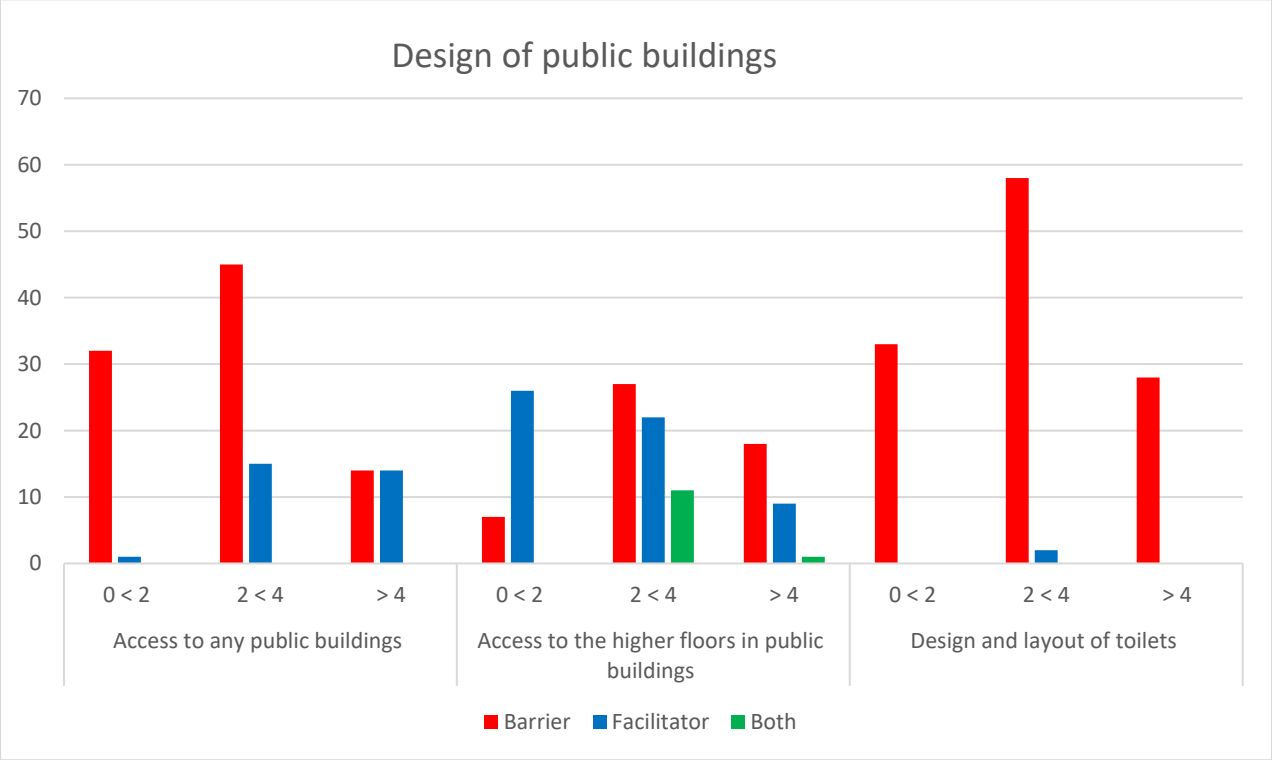

Figure 4.11: Barrier and facilitators of the design of public buildings

More than half of the participants of all groups indicated that access to public buildings is a barrier of occupational performance. This is consistent with previous results (cf 4.3.1.3), where participants indicated that access to public buildings is a barrier of occupational performance.

The overwhelming majority of all groups of participants 100% (n=33), 96.67% (n=58) and 100% (n=28) respectively, reported that the design and layout of the toilets in

public buildings is a barrier of occupational performance. These results correlate with previous results (cf. 4.3.1.3), where the overwhelming majority of participants 98.35% (n=119) indicated that the design and layout of toilets in public buildings is a barrier of occupational performance in their daily activities.

4.4.2 The natural environment

This section describes the influence of the natural environment on the occupational performance of participants during the occupational performance of their daily activities. The natural environment components included in the study are geographical location of the home, terrain around the home and climate. Figure 4.12 outlines the barriers and facilitators of the components of the natural environment on the occupational performance of the participants.

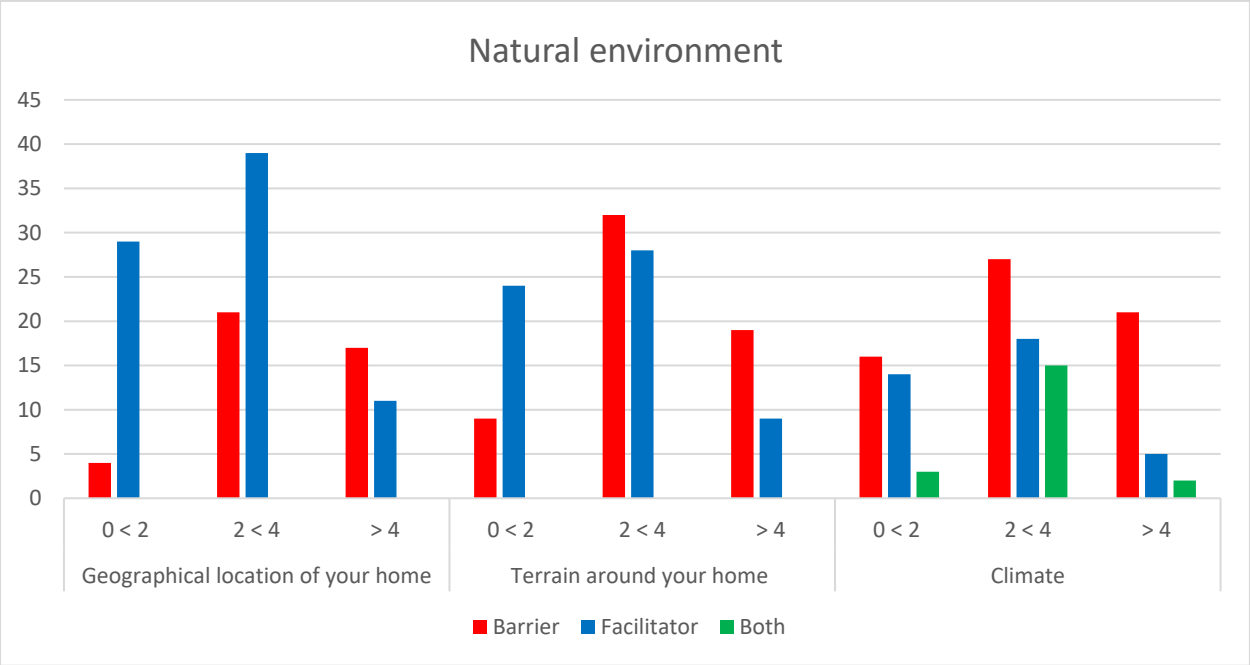

Figure 4.12: Barriers and facilitators of the natural environment

The results show that the geographical location of the home changes from a facilitator to a barrier of occupational performance over time. More than half of the participants

of group A and group B indicated that the geographical location of their homes is a facilitator while the majority of group C indicated the geographical location of their homes is a barrier of occupational performance. Taking into consideration that many participants 83.47% (n=101) live in urban areas (cf. 4.2.1) where it is assumed that infrastructure supports occupational performance, the results are in contrast for group C of the participants.

The terrain around the home is a facilitator for the majority of the participants of group A, however this changed to a barrier for group B and the group C participants. This result contrasts with previous results (cf. 4.3.2) where half of the participants 50.41% (n=61) indicated that terrain around their home is a facilitator of occupational performance.

The extreme summer temperatures in Saudi Arabia make climate an important aspect to consider in the performance of daily activities. The majority of all groups of participants 48.48% (n=16), 45% (n=27) and 75% (n=21) respectively, indicated that climate is a barrier of occupational performance of their daily activities. This is consistent with previous results (cf. 4.3.2), where more than half of participants 52.89% (n=64) reported that the climate is a barrier of occupational performance.

4.4.3 The cultural environment

The cultural environment includes two components namely, religious beliefs, and customs or traditions. Figure 4.13 shows participant responses of the barriers and facilitators of the cultural environment of occupational performance.

Previous results (cf. 4.3.3) showed that the cultural environment is an important facilitator of occupational performance of all participants. Consistent with previous results (cf. 4.3.3.), all participants of all groups indicated that their religious beliefs, as well as their customs and traditions is a facilitator in the performance of their daily activities. Once again, the importance of the components of the cultural environment is confirmed by participant responses. This finding underlines the value and importance that participants place on the cultural environment in the occupational performance of their daily activities.

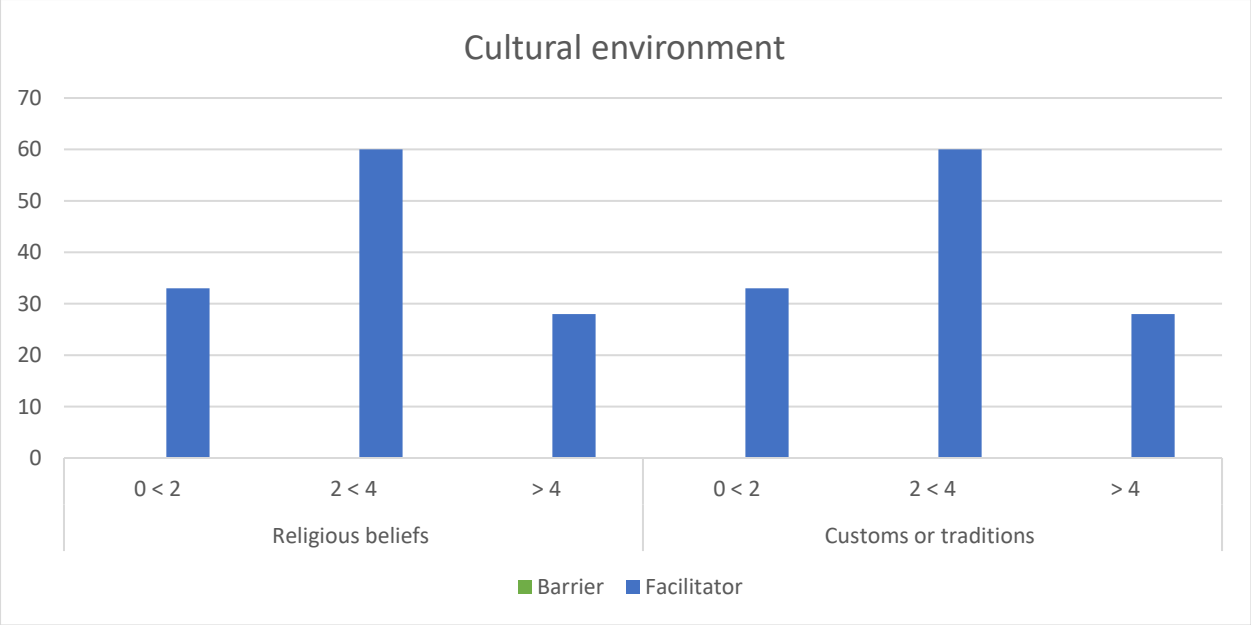

Figure 4.13: Barriers and facilitators of the cultural environment

4.4.4 Social factors

This section describes the influence of social factors on the occupational performance of the participants during the performance of their daily activities. This section is subdivided in social acceptance and social interaction.

4.4.4.1 Social acceptance and social prejudice

The results of social acceptance and social prejudice and its influence on the occupational performance of participants during the performance of their daily activities will be discussed. Figure 4.14 displays the barriers and facilitators of social acceptance and social prejudice.

The results show that many participants of all time periods, indicated that social acceptance by others is a problem for them. Forty-two per cent (n=14) of group A of the participants indicated that social acceptance by others is a problem for them. Fifty-five per cent of participants (n=33) of group B and group C of the participants indicated that social acceptance by others is a problem for them.

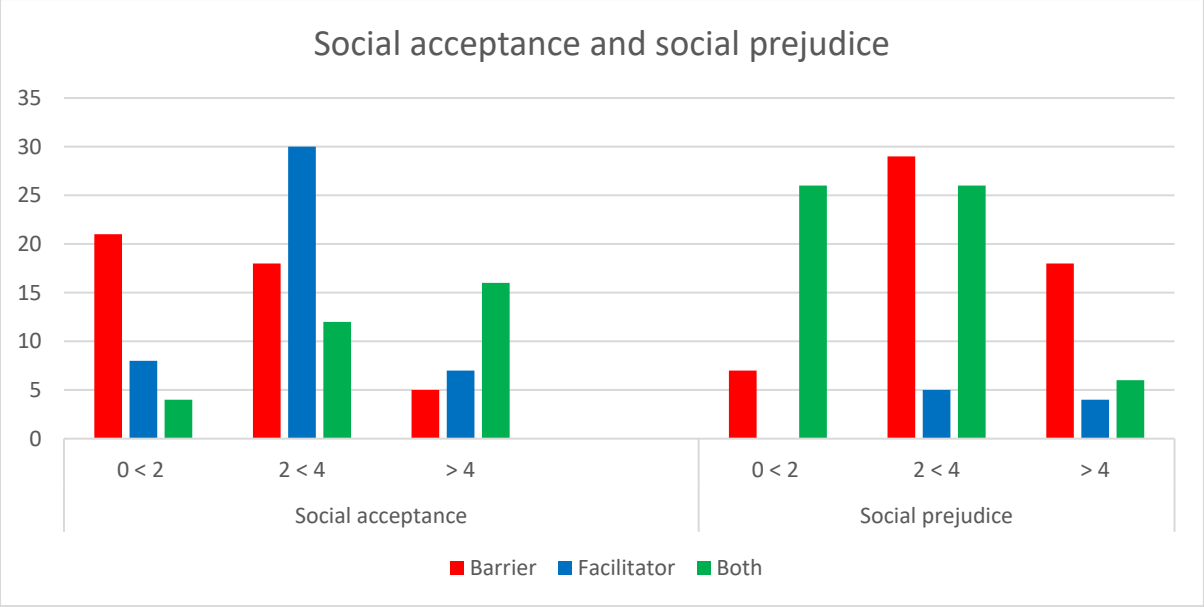

Figure 4.14: Barriers and facilitators of social acceptance and social prejudice

The results show that social acceptance becomes less of a barrier for participants over time. More than half 63.64% (n=21) of group A of the participants indicated that social acceptance by others is a barrier, whereas 30% (n=18) and 17.86% (n=5) of group B and group C respectively, reported that social acceptance is a facilitator of occupational performance.

All groups of participants indicated that they have experienced social prejudice by others. The majority of all the groups of participants 90.91% (n=30), 83.33% (n=50) and 85.71% (n=24) respectively, indicated that they have previously experienced social prejudice from others.

The results indicated that social prejudice experienced as a barrier by participants increased over time. Social prejudice experienced is less of a barrier for group A 21.21% (n=7) and increased to 48.33% (n=29) in group B and further increased to 64.29% (n=18) in Group C of the participants. The results therefore point out that persons living with SCI in Saudi Arabia experience a large amount of social prejudice from others and that this is a barrier of their occupational performance.

4.4.4.2 Social interaction

Social interaction and social interaction are part of the social factors. The influence of both factors on the occupational performance of participants during the performance of their daily activities will now be discussed. Figure 4.15 below displays the barriers and facilitators of social interaction and social support according to participants' responses.

The results indicate that social interaction with others became less of a facilitator for participants and more of a barrier of occupational performance over time. Group A had the largest number 87.88% (n=29) of participants who indicated that social interaction with others is a facilitator of occupational performance. It decreased to 68.33% (n=41) and 28.57% (n=8) for group B and C respectively. The converse is true, as social interaction became more of a barrier with time. The results thus show that persons living with SCI interact less socially with others over time.

An overwhelming number of participants 100% (n=33), 81.67% (n=49) and 96.43% (n=27) respectively, of all groups indicated that the social support by others is a facilitator for them in the performance of their daily activities.

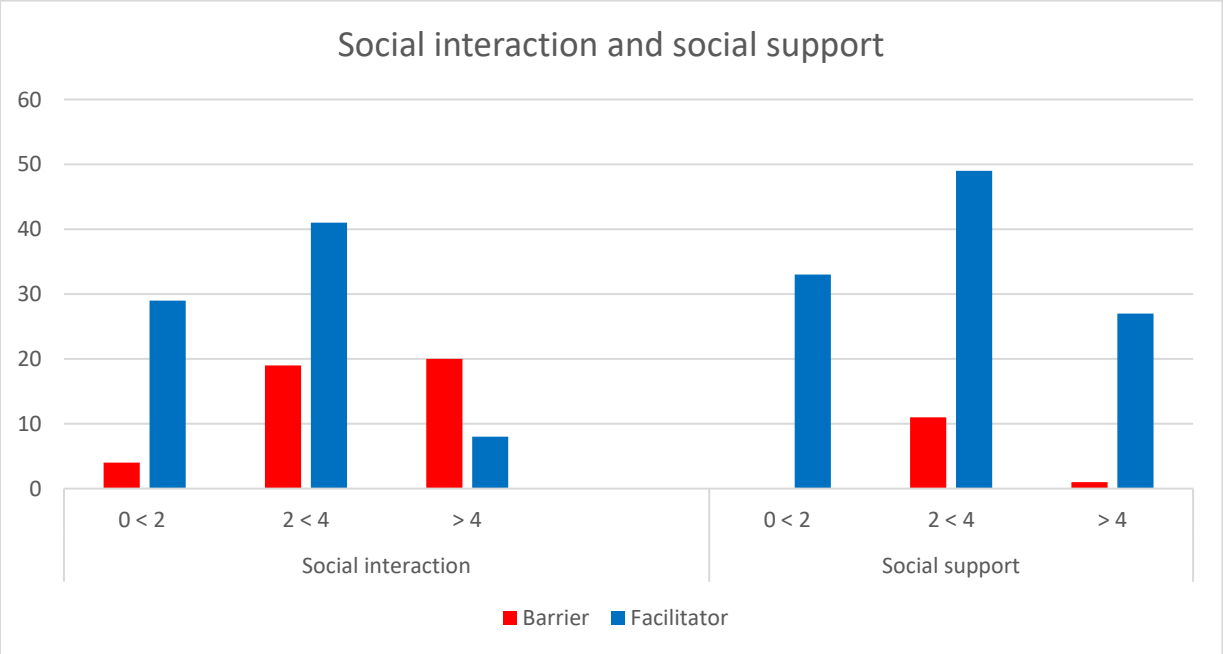

Figure 4.15: Barriers and facilitators of social interaction and social support

4.4.5 Social and economic systems

This section describes the influence of the social and economic systems on the occupational performance of participants during the performance of their daily activities. The components of current economic status, access to health services, assistive devices and governmental aid and support is included. Figure 4.16 displays the barriers and facilitators of the social and economic systems according to the participants' responses.

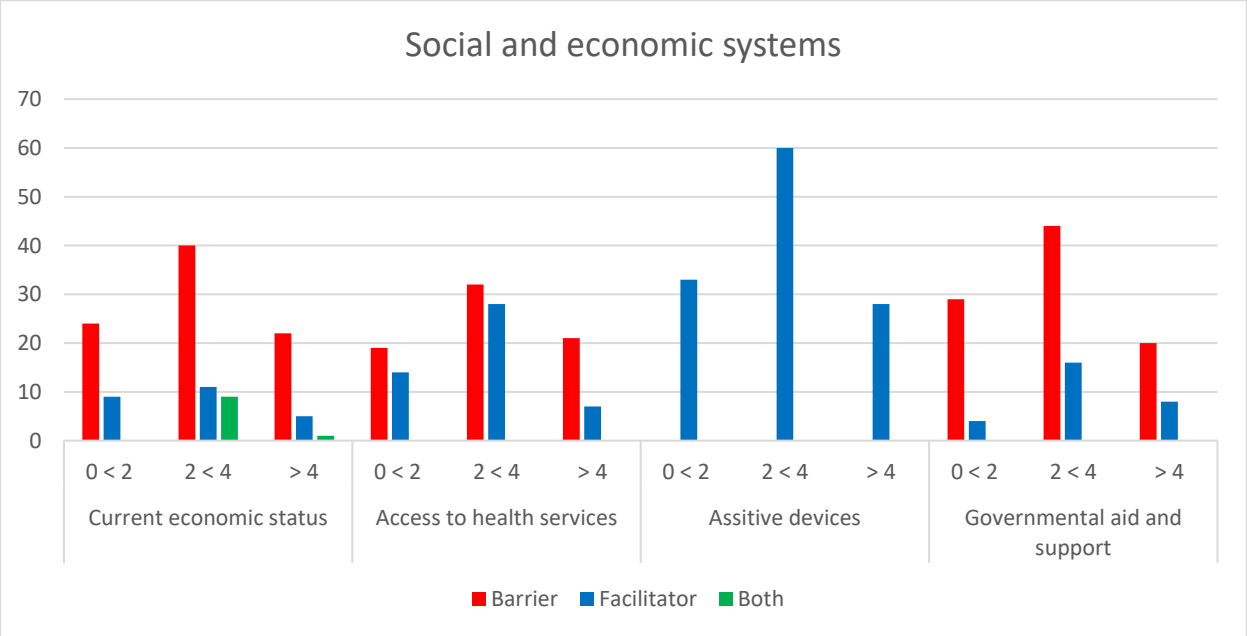

Figure 4.16: Barriers and facilitators of the social and economic systems

The majority of participants of all groups of participants 72.73% (n=24), 66.67% (n=40) and 78.57% (n=22) respectively, indicated that their current economic status is a barrier of their occupational performance. This correlates with the significant number of participants 99.17% (n=120) that indicated that they are currently unemployed (cf. 4.2.1). Most participants of all groups 57.58% (n=19), 53.33% (n=32) and 75% (n=21) respectively, also indicated that access to health services is a barrier of their occupational performance.

All participants of all groups indicated that their assistive devices is a facilitator of their

occupational performance. The results correlate with the large number 81.82% (n=99) of participants that indicated that they have a suitable assistive device (cf. 4.3.10).

Most participants of all groups of participants 87.88% (n=29), 73.33% (n=44) and 71.43% (n=20) respectively, indicated that the governmental financial aid or support received is a barrier of their occupational performance. This correlates with previous results (cf. 4.3.10) that showed that all groups of participants reported that their current financial situation is a barrier of their occupational performance.

4.5 Summary

This chapter presented the results of the research study in three sections. Section A described the demographic characteristics of the participants of the research study. The known barriers or facilitators of environmental factors (as identified in the PEOP model) and their influence on occupational performance was discussed in Section B. Section C compared the identified barriers or facilitators of occupational performance as it related to the time since previous inpatient rehabilitation and the interview date. Descriptive statistics, namely frequencies and percentages for categorical data were calculated and summarised in tables and charts throughout the chapter.

One hundred and twenty-one participants (n=121) formed part of this study. The majority of participants were male with a median age of 29 years. The overwhelming majority of participants at the time of the study were unemployed and lived in urban areas. One hundred and nineteen participants reported that they are wheelchair users.

In Section B, most participants reported that the physical layout of their home is a facilitator during the occupational performance of nine self-care activities and a barrier of the remaining three self-care activities. Most participants indicated that four of the six components of the design properties of the home are facilitators of occupational performance, while the remaining two components are barriers. All participants indicated that they could easily access public buildings in their area however, most participants indicated that the design and layout of public toilets is a barrier for them. Climate was found to be a barrier of occupational performance for most participants.

The value and importance of the components of the cultural environment was confirmed by all participants, who indicated that their religious beliefs and customs or traditions that they practice are facilitators in the occupational performance of their daily activities. Furthermore, an overwhelming number of participants indicated that they have experienced social prejudice by others, and it is a barrier of occupational performance. Most participants experienced a change in their economic status after their injury and stated that the governmental financial aid or support that they receive is a barrier and not enough to provide for their needs.

Section C compared the identified barriers and facilitators of occupational performance as they related to the time since previous inpatient rehabilitation. To quantify the results, the data was divided into three time periods post rehabilitation. Most results followed similar trends as the data discussed in Section B. Social acceptance became less of a barrier for participants over time, conversely, social prejudice by others increased as a barrier over time. The results pointed out that persons living with SCI in Saudi Arabia experience a large amount of social prejudice from others. Most participants of all groups also confirmed that their current economic status is a barrier of their occupational performance and that the governmental financial aid or support received is not enough to provide for their needs.

In the following chapter, the results of the study will be discussed and compared to relevant literature.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

The results of this study were comprehensively presented in Chapter Four with the aid of tables and figures. The results were presented in three sections. The first section provided an overview of the demographics of the participants. The second section illustrated the results of the first two objectives of the research study (cf. 3.2.2), namely identifying and describing the known environmental factors (as identified by the PEOP model) that were either a barrier or facilitator of occupational performance of persons living with SCI. The third section of the results compared the identified barriers and facilitators of occupational performance as related to the time since previous inpatient rehabilitation and date of interview.

A valuable amount of data was gained from participant responses, and this provided the researcher with numerous options for interpretation and analysis. The format of this discussion chapter will remain consistent with the format followed in Chapter Four. The aim of this study is to determine which known environmental factors (as identified by the PEOP model) are barriers or facilitators of occupational performance of persons living with SCI (cf. 3.2.1). The results presented in Chapter Four will be analysed and discussed and compared to relevant literature that will ultimately be used to answer the aim, research question and objectives of the research study.

5.2 Section A: Demographic description of the participants

The participants of this research study included 121 outpatients with spinal cord injuries. One hundred and nineteen participants – 98.35% (n=119), are wheelchair users, while only two participants – 1.65% (n=2), are not using wheelchairs for mobility. The two participants who are not wheelchair dependant presents with an incomplete AIS D neurological level according to the ASIA scale (cf 2.2.3) and are ambulating independently.

The majority of participants (90.08%) were found to be male. This was found to be consistent with data published by the WHO (2013), that males are most at risk for SCI in young adulthood than females. Alcohol consumption, driving behaviour and participating in high-risk sports are reasons for the higher incidence of SCI in males during young adulthood (WHO, 2013). Literature on frontal lobe development mentions that the frontal lobe of the brain is responsible for impulse control and it only fully matures “halfway through the third decade of life” (Johnson, Blum, & Giedd, 2009). This is widely touted as a contributing factor as to why this age group is most at risk for risk taking behaviour that may lead to MVAs. This also correlates with the results of Robert and Zamzani (2013), that Saudi Arabia has one of the highest rates of MVAs in the world among young adult drivers (cf. 2.2.2).

The median age of the participants in this study is 29 years. This correlates well with results of previous studies on similar subjects by Alshahri et al. (2012) and Al Jadid (2013), who found that the median age of SCI in Saudi Arabia is 29.5 years and 29.7 years respectively.

SCI has a debilitating effect on an individual and often results in activity and participation limitations in their daily lives due to their impairments (Biering-Sorenson et al., 2006). It is associated with lower rates of economic participation, with a global employment rate of only 37% (WHO, 2013). Many studies in literature support the results that there is a very high unemployment rate among persons living with SCI. This is consistent with the results of this study where most participants – 17% (n=99) indicated that they are unemployed. This may place an undue financial burden on the person living with SCI and their families and may have an influence on their quality of life post injury (Merritt, Taylor, Yelton, & Ray, 2019). This aspect is further explored later in this chapter.

5.3 Section B: Known environmental factors (as identified by the PEOP model) as barriers or facilitators of occupational performance

A person's environment has a major impact on the experience and extent of their disability (WHO, 2011). Inaccessible environments promote disability by creating barriers to participation and inclusion. The environment may therefore be a barrier or facilitator of occupational performance of persons living with SCI (Whiteneck et al., 2004). The environmental factors that are subsequently discussed, include the factors of the built environment, natural environment, cultural environment, social factors, and the social and economic systems influencing the occupational performance of persons living with SCI in Saudi Arabia.

5.3.1 Built environment

Christiansen and Baum (2015), view the environment as a space which includes physical aspects such as the built environment, products and technology, as well as the natural environment. For the person living with SCI, their physical environments may act as barriers or facilitators of participation during the occupational performance of their daily activities (WHO, 2013). It is therefore important to identify these barriers and facilitators, as they will have an important impact on the quality of life of the persons living with SCI (WHO, 2013). For this discussion, the built environment will be divided into the physical layout of the home, design properties of the home and design properties of public buildings.

5.3.1.1 Physical layout of your home

Physical properties and design considerations of the home are important aspects to consider in order to facilitate or enable the person living with SCI to perform their daily occupations (Christiansen & Baum, 2005; Turpin & Iwama, 2011). Table 4.2 (cf. 4.3.1.1) indicates a summary of participants' responses of the influence of the physical environment of the home during the performance of their self-care activities. Most participants indicated that the physical layout of their home is a facilitator during the performance of nine of the 12 self-care activities that were included in the research study. These self-care activities include: eating and drinking, washing and drying your

face, washing and drying your hands, brushing your teeth/cleaning your dentures, bathing and/or showering activities, brushing or grooming their hair activities, dressing of their upper body, dressing of their lower body and performing toileting activities (cf 4.3.1.1).

Many of the self-care activities mentioned above requires the layout of the home to include a suitable wash basin that facilitates the occupational performance of persons living with SCI. Regulations published by the Saudi Arabia Standards Organisation (SASO), stipulates that basins in homes should be 830 mm with a deviation of +- 5% measured from the “top of the rim at the front of the basin to the floor level” (SASO, 1999, p. 2). Furthermore, a position paper on universal accessibility published by the Prince Salman Center for Disability research, recommends that the mounting location of a basin for people with disabilities in Saudi Arabia should be 850 mm from the floor to the basin rim (Universal accessibility KSA, 2010). It is clear that there is a minimal difference between the building regulation basin height and recommended basin height for people with disabilities in Saudi Arabia. Therefore, if homes in Saudi Arabia adhere to the prescribed basin height regulation then this strongly supports the results of this study regarding the layout of the home as a facilitator of occupational performance in self-care activities.

The results also correlate with previously mentioned results (cf. 4.3.3), where all participants (n=121) indicated that their religious beliefs is a facilitator in the performance of their daily activities. Followers of Islam are required to perform an ablution routine to prepare themselves for prayer. This ablution routine includes the washing of the hands and face. Therefore, the physical layout of the home and the presence of a suitable wash basin mounting location, may facilitate the occupational performance of persons living with SCI during the performance of their spiritual activities.

Most participants reported that the physical layout of their home is a barrier during the performance of three of the 12 self-care activities that were included in the research study. This included the self-care activities of shaving a beard or applying makeup, washing and/or drying hair and the ability to move around the home.

With regards to washing and/or drying hair, and, participants mentioned that the basin was not suitable to wash their hair. No other information is available to the researcher to provide more clarity as to why the activities of washing and/or drying hair, and shaving a beard or applying makeup is so challenging for people living with SCI. This is a limitation of this research study and it is recommended that this aspect is futher investigated in future studies. To ensure that the person with SCI is able to perform the activity, it is the role of the OT to either provide an assistive device (cf 2.4.1) or to introduce alternative or compensatory techniques to facilitate occupational performance of washing hair. These intervention techniques used by the OT will need to be incorporated into the rehab programme for persons living with SCI.

Most participants indicated that moving around the home is a barrier of their occupational performance. Barriers that restrict mobility around the home lead to less participation and well-being among persons with SCI (Hertig-Godeschalk, Gemperli, Arnet, & Hinrichs, 2018). Mohanta et al. (2017), further identified the design of the home and the internal arrangement of furniture as barriers of wheelchair users to move around the home. This correlates with motivations provided by participants that their house is too small to move around in with a wheelchair. The results therefore show that the physical layout of the home is a barrier for participants when moving around their home, and taking the PEOP model (cf. 2.4.3.3) into consideration, this may prevent participation in their daily occupations and further affect the overall well-being of participants.

5.3.1.2 Design properties of your home

The home is widely regarded as the most important environment for persons living with SCI. It is therefore important that the home environment is accessible, comfortable and facilitates the occupational performance of daily activities (WHO 2013). The design of the home environment must be considered for accessibility, manageability, safety and aesthetics and all design considerations of an individual's environment should facilitate their occupational performance and participation (Christiansen & Baum, 2005). The design properties of the homes of persons living with SCI, may contain many barriers of occupational performance (Lysack,

Komanecky, Kabel, Cross, & Neufeld, 2007). Design properties such as the front door entrance, door accessibility, layout and design aspects of the bathroom and kitchen are commonly considered to be essential aspects to facilitate occupational performance (WHO, 2013).

The results of this study show that participants indicated that three of the four aspects of the design properties of their homes, are in fact facilitators of occupational performance in their daily activities. Only one aspect, the “design and layout of the kitchen” was found to be a barrier for most participants.

Seventy-three participants (60.33%) indicated that gaining access to the entrance of the front door of their home is a facilitator for them. Thirty-one participants (42.47%) further commented that they already had a ramp installed at home. Access to their front entrance was therefore already adapted to accommodate their disability and facilitate their occupational performance. This is consistent with the results of Hertig-Godeschalk et al. (2018), who reported that ramp installation was the most the commonly found home adaptation of people living with SCI in the US. It also correlates with Cho et al., (2016) who stated that the occupational performance of people with functional limitations improves after home modifications.

It is generally accepted that the design and layout of bathrooms may pose a significant barrier for persons living with SCI during their bathing and toileting activities (Radomski & Latham, 2014). A slight majority of participants 52.07% (n=63) indicated that the “design and layout of their bathroom” is a facilitator for them. This correlates with the previous results (cf. 4.3.1.1), where participants indicated that they have adaptations to their bathrooms in the form of a commode to facilitate the occupational performance of bathing and toileting activities. The results support the findings of Biering-Sorenson et al. (2006) and Keysor et al. (2006), who found that the most common bath/toilet aid used by persons living with SCI was a commode chair with wheels. It is thus clear that a large number of participants already have some home adaptations in the form of ramps and commodes that facilitate occupational performance. This is in accordance with Cho et al., (2016) and Hertig-Godeschalk et al. (2018), who mentions that

adaptations of the home can improve the occupational performance of persons living with SCI and promote participation in their daily activities. The results are also consistent with the view of O'Sullivan (2014), that persons living with SCI may have impairments that require structural adaptations and these structural adaptations may transform the design of the home to be a facilitator of occupational performance. The structural adaptations to the homes of the participants of the study therefore enabled the design of their home to be a facilitator of occupational performance and ensure participation.

Wheelchair users may face difficulties with the design and layout of the kitchen (Radomski & Latham, 2014). Activities such as meal preparation may be difficult to perform as kitchen counters are usually not adapted for wheelchair users. Persons living with SCI experience well-being when they are able to perform self-care activities such as meal preparation independently. Kitchen counters should be of a sufficient height for wheelchair users and the depth clearance should allow ample room to accommodate wheelchair leg rests (Radomski & Latham, 2014). The results show that the majority of participants 98.35% (n=119), indicated that the design and layout of the kitchen is a barrier of occupational performance. Many participant's commented that kitchen counters and cupboards were too high for them. This is consistent with the view of the researcher gained through home visits and treatment sessions with persons living with SCI, that kitchen counters are often too high and the depth too shallow to facilitate occupational performance. The Prince Salman Center for Disability research report (cf 2.4.3.3), recommends that the height of kitchen counter tops should be between 725-850 mm from the floor surface and make allowance for the wheelchair leg rests to facilitate occupational performance (Universal accessibility KSA, 2010). The results thus show that kitchen modifications need to be performed at participants homes that will facilitate their occupational performance and ensure participation. This is an important aspect that can integrated into the treatment intervention provided by OTs with persons living with SCI in Saudi Arabia.

5.3.1.3 Design of public buildings (e.g. malls, mosques, government buildings and hospitals)

In this study, public buildings include all the public places that the person living with SCI will most commonly frequent in their pursuit to perform the occupations of their daily activities. For this study, public buildings include malls, mosques, government buildings and hospitals.

As mentioned previously (cf. 5.3.1.2), physical environments must be considered for accessibility, manageability, safety and aesthetics (Christiansen & Baum, 2005, 2015). The inability to access public buildings may prevent the occupational performance of persons living with SCI (WHO, 2013). Universal design principles have emerged to guide stakeholders in the construction industry to consider architectural design principles that may guarantee access to public buildings for people with disabilities (Universal accessibility, 2010). It is a reality however, that many public buildings in countries around the world have multiple architectural barriers that may prevent access to public buildings (Mulazadeh & Al-Harbi, 2016). Verhoef and Roebroeck (2014) revealed that persons living with SCI may require many adaptations to their environments to accommodate their disabilities. Typical examples include ramps at the entrances of buildings, accessible doorways, accessible bathrooms, wheelchair friendly desks and counters, etc. (cf 2.4.3.3). These adaptations will facilitate the occupational performance of the person living with SCI.

For wheelchair users in Saudi Arabia, accessibility to public buildings is extremely poor and many architectural barriers exist restricting their participation in their daily activities (Mulazadeh & Al-Harbi, 2016). In contrast to this view, most participants of this study indicated they can easily access public buildings in their area. It is recommended that further studies be performed that will provide more insight of the reasons for ease of access to public buildings. The Saudi building code (SBC) adopted in 2007, includes accessibility regulations that include the minimum requirements that all buildings in Saudi Arabia should adhere to (SBC, 2007). The SBC only provides a general statement that “buildings and facilities should be accessible” for people with disabilities

(SBC, 2007, p. 9/2). It however does not define the exact specifications and measurements to ensure access for people with disabilities (Mulazadeh & Al-Harbi, 2016). The construction industry therefore does not have clear guiding principles on the exact requirements of accessible buildings, and this may not ensure adequate accessibility of all public buildings. It is important for OTs in Saudi Arabia to lobby for the inclusion of accessible building regulations in the SBC.

Although most participants indicated that they can easily gain access to public buildings, the results show that most participants indicated that access to public buildings is a barrier of occupational performance of their daily activities. Participants commented that all buildings do not have elevators available. This correlates with previous findings (cf. 4.3.1.2) where 52 participants (42.98%) indicated that access to higher floors in public buildings is a barrier of occupational performance in their daily activities. The SBC prescribes that “at least one accessible route shall connect each accessible level” in multi-level buildings and facilities (SBC, 2007, p. 9/3). The term “accessible route” is not clearly defined by the SBC and this may be open to own interpretation by construction industry stakeholders. The Prince Salman Center for Disability research recommends that lifts or elevators are considered part of “accessible routes” (Universal accessibility KSA, 2010). It is important that “accessible routes” for multi-level buildings and facilities should be well defined by the SBC, to ensure that all public buildings adhere to the recommended requirements in order to facilitate occupational performance and participation for all persons with SCI.

Consistent with previous research by Mulazadeh and Al-Harbi (2016) and Vissers et. al. (2008), 98.35% (n=119) of participants indicated that the design and layout of toilets in public buildings is a barrier of occupational performance. Participants motivated that “not all toilets are large enough to accommodate a wheelchair”. SBC does not clearly prescribe the exact measurement and specifications of accessible toilets in public buildings (SBC, 2007). The Prince Salman Center for Disability research report however provides clear technical guidelines for signage, entrance doors, floor space, floor surface and configuration of toilet fixtures and wash basins (Universal

accessibility KSA, 2010). It will be beneficial for persons living with SCI and other disabilities, if the recommendations provided by The Prince Salman Center for Disability research were included in the regulations of the SBC. As mentioned previously (cf. 2.4.3.3), the PEOP model shows that if the design of the built environment (environmental factor) is a barrier of occupational performance, then the participation and well-being of persons living with SCI will be negatively affected. Appropriate legislation will therefore ensure that design of the built environment will facilitate occupational performance which will in turn facilitate participation of persons living with SCI in Saudi Arabia.

5.3.2 The natural environment

Turpin and Iwama (2011) mention that the natural environment includes aspects such as terrain, hours of sunlight, climate and air quality. They hold the view that the natural environment may either be a barrier or facilitator of occupational performance of an individual with impairments. Saudi Arabia is a country known for its desert landscapes and extreme climate where temperatures can soar up to 54°C during summer months.

Persons living with SCI suffer from many physical complications. Autonomic dysfunction is a complication of SCI that may result in hyperthermia or hypothermia due to an impaired internal thermoregulatory response to outside temperatures (O'Sullivan et al., 2014). The impaired temperature regulation of persons living with SCI is due to a reduced sensory input to the temperature regulating centres of the brain and the loss of sympathetic control of temperature and sweat regulation below the level of injury (Nas, 2015). Impaired temperature regulation results in reduced participation in activities of daily living and a lower quality of life and may therefore be regarded as a barrier of occupational performance of persons living with SCI (Round et al., 2017). The results of the study indicate that more than half of participants (52%) reported that the climate was a barrier in the performance of their daily activities. Participants motivated that it was too hot to go outside in summer and that during summer it is difficult to perform activities outside of the home. It is clear that the extreme temperatures in Saudi Arabia coupled with the impaired temperature regulation may cause hypothermia for persons living with SCI and is therefore

regarded as a barrier of occupational performance. This correlates well with the reluctance of participants to venture outside during the summer months in Saudi Arabia, which may in turn affect the occupational performance of their daily activities.

Persons living with SCI will have significant health care needs throughout their lives (WHO, 2013). WHO (2013) recommends that all countries endeavour to build a strong healthcare system that can provide for all the needs of the persons living with SCI. Robert and Zamzani (2013) state that although Saudi Arabia has a very well-developed health care system, health services are mostly located in urban areas and this may affect the access that the person living with SCI has to health services. The results of the study show that 65% (n=79) of participants reported that the geographical location of their home is a facilitator of their occupational performance. This correlates well with the majority of participants (cf. 4.2.1), that indicated that they reside in urban areas and therefore have better access to health care facilities (cf. 4.4.5). Living in an urban area can thus be regarded as a facilitator of occupational performance for persons living with SCI in Saudi Arabia.

Approximately half of all participants 50.41% (n=61) indicated that terrain around their home is a facilitator in the performance of their daily activities, while 49% (n=60) of participants indicated that the terrain around their home is a barrier in the performance of their daily activities. This correlates with results regarding the type of terrain (cf 4.4.2), where 55% (n=67) of participants indicated that they have asphalt around their homes and 44% (n=54) of participants indicated that they have loose sand around their home. From the researcher's experience during home visits and assessments during rehab sessions of persons living with SCI in Saudi Arabia, it is easier for wheelchair users to move around the outside of their home with a paved or asphalt surface than it is moving around a home with loose sand. It is important for persons living with SCI that are wheelchair users to have a suitable surface around the home with e.g. a paved or asphalt surface as this will facilitate movement around the outside the home and in turn improve occupational performance and participation in their daily activities.

5.3.3 The cultural environment

According to Turpin and Iwama (2011), the environment includes the tangible and intangible aspects of the context within in which people engage in their occupations. They are of the opinion that spirituality and culture are regarded as the intangible aspects of the environment. The cultural environment includes the values, beliefs, customs and behaviour of an individual that is passed on from one generation to the next (Christiansen & Baum, 2015). It also includes norms, cultural orientation, as well as preferences and shapes perspective and attitude towards the choice of occupation. A large emphasis is placed on the role of spirituality and religion as important aspects of occupational performance that may improve health outcomes and quality of life (Thompson, Gee, & Hartje, 2018). People express their spirituality through their beliefs, values, traditions and practices (Mthembu, Wegner, & Roam, 2017).

The people of Saudi Arabia are very religious and fiercely proud of their culture and traditions (cf 2.3). This is reflected in the performance of some occupations in their daily lives such as feeding and toileting. The performance of these ADL tasks is strongly influenced by their religious belief in Islam (cf 2.3). The followers of Islam are directed to eat with the right hand due to religious reasons and are required to perform an ablution routine following toilet use. Mthembu et al. (2017) is of the opinion that a strong sense of spirituality may lead to increased coping mechanisms to deal with crisis, better stress control and improved social, mental and emotional health. This view is also shared by Jones, Dorsett, Simpson and Briggs (2018), that agree that the role of spirituality for persons living with SCI is important in providing support and to help to cope with the injury.

The importance that religious beliefs, as well as customs and traditions form in the lives of the participants is clearly reflected in the results of the research study (cf 4.3.3). All participants (n=121) indicated that their religious beliefs is a facilitator in the performance of their daily activities. All participants 100% (n=121), also indicated that their customs and traditions are facilitators in the performance of their daily activities. The results correlate well with previously mentioned results (cf. 4.3.1.3), where most participants indicated they are able to easily access public buildings including

mosques in their area. Access to mosques for persons living with SCI in Saudi Arabia ensures occupational performance and participation in their spirituality while practicing their religious beliefs. This in turn will improve well-being and provide social support for persons living with SCI to better cope with the challenges of their disability (Marini & Glover-Graf, 2011; Thompson et al., 2018). It is thus clear that religious beliefs, as well as culture and traditions are important facilitators of occupational performance and participation for persons living with SCI in Saudi Arabia.

5.3.4 Social factors

Christiansen and Baum (2005) state that humans are social beings and the standing of the individual within a group and the importance of interpersonal relationships will fundamentally influence their behaviour and attitude towards themselves. Individuals also require social interaction with others. During interaction with others, social acceptance is sought by all and social rejection and isolation may have a negative effect on the well-being of an individual. Social factors therefore contribute immensely to the health and well-being of an individual and may serve as barriers or facilitators of occupational performance and participation (Christiansen & Baum, 2015). Four important social factors namely social acceptance, social prejudice, social support and social interaction were included in this study.

A study by Babamohamadi et al. (2011), on participants with a similar background (as the participants of this study), the authors found that social acceptance is a barrier for persons living with SCI. The participants of their study commented that the negative attitude of the public hindered their acceptance in society, which in turn negatively influenced their social interaction with others in society and ultimately lead to social isolation. Levins et al. (2004), further state that a negative social attitude and acceptance toward persons living with SCI is a significant barrier of occupational performance and participation. As mentioned previously (cf. 4.3.4.1), 56.2% (n=68) of the participants indicated that social acceptance by others is a problem for them and a further 44 participants (36.36%) stated that social acceptance by others is a barrier of occupational performance. These results directly correlate with previously mentioned results (cf. 4.3.4.2), where 43 participants (35.54%) indicated that social

interaction with others was a barrier in the performance of their daily activities. The results of social acceptance and social interaction also correlate with the findings of Robert and Zamzani (2013), that persons living with SCI in Saudi Arabia experience a low quality of life due to social isolation. The results of the study therefore confirm that if social acceptance and social interaction with others is a barrier of occupational performance, it will ultimately result in poor participation in the daily activities of persons living with SCI in Saudi Arabia.

Literature emphasises that social support is central to a person as they engage in the complexities of life (Christiansen & Baum, 2015). The amount of social support required by an individual differs from person to person and the outcomes contribute to their health and well-being (Turpin & Iwama, 2011). Social support can be provided by friends, family or the community at large, however, to be effective, social support should be received as positive, supportive and helpful by the individual (Christiansen & Baum, 2005, 2015; Turpin & Iwama, 2011). Babamohamadi et al. (2011), further mention that the supportive networks of friends and family are important in the lives of persons living with SCI and facilitate coping with a spinal injury.

The results of this study revealed that the majority of participants (n=109) reported that the social support received by others is a facilitator in the performance of their daily activities. Participants commented that their friends and family are very supportive. These comments correlate well with comments by participants in the study by Babamohamadi et al. (2011). The results also correlate well the results of social interaction (cf. 4.3.4.2), where 64.46% (n=78) of participants indicated that social interaction with others was a facilitator in the occupational performance of their daily activities. The results therefore confirm that social support and support interaction may facilitate occupational performance and participation of persons living with SCI in Saudi Arabia.

In WHO (2013), it is mentioned that negative attitudes towards persons with SCI and prejudice by family members or society may be a barrier and restrict participation and undermine their quality of life. Consistent with this view, Newman (2010) and Babamohamadi et al. (2011), found that persons living with SCI experienced prejudice

and it is a barrier in their daily lives. Social prejudice may therefore negatively affect the occupational performance and participation of persons living with SCI in their daily activities. Previously mentioned results (cf. 4.3.4.1) showed that a vast majority of participants 85.95% (n=104), indicated that they have experienced social prejudice from others; 44.63% (n=54) of participants furthermore indicated that social prejudice by others is a barrier for them in the performance of their daily activities. The results therefore show that persons living with SCI in Saudi Arabia experience social prejudice and that this is a barrier of their occupational performance. It also reaffirms with PEOP literature (cf. 2.4.3.3), that if social prejudice is found to be a barrier for the persons living with SCI then their occupational performance and participation will be negatively affected.

5.3.5 Social and economic systems

SCI is a debilitating condition that may result in financial strain for persons living with SCI (Merritt et al., 2019). Persons living with SCI will require ongoing medical care, assistive devices, as well as rehabilitation from the time of their injury throughout the rest of their lives (Pendleton & Shultz-Kron, 2013). The initial and ongoing costs associated with the disease may therefore be significant for both the individual and their families (WHO, 2013). Christiansen and Baum (2015) are of the opinion that social and public policies in the external environment can either provide support or restrict the occupational performance of an individual. The prevailing economic conditions and the availability of resources that form part of the social landscape are important factors for an individual with a disability. It influences the availability and access to much needed health services.

Literature reveals that persons with SCI may experience a significant change in their economic status post injury (Merritt et al., 2019; WHO, 2013). They may be unable to cope with the additional healthcare costs associated with their disease and this places an undue burden on the individual and their families (WHO, 2013). Employment rates for persons living with SCI are low in most countries and this affects their quality of life and well-being (Merritt et al., 2019; WHO, 2013). The results of this study revealed that 59% (n=72) of participants experienced a change in their economic status after

their injury. Furthermore, 71.07% (n=86) of participants indicated that their current economic status is a barrier of their occupational performance. This correlates with the significant number of participants 99.17% (n=120) that indicated that they are currently unemployed (cf. 4.2.1). The results also correlate with the high number of participants 76% (n=93) that indicated that the governmental financial aid or support that they receive is a barrier in the performance of their daily activities (cf 4.3.10). The results substantiate the view of Robert and Zamzani (2013), that the quality of life of persons living with SCI in Saudi Arabia are affected by their declining financial status and lack of employment opportunities. It is thus clear that persons living with SCI in Saudi Arabia experiences a change in change in their economic status post injury and this a barrier of the occupational performance.

The WHO (2013) mentions that persons living with SCI have specialised healthcare, rehabilitation and assistive technology needs. Health systems need to respond and provide appropriately for the needs of persons living with SCI. The government of Saudi Arabia provides free health services to all citizens and residents residing in the country (cf 2.3). Almalki et al. (2011), furthermore state that Saudi Arabia has a relatively high level of healthcare and the Saudi health care system is ranked 26th among 190 of the world's health systems (cf. 2.3). The results show that more than half of the participants 53% (n=64), reported that they were not able to easily access health care services. Furthermore, fifty-nine per cent of participants (n=72) reported that access to health services was a barrier of their occupational performance. The results are in stark contrast to the health policy of the Saudi Arabia, that medical services should be free and accessible for all its citizens. Although health services are free, admission to health facilities are governed by individual facility admission policies and this may have an influence on the access persons living with SCI has to health facilities. This, however, should not prevent participants from accessing healthcare services in Saudi Arabia.

OTs use assistive devices to rehabilitate and compensate for disabilities (Radomski & Latham, 2014). This is consistent with the view of the authors of WHO (2013), who indicated that access to wheelchairs and other assistive technologies can facilitate

persons living with SCI to perform the everyday activities that they would otherwise be unable to perform e.g. feeding, dressing, bathing, mobility, etc. It allows persons living with SCI to be mobile in their communities and may facilitate occupational performance and participation in their daily lives. Eighty-two per cent of participants (n=99) indicated that they have suitable assistive devices and therefore it is not surprising that all participants indicated their assistive device is a facilitator for them in the performance of their daily activities. This correlates well with previous results (cf. 4.3.1.1), where more than half of the participants indicated that they have an assistive device in the form of a commode to aid their performance of ADL activities, such as bathing/showering and toileting activities. It is thus clear that persons living with SCI in Saudi Arabia have suitable assistive devices and this facilitates their occupational performance and participation in their daily activities.

5.4 Section C: Barriers and facilitators to occupational performance as it relates to time since inpatient rehabilitation

This section will discuss the results of the study to compare the identified barriers or facilitators of occupational performance, as it relates to the time since participants received previous inpatient rehabilitation to the date of interview. As in Chapter Four (cf 4.4), the results discussed will be divided into three time periods post previous inpatient rehabilitation. The time periods represented below will subsequently be referred to as group A, B and C. All environmental factors as suggested by the PEOP model (cf. 2.4.3.3), will be integrated in the discussion.

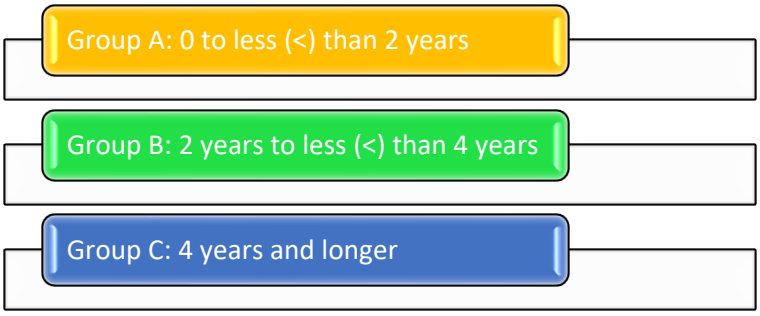

Figure 5.1: Time periods since rehabilitation

The results will be discussed according to the barriers and facilitators of occupational performance affecting each group since inpatient rehabilitation to the date of interview. All environmental factors as suggested by the PEOP model (cf. 2.4.3.3), will be integrated in the discussion.

5.4.1 Group A and B:

In this section, the results will be discussed according to the environmental barriers and facilitators of occupational performance affecting group A and B since previous inpatient rehabilitation to the date of interview. The discussion of group A and B is combined due to the similarities found in the results between the two groups.

The effect of the physical layout of the home on the occupational performance of 12 self-care activities were evaluated for persons living with SCI, as it relates to time since previous inpatient rehabilitation. A similar trend was observed in five self-care activities which include:

- eating and drinking activities
- washing and drying your face
- washing and drying your hands
- brushing your teeth/cleaning your dentures
- bathing and/or showering activities.

More than half of the participants of group A and B indicated that the physical layout of the home is a facilitator of occupational performance. As mentioned previously (cf. 5.3.1.1), there is minimal difference between the regulated basin height (according to the SASO) in participant homes and the recommended basin height (according to the Prince Salman Center for Disability research report) for people with disabilities in Saudi Arabia. Appropriate basins are therefore a facilitator for the wheelchair users while performing many of the self-care activities mentioned above.

The results of bathing and showering for group A and B is consistent with the large number of participants that indicated that they have a commode chair at home (cf. 4.3.1.1). As mentioned in Section 5.3.1.1, wheelchair users often require adaptations

to their bathrooms such as bath chairs or commodes, to facilitate bathing and toileting activities and consistent with the results, it will facilitate occupational performance of bathing and showering activities (Radomski & Latham, 2014).

The remaining four self-care activities include:

- brushing or grooming your hair
- dressing your upper body
- dressing your lower body
- performing toileting activities.

All participants of group A and B indicated that the physical layout of their home is a facilitator of occupational performance. Biering Sorensen et al. (2009) and Keysor et al. (2006), mention that the most common home aid to facilitate the occupational performance of toilet activities of persons living with SCI are commodes. This is consistent with results discussed previously (cf. 5.3.1.1), where the majority of participants indicated that they have a commode at home. The participants of group A and B should therefore not experience any problem with the occupational performance of their toileting activities.

In the remaining two self-care activities which include: shaving your beard or applying make-up, and washing and/or drying your hair, most participants of group A and B indicated that the physical layout of the home is a barrier of occupational performance. This is in direct contrast to other results mentioned above. As mentioned previously (5.3.1.1) no other information is available to the researcher to provide more clarity as to why the activities of washing and/or drying hair, and shaving a beard or applying makeup is so challenging for people living with SCI. This is a limitation of this research study and it is recommended that this aspect is futher investigated in future studies.

Lysack et al. (2007), mention that access to the home is commonly regarded as a barrier of occupational performance for persons living with SCI. This view is consistent with the participants of group A that indicated that access to the entrance of the front door is a barrier for them. The results show that participants of group A do not have any adaptations in the form of a ramp to aid access to the entrance of the front door.

Access to their front entrance moves from a barrier to a facilitator of occupational performance for the participants of group B. This correlates with previous results mentioned in Section 4.4.1.2, where most participants indicated that there is a ramp installed at their home. The access to their front entrance is already adapted to accommodate their disability and this facilitates their occupational performance and participation in their daily activities. It is clear from the results that many participants from Group A do not have any adaptations to the front entrance whereas many participants of group B have adaptations to the front entrance of their homes. Adaptations in the form of a ramp changes access to the front entrance of the home from a barrier to facilitator of occupational performance. It is therefore important for OTs to advise persons living with SCI that are wheelchair users to have a ramp installed to the front entrance of their home (if required) as soon as possible to facilitate occupational performance.

Radomski and Latham (2014) state that most homes do not have kitchens that are adapted for wheelchair users and they may face difficulties with meal preparation, as kitchen counters do not have sufficient height and depth clearance. Radomski and Latham (2014) further mention that persons living with SCI experience well-being, when they are able to perform self-care activities such as meal preparation independently. Therefore, kitchen counters should be of a sufficient height for wheelchair users and the depth clearance should allow ample room to accommodate wheelchair leg rests. Participants of Group A and B indicated that the kitchen in their home is a barrier of their occupational performance during meal preparation activities which correlates strongly with the literature mentioned above. From the results it is clear that OTs should advise persons living with SCI to adapt their kitchen cupboards and counters to an appropriate level to facilitate occupational performance.

The design and layout of bathrooms may pose a significant barrier for persons living with SCI during their bathing and toileting activities (Radomski & Latham, 2014). More than half of the participants of group A and B indicated that the design and layout of the bathroom in their home is a facilitator of their occupational performance. This correlates with results reported previously (cf. 4.4.1.1), where most participants of

group A and B indicated that the physical layout of the home is a facilitator of occupational performance during bathing and showering activities.

Consistent with results reported previously (cf. 4.4.1.2), the overwhelming majority of the participants of groups A and B indicated that the type of toilet in their home is a facilitator during the performance of their toileting activities. This can be ascribed to the fact that most participants (cf. 4.3.1.2) indicated that they already have adaptations to their toilets in the form of a commode to facilitate their occupational performance in toileting activities.

The inability to access public buildings may restrict the occupational performance of daily living activities of persons living with SCI (WHO 2013). Therefore, the design considerations of an individual's environment should enable or accommodate their occupational performance (Christiansen & Baum, 2005, 2015). The effect of the design of public buildings (malls, mosques, government buildings and hospitals) on the occupational performance of persons living with SCI in group A and B is discussed below.

Mulazadeh and Al-Harbi (2016) states that the accessibility of public buildings for wheelchair users in Saudi Arabia is extremely poor, and many architectural barriers exist restricting their participation in their daily activities. Most participants of group A and B indicated they are able to access public buildings easily. No further comments were provided by participants to elaborate the reasons for ease of access to public buildings. The results are thus in contrast to the findings of Mulazadeh and Al-Harbi (2016). However, the findings of Mulazadeh and Al-Harbi (2016) were based on field observations of the authors of randomly selected public buildings and did not include the subjective view of the wheelchair user, as is the case with this study. A limitation of this study is that the questionnaire did not specify what access to public buildings entail. It is a recommendation for futher studies to be performed on access to public buildings in Saudi Arabia.

Although most participants of group A and B indicated that they are able to access public buildings easily, in contrast, most participants of group A and B indicated that

access to public buildings is a barrier of their occupational performance. Participants commented that all buildings do not have elevators available. These results correlate with results mentioned previously (cf. 4.4.1.3), where the majority of participants of group A and B indicated that access to higher floors in public buildings is a barrier of their occupational performance. If wheelchair users are unable to ascend to higher floors due to the unavailability of elevators, it will surely restrict their occupational performance. As mentioned previously (cf. 5.2.1.3), the Saudi Building Code (SBC) prescribes that one accessible route should connect each level in multi-level buildings and facilities, however it does not clearly define what an “accessible route” is (SBC 2007). The Prince Salman Center for Disability recommends that lifts or elevators are considered part of “accessible routes” (Universal accessibility KSA, 2010). In correlation with the discussion of similar results in the previous section (cf. 5.3.1.3), it is clear that not all public buildings in Saudi Arabia ensure access and facilitate the occupational performance of persons living with SCI.

Vissers et al. (2008) state that the design and layout of public toilets is a barrier of the occupational performance for persons living with SCI during the performance of their toileting activities. Consistent with the previous results (cf. 4.4.1.3), participants of group A and B indicated that the design and layout of toilets in public buildings is a barrier of their occupational performance. This correlates with previously discussed results (cf. 5.3.1.3), where most participants indicated the design and layout of toilets in public buildings is a barrier of occupational performance. It is clear from the results that public toilets are a barrier of occupational performance for persons living with SCI in Saudi Arabia.

O’Sullivan et al. (2014) state that persons living with SCI may suffer from autonomic dysfunction that may impair their internal thermoregulatory responses to outside temperatures. Consistent with the discussion in the previous section (cf. 5.3.2), participants of group A and B indicate that climate is a barrier of their occupational performance. In correlation with the discussion in Section 5.3.2, the impaired temperature regulation of persons living with SCI results in reduced participation in activities of daily living and may therefore be regarded as a barrier of occupational

performance of persons living with SCI (Nas 2015, O'Sullivan et al., 2014; Round et al., 2017).

The participants of group A and B reported that geographical location and the terrain around the home is a facilitator of their occupational performance. This correlates with the view of the overwhelming number of participants who indicated that they reside in an urban area (cf. 4.2.1), where, according to Robert and Zamzani (2013), the public infrastructure is more suited to persons living with SCI.

The cultural environment includes the values, beliefs, customs and behaviour of an individual that is passed on from one generation to the next (Christiansen & Baum, 2015). The role of spirituality and religion are important aspects of occupational performance that may improve health outcomes and quality of life (Thompson et al., 2018). In correlation with the discussion in the previous section (cf. 5.3.3), all participants of group A and B indicated that their religious beliefs, as well as their customs and traditions are a facilitator of their occupational performance. In accordance with the discussion in Section 5.3.3, there are many benefits of a strong sense of spirituality which include support, increased coping mechanisms to deal with crisis, better stress control and improved social, mental and emotional health (Jones et. al., 2018; Mthembu et al., 2017). It is thus clear from the results that religious beliefs, as well as culture and traditions are important facilitators of their occupational performance and participation for persons living with SCI in Saudi Arabia.

Humans are social beings and the importance of interpersonal relationships will fundamentally influence their behaviour and attitude towards themselves (Christiansen & Baum, 2005). Social factors contribute immensely to the health and well-being of an individual and may serve as barriers or facilitators of occupational performance and participation (Christiansen & Baum, 2015). Social acceptance is a barrier for persons living with SCI and a negative social attitude and acceptance towards persons living with SCI is a significant barrier of occupational performance and participation (Babamohamadi et al., 2011; Levins et al., 2004). The results of this study show that social acceptance became less of a barrier for participants over time (cf. 4.4.4.1). Most of the participants of group A indicated that social acceptance by

others is a barrier of their occupational performance. In contrast to group A, the participants of group B, indicated that social acceptance by others is a facilitator of social acceptance. The results thus show that persons living with SCI feel more socially accepted by society over time after approximately two years post previous inpatient rehabilitation.

Social support is central to a person as they engage in the complexities of life (Christiansen & Baum, 2015). The amount of social support required by an individual differs from person to person and the outcomes contribute to their overall health and well-being (Turpin & Iwama, 2011). Participants of group A and B indicated that the social support received by others is a facilitator of their occupational performance. In consensus with the results, Babamohamadi et al. (2011), agree that the supportive networks of friends, family and other people living with SCI are facilitators of coping with a spinal injury. Furthermore, Bhattarai, Maneewat and Sae-Sia (2018), state that persons living with SCI who receive more social support display higher resilience. This is an important attribute that helps individual cope and adjust to the consequences of a traumatic event such as SCI. OTs should take cognisance and integrate this important aspect in their treatment interventions and should encourage social support of family and friends.

SCI may result in considerable financial strain for persons living with SCI (Merritt et al., 2019). Persons living with SCI will require ongoing medical care, assistive devices, as well as rehabilitation from the time of their injury for the rest of their lives (WHO, 2013). The prevailing economic conditions and the availability of resources are important factors for an individual with a disability, as they influence the availability and access to much needed health services (Christiansen & Baum, 2015). Persons living with SCI experience a significant change in their economic status post injury (Merritt et al., 2019; WHO, 2013). Most participants of group A and B indicated that their current economic status is a barrier of their occupational performance. This directly correlates with the overwhelming majority of participants that are currently unemployed (cf 4.2.1). Employment rates in most countries are low for persons living with SCI and this negatively affects their quality of living and well-being (Merritt et al.,

2019; WHO ,2013). Social and public policies in the external environment of a country can either support or restrict occupational performance (Christiansen & Baum, 2015). Therefore, the above results also correlate with the overwhelming number of participants of group A and B that indicated that the governmental financial aid or support that they receive is a barrier of their occupational performance (cf 4.4.5). The results substantiate the view of Robert and Zamzani (2013), that the quality of life of persons living with SCI in Saudi Arabia are affected by their declining financial status and lack of employment opportunities. Furthermore, it is also consistent with the view of Babamohamadi et al. (2011) and (Merritt et al., 2019), that persons living with SCI experience a decline in their financial status and this may be a barrier of occupational performance in their daily activities.

Persons living with SCI have specialised healthcare, rehabilitation and assistive technology needs (WHO, 2013). Health systems need to respond and provide appropriately for the needs of persons living with SCI. As discussed previously (cf 5.3.5), the government of Saudi Arabia has a good healthcare system that provides free health services to all its citizens (Almalki et al., 2011). Interestingly, the results show most participants of group A and B indicated that access to health services is a barrier of their occupational performance (cf. 4.4.5). As discussed previously (cf 5.3.5) health services in Saudi Arabia are free however admission to health facilities are governed by individual facility admission policies and this may have an influence on the access a person living with SCI may have to health facilities. This, however, should not prevent participants from accessing healthcare services when required.

As mentioned previously (cf 4.2.1), the overwhelming majority of participants identified that they are wheelchair users. Access to wheelchairs and other assistive technologies can enable persons living with SCI to perform everyday activities that they would otherwise be unable to perform (WHO, 2013). It allows persons living with SCI to be mobile in their communities and may facilitate occupational performance in their daily lives. The results of the study show that participants of group A and B indicated that their assistive devices are suitable for them and are facilitators of their occupational performance (cf. 4.4.5). The results correlate with previous results (cf 4.4.1.1), where

more than half of participants indicated that they have an assistive device in the form of a commode to aid the occupational performance of their ADL activities, such as bathing/showering and toileting activities.

5.4.2 Group C: Four years and longer

In this section, the results of the barriers and facilitators of the environmental factors (as identified by the PEOP model) on the occupational performance and participation of group C will be discussed.

In contrast to group A and B, the participants of group C indicated that the physical layout of the home is a barrier of the occupational performance of the following five self-care activities which include:

- eating and drinking activities
- washing and drying your face
- washing and drying your hands
- brushing your teeth/cleaning your dentures
- bathing and/or showering activities.

The researcher did not find any studies that correlate the occupational performance of self-care activities and the physical design of the home, therefore an objective comparison with the results of this study could not be performed. However, in the researcher's subjective experience working with many persons living with SCI, a decline is seen in the independence of self-care activities in some persons living with SCI over time. This can be due to many factors such as the occurrence of secondary complications e.g. spasticity, pain, pressure ulcers, as well as a decreased mobility over time (Ramakrishnan, 2014). This view is also consistent with Vissers et al. (2008), who state that persons living with SCI experience a decline over time in physical activity after discharge from the hospital. This decline in functional status may be responsible for a decline in the occupational performance of self-care activities.

In two self-care activities which include: shaving your beard or applying make-up and washing and/or drying your hair, the majority of the participants of group C indicated

that the physical layout of the home is a facilitator of occupational performance. This is in direct contrast to other results mentioned above. The researcher did not find any studies that correlate the occupational performance of these self-care activities and the physical design of the home, therefore an objective comparison with the results of this study could not be performed.

More than half of the participants of group C indicated that the design and layout of the bathroom of their home is a barrier for them. The results thus show that four years after rehabilitation, the design and layout of the bathroom moved from a facilitator to a barrier of occupational performance. No reasons for this change were provided by the participants. A possible reason may be due to the occurrence of secondary complications and a decline in functional abilities which may cause decreased mobility of persons living with SCI over time (Ramakrishnan, 2014, Vissers et al., 2008).

The geographical location and the terrain around the home changed from a facilitator for group A and B to a barrier of occupational performance for group C. This may correlate with the view of Vissers et al. (2008), that persons living with SCI experience a decline over time in physical activity and may therefore be unable to move as freely around outside the home as before. The results thus show that four years and longer post inpatient rehabilitation, the geographical location and the terrain around the home became a barrier of occupational performance for persons living with SCI in Saudi Arabia.

The WHO (2013) mentions that negative attitudes towards persons with SCI and prejudice by family members or society may be a barrier of occupational performance and restrict participation in daily activities. The results show that many participants of all time periods, indicated that social acceptance by others is a problem for them (cf 4.4.1.1). Furthermore, the results show that social acceptance becomes less of a barrier for participants over time (cf 4.4.1.1). It is thus clear that persons living with SCI in Saudi Arabia feel more socially accepted by society over time.

The results indicate that all groups of participants experience social prejudice as barrier over time (cf 4.4.1.1). Social prejudice experienced is less of a barrier for group

A as compared to group B and group C. The results therefore show that persons living with SCI in Saudi Arabia experience a large amount of social prejudice from others. This finding is confirmed by Newman (2010) and Babamohamadi et al. (2011), that persons living with SCI experience prejudice and it is a barrier of their occupational performance and participation.

Babamohamadi et al., (2011) found that social participation of persons living with SCI declines over time. A similar phenomenon was found in this study, where participants of group A and B indicated that social interaction with others is a facilitator of their occupational performance, while most participants of group C indicated that social interaction with others is a barrier of the occupational performance in their daily activities. Social interaction therefore became a barrier for participants four years post inpatient rehabilitation.

All groups of participants indicated that the social support by others is a facilitator for them in the performance of their daily activities. Social support is central to a person as they engage in the complexities of life and the outcomes contribute to their overall health and well-being (Turpin & Iwama, 2011; Christiansen & Baum, 2015).

As mentioned previously (cf 5.4.1), persons living with SCI will require ongoing medical care, assistive devices, as well as rehabilitation from the time of their injury for the rest of their lives (WHO, 2013). The prevailing economic conditions and the availability of resources are important factors for an individual with a disability, as they influence the availability and access to much needed health services (Christiansen & Baum, 2015). Consistent with most participants of group A and B, participants of C indicated that their current economic status is a barrier of their occupational performance. This is confirmed by Robert and Zamzani (2013), that the quality of life of persons living with SCI in Saudi Arabia are affected by their declining financial status and lack of employment opportunities.

The results show that consistent with group A and B, participants of group C indicated that access to health services is a barrier of their occupational performance (cf. 4.4.5). All groups of participants also indicated that their assistive devices are suitable for

them and are facilitators of their occupational performance (cf. 4.4.5). Persons living with SCI require specialised healthcare, rehabilitation and assistive technology (WHO, 2013). Health systems need to respond and provide appropriately for the needs of persons living with SCI (cf 5.3.5). The results thus show that all groups of participants have similar experiences with regards to their social and economic systems in Saudi Arabia. This is an important recommendation of this study for OTs in clinical practice to include in their therapeutic intervention with persons living with SCI in Saudi Arabia.

5.5 Summary

This chapter presented the discussion of the results of the research study. The discussion was divided into three sections namely, the demographic description of the participants, the known environmental factors (as identified by the PEOP model) as barriers or facilitators of occupational performance, and the barriers and facilitators of occupational performance as it relates to time since previous rehabilitation. In each section, the results were presented and compared to relevant literature. The following chapter will highlight the limitations and the value of the study and will propose recommendations for OTs and future research opportunities.

CHAPTER SIX: CONCLUSION

6.1 Introduction

In the previous chapter, the research results were discussed in accordance with relevant literature. In this chapter, the conclusions and recommendations gained from this study will be encapsulated. It will provide an overview of the entire research study journey and suggest opportunities that may exist for further study and exploration.

6.2 Conclusions

The aim of this study was to determine which known environmental factors (as identified by the PEOP model) influenced the occupational performance of persons living with SCI in Saudi Arabia. The following conclusions were derived from the results of the study in order to satisfy the aim of the research study. The conclusions will be discussed according to the three objectives of the research study as outlined previously (cf. 3.2.2).

6.2.1 Objective 1 and 2: To distinguish and describe which known environmental factors (as identified by the PEOP model) were either a barrier or facilitator of occupational performance of persons living with SCI

6.2.1.1 Built environment

The results of the influence of the physical layout of the home on the occupational performance of twelve daily self-care activities shows that the home is a facilitator in nine self-care activities namely:

- Eating and drinking activities
- Washing and drying the face
- Washing and drying hands
- Brushing teeth/cleaning dentures
- Brushing or grooming hair
- Bathing and/or showering activities

- Dressing upper body
- Dressing lower body
- Performing toileting activities

For the self-care activities (mentioned above) that requires the use of a basin, it was found that the basin height in participant homes is appropriate to facilitate the self-care activities. For the self-care activities of bathing/showering and toileting activities more than half the participants indicated that they have a commode chair at home which is regarded as a common adaptation for wheelchair users.

The results further show the physical layout of the home is barrier during the occupational performance of the remaining three daily self-care activities namely:

- Washing and/or drying hair
- Shaving your beard or applying make up
- Ability to move around the home

The results show that the following design properties of the home are facilitators of occupational performance.

- Gaining access to the entrance of the front door
- Gaining access to all doors in the home
- Type of toilet

A large number of participants indicated that there was already a ramp installed at the entrance of their home to accommodate their disability and facilitate their occupational performance.

The design and layout of the kitchen is regarded as a barrier of occupational performance by the participants as the kitchen counters and cupboards are too high and the depth too shallow to accommodate for the footrests of a wheelchair to facilitate occupational performance and participation. As the majority of the participants indicated that they are wheelchair users it is clear why this is a barrier for participants.

The results show that participants can easily access public buildings such as malls,

mosques, hospitals and government buildings in their area, however access to public buildings is a barrier of their occupational performance. Participants commented that all buildings do not have elevators available which is a barrier for them when they need to access higher floors. Most participants also indicated that the design and layout of toilets in public buildings is a barrier of their occupational performance and motivated that toilets were not large enough to accommodate a wheelchair.

6.2.1.2 The natural environment

Participants indicated that the geographical location of their home and type of terrain is a facilitator of their occupational performance. Participants however, indicated that the climate is a barrier of their occupational performance. Their comments included that it was “too hot to go outside in summer” and that “during summer it was difficult to perform activities outside of the home”.

6.2.1.3 The cultural environment

Religious beliefs and customs or traditions are two important factors that form part of the cultural environment of the persons living with SCI that were included in this study. Compellingly, all participants indicated that their religious beliefs and customs or traditions are facilitators of their occupational performance. These participants motivated that their religious beliefs provide support for them. This is a very significant conclusion derived from this study as it points to the importance that religious beliefs and customs or traditions occupy in the lives of persons living with SCI in Saudi Arabia.

6.2.1.4 Social factors

Social acceptance, social prejudice, social interaction and social support were the components of social factors that were addressed in this research study. The results show that most participants indicated that social acceptance by others is a problem for them. Not surprisingly, a large number of participants further indicated that social acceptance by others is a barrier of their occupational performance and motivated that they are not accepted by all people. Participants indicated that they have previously

experienced social prejudice from others and further indicated that social prejudice by others is a barrier for them of their occupational performance. As seen by the results, the social rejection and isolation that persons living with SCI in Saudi Arabia experience may have a devastating effect on their well-being and participation in their daily activities.

Participants indicated that social interaction and the social support by others is a facilitator of their occupational performance. The study however did not distinguish between the social interaction and the social support received from the family and society. This can be regarded as a shortcoming of this study.

6.2.1.5 Social and economic systems

The results show that participants indicated that they experienced a change in their economic status after their injury and furthermore indicated their current economic status is a barrier of occupational performance.

Participants indicated that they were not able to easily access health care services, and that this is a barrier of occupational performance in their daily activities.

The participants indicated that they currently have a suitable assistive device, and this is a facilitator of their occupational performance.

A significant number of participants also indicated that they received a form of governmental financial aid or support however, the aid or support received is a barrier of their occupational performance as the amount received is not enough to accommodate for the change in financial status and loss of income.

6.2.2 Objective 3: To compare the identified barriers or facilitators of occupational performance as it relates to time since inpatient rehabilitation

The third objective of this study was to compare the identified barriers or facilitators of occupational performance as it relates to time since inpatient rehabilitation. The results were divided into three time periods (group A, B and C) since inpatient rehabilitation

received from the date of interview.

6.2.2.1 Built environment

The results show that participants of group A and B indicated that the physical layout of the home is a facilitator of occupational performance in five self-care activities namely:

- eating and drinking activities
- washing and drying your face
- washing and drying your hands
- brushing your teeth/cleaning your dentures
- bathing and/or showering activities.

Consequently, participants of group C indicated that the physical layout of the home is a barrier of the occupational performance of the self-care activities mentioned above. The results thus show that the occupational performance of participants for the self-care activities mentioned above, changed after four years since receiving inpatient rehabilitation from a facilitator to a barrier of occupational performance.

All three groups of participants indicated that the physical layout of the home is a facilitator of occupational performance of the following self-care activities:

- brushing or grooming their hair activities
- dressing of their upper body
- dressing of their lower body
- performing toileting activities.

With regards to the effect that design properties of the home has on occupational performance, the participants of group A indicated that access to the entrance of the front door is a barrier of occupational performance. It however, changed to a facilitator of occupational performance for the participants of group B and C. The results show that participants of group A do not have any adaptations in the form of a ramp to aid access to the entrance of the front door.

More than half of the participants of group A and B indicated that the design and layout of the bathroom in their home is a facilitator of their occupational performance.

All groups of participants indicated that the type of toilet in their home is a facilitator during the performance of their toileting activities. All groups of participants also indicated that they already have adaptations to their toilets, in the form of a commode, to facilitate their occupational performance during toileting activities.

All groups of participants indicated that the kitchen in their home is a barrier of their occupational performance during meal preparation activities.

Participants of all groups indicated that they are able to access public buildings easily, however in contrast, most participants of all groups indicated that access to public buildings is a barrier of their occupational performance.

All groups of participants indicated that the design and layout of toilets in public buildings is a barrier in their occupational performance.

6.2.2.2 The natural environment

The results show that geographical location of the home changed from a facilitator to a barrier of occupational performance over time. Participants of group A and group B indicated that the geographical location of their home is a facilitator, while participants of group C indicated the geographical location of their homes is a barrier of occupational performance.

All groups of participants mentioned climate as a barrier of their occupational performance.

The results also show that the terrain around the home is a facilitator for the participants of group A, however, this changed to a barrier for group B and group C which possibly points to a declining functioning level of participants to manage the terrain outside the home with a wheelchair.

6.2.2.3 The cultural environment

All participants of all groups indicated that their religious beliefs, as well as their customs and traditions is a facilitator of their occupational performance. It is thus clear from the results that religious beliefs, as well as culture and traditions are important facilitators of occupational performance and participation for persons living with SCI in Saudi Arabia.

6.2.2.4 Social factors

Social acceptance became less of a barrier for participants over time. Participants of group A indicated that social acceptance by others is a barrier, whereas group B and group C indicated that social acceptance is a facilitator of occupational performance for the participants. The results thus show that persons living with SCI feel more socially accepted by society after two years since receiving previous inpatient rehabilitation.

All groups of participants indicated that they have experienced social prejudice by others. The results indicate that social prejudice experienced as a barrier by participants increased over time. The results therefore point out that persons living with SCI in Saudi Arabia, experience a large amount of social prejudice from others and this is a barrier of their occupational performance.

All groups of participants indicated that the social support received by others is a facilitator of their occupational performance.

The results indicate that social interaction with others became more of a barrier of occupational performance over time. Participants of group A and B indicated that social interaction with others is a facilitator of occupational performance and this changed to a barrier four years after receiving inpatient rehabilitation. The results thus show that persons living with SCI interact less socially with others over time.

6.2.2.5 Social and economic systems

All groups of participants indicated that their current economic status is a barrier of their occupational performance. This directly correlates with the overwhelming majority of participants that are currently unemployed.

All groups indicated that access to health services is a barrier of their occupational performance.

The results of the study show that all groups of the participants indicated that their assistive devices are suitable for them and it is a facilitator of their occupational performance. Participants of all groups also indicated that the governmental financial aid or support that they receive is a barrier of their occupational performance.

6.3 Limitations of the Study

A few limitations were identified by the researcher during the course of the research study:

- The participants of the study were only sampled from one healthcare institution.
- As this is the only study of its kind performed on persons living with SCI in Saudi Arabia, the results could not be compared to other studies.
- The research population consisted mostly of males and therefore findings heavily favour the experiences and perceptions of males living with SCI in Saudi Arabia.
- The study relied on the subjective reporting of participant perceptions. Due to the subjective nature of responses, certain questions of the questionnaire may therefore have been regarded as ambiguous by the participants and this may have had an influence on the results.
- The study did not consider the differences between the effect of the environmental factors on participants with quadriplegia and paraplegia as well as complete and incomplete injuries.
- Measurement errors of the questionnaire were detected in the questions of the social factors with regards to the word “others”. The questions did not adequately distinguish whether “others” referred to the family or to society. The questionnaire

also did not specify what “access to public buildings” entail.

- Some motivations provided by the participants did not adequately describe why the certain environmental factors were chosen as barriers or facilitators.

6.4 Value of the Study

Limited research exists in the field of Occupational Therapy on the Saudi Arabia population and many research studies need to be performed to better understand this population. As far as the researcher is aware, no other research studies have been performed in Saudi Arabia to determine the effect of environmental factors on the occupational performance and participation of persons living with SCI in Saudi Arabia.

As these concepts have not been previously explored in Saudi Arabia, the information gained from this study will provide invaluable information to OT practitioners, as well as relevant stakeholders. Identifying the environmental barriers and facilitators of occupational performance of persons living with SCI, will aid OT practitioners and other stakeholders during the development of intervention and social planning and to create a supportive environment that facilitates participation and well-being.

The identified barriers and facilitators can also be regarded as predictors of occupational performance of persons living with SCI in Saudi Arabia.

6.5 Recommendations

Recommendations that arose from the outcomes of this research study will be made on the impact for OT practice, institutional level, governmental level and opportunities for future research:

6.5.1 Impact for OT practice

- The research study shows that the PEOP model may be used as an effective model of practice to guide OTs during their intervention, to improve the occupational performance and participation of persons living with SCI.
- The study shows that the physical layout and design of the home environment has a significant impact on the occupational performance of self-care activities

for persons living with SCI.

- OTs therefore need to perform a thorough home and environment assessment and provide advice to persons living with SCI, to ensure that the physical layout and design of the home is a facilitator of their occupational performance.
- The results confirm that assistive devices e.g. commodes aid occupational performance in self-care activities. It is therefore important that persons living with SCI must be provided with suitable assistive devices.
- When prescribing assistive devices OTs have to consider the natural environment and terrain around the home of persons living with SCI to facilitate their occupational performance.
- From the results of the study, it is clear that religious beliefs, as well as culture and traditions, are important facilitators for persons living with SCI in Saudi Arabia. The OT should take cognisance of this and incorporate it during their treatment interventions to ensure that persons living with SCI can participate in their cultural events and meet their spirituality needs.
- Effective social interaction and social support by others may be used by OTs to overcome occupational performance barriers faced by people living with SCI in Saudi Arabia.
- OTs should consider incorporating vocational rehabilitation initiatives to decrease the level of unemployment amongst persons living with SCI.
- OTs should advocate and lobby for better environmental access and adaptations for persons living with SCI in Saudi Arabia.

6.5.1 Institutional level

- The results confirm that assistive devices e.g. commodes aid occupational performance in self-care activities. It is therefore imperative that the institution provide persons living with SCI with suitable assistive devices.
- The importance that religious beliefs, as well as customs and traditions form in the lives of the participants is clearly reflected in the results of the research study. The institution should ensure that this is important aspect is incorporated

into the inpatient rehabilitation program.

- From the results many participants show a decline in functional level after two to four years post inpatient rehabilitation. It is therefore recommend that the facility investigate the possibility of a follow up inpatient rehabilitation admission for persons living with SCI to improve the occupational performance and participation in their daily activities.
- Social support and social interaction initiatives should be incorporated during inpatient rehabilitation admissions for persons living with SCI.
- The facility should ensure that persons living with SCI have easy access to health and rehabilitation services.
- The facility should advocate and lobby for better environmental access and adaptations for persons living with SCI in Saudi Arabia.

6.5.2 Governmental level

- Policymakers will need to address the high unemployment rate among persons living with SCI in Saudi Arabia.
- Policymakers in Saudi Arabia will have to ensure that all public buildings are accessible for all disabilities to enable occupational performance and participation in their daily activities.
- Policymakers in Saudi Arabia will have to ensure that all public buildings have accessible and adapted toilets for all disabilities to enable occupational performance and participation in their daily activities.
- The government of Saudi Arabia needs to adopt the recommendations of the Prince Salman Center for Disability research on universal accessibility into the SBC, to ensure that all public buildings and facilities are accessible for people with disabilities.
- Stakeholders should ensure that social support programmes are available for persons living with SCI to encourage social support and social interaction with others.
- Stakeholders should embark on a public education programme to discourage social prejudice of persons living with SCI in Saudi Arabia.

- Stakeholders should consider initiatives to decrease the level of unemployment amongst persons living with SCI in Saudi Arabia.
- Stakeholders should investigate the financial impact on persons living with SCI following their injury and provide more adequate financial support.
- Policy makers should ensure that all persons living with SCI have suitable access to health and rehabilitation services if required.

6.5.3 Future research

- Research studies with a qualitative design can be conducted on the same population focusing on the lived experience of persons living with SCI exploring in detail the environmental factors impacting their occupational performance and participation in their daily activities.
- To reflect a more representative view of persons living with SCI in Saudi Arabia, the researcher recommends comparative studies that include more participants from rural areas, as well as females. This will provide better insight of the impact of environmental factors on the occupational performance of persons living with SCI.
- The researcher recommends that similar studies be performed on persons living with other disabilities in Saudi Arabia e.g. stroke and TBI.
- The role of spirituality on the resilience of persons living with SCI in Saudi Arabia, may be a fascinating future study that may be further explored.
- Research studies exploring the occupational performance of persons living with SCI who are unemployed and how this impacts their quality of living (QOL).
- More comprehensive studies investigating the built environment and it's impact on persons living with SCI in Saudi Arabia.

6.6 Conclusion

The aim of the research study was to determine which known environmental factors (as identified by the PEOP model) influences the occupational performance of persons living with SCI. A significant amount of data was collected from the participants and presented in the previous chapters in order to achieve the research aim and

objectives. It is the researcher's firm belief that the implementation of the recommendations from this study will positively impact the occupational performance, participation and well-being of persons living with SCI in Saudi Arabia. Furthermore, it is the hope of the researcher that the recommendations gained from this study will further aid relevant stakeholders and policymakers to ease the plight of persons living with SCI in Saudi Arabia.

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APPENDIX A

QUESTIONNAIRE

Date	
Participant number	
Neurological level (ASIA scale)	

Instructions: You will be asked a series of questions. Please provide your answer accordingly. The researcher/fieldworker will note your responses. Please remember that there are no incorrect answers. Answer based on your personal experience.

1.1. Gender

Male	
Female	

1.2 What is your age?

1.3 What is your current marital status?

Single	
Married	
Divorced	
Widow	

1.4 What is the date of your spinal injury?

1.5 When was the last time that you received inpatient rehabilitation?

1.6 What is your current occupation?

1.7 What was your occupation prior to your spinal injury?

1.8 Where is your home located?

Urban area	
Rural area	

1.9 What type of home do you currently live in?

Villa	
Apartment	
Others (Please specify)	

1.10 How many floors does your home have?

One floor	
Two or more floors	

Section 2: Built environment

Read the paragraph below to the participant before commencing this section.
Important: Ensure that the participant understands the concepts before proceeding.

2.1 Physical layout of your home

Occupational performance can be defined as all the activities that you perform daily. This includes self-care activities, work or school activities, leisure or free time activities and social participation activities.

Barriers in this questionnaire refers to anything that prevents the occupational performance of your daily activities.

2.1.1 Is the physical layout of your home a barrier or facilitator when you are performing your eating and drinking activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.1.2 Is the physical layout of your home a barrier or facilitator when you are washing and drying your face?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.1.3 Is the physical layout of your home a barrier or facilitator when you are washing and drying your hands?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.1.4 Is the physical layout of your home a barrier or facilitator when you are brushing your teeth/cleaning your dentures?

Barrier	
Facilitator	
Both	
Not applicable	

Motivate your response: _____
_____

2.1.5 Is the physical layout of your home a barrier or facilitator when you are brushing or grooming your hair?

Barrier	
Facilitator	
Both	
Not applicable	

Motivate your response: _____
_____

2.1.6 Is the physical layout of your home a barrier or facilitator when you are shaving your beard or applying make-up?

Barrier	
Facilitator	
Both	
Not applicable	

Motivate your response: _____
_____

2.1.7 Is the physical layout of your home a barrier or facilitator when you are either bathing and/or showering?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.1.8 Is the physical layout of your home a barrier or facilitator when you are washing and/or drying your hair?

Barrier	
Facilitator	
Both	
Not applicable	

Motivate your response: _____
_____

2.1.9 Is the physical layout of your home a barrier or facilitator when you are dressing your upper body (this includes donning and doffing of any garment in your preferred position)?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.1.10 Is the physical layout of your home a barrier or facilitator when you are dressing your lower body (this includes donning and doffing of any garment or pants in your preferred position)?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.1.11 Is the physical layout of your home a barrier or facilitator when you are performing toileting activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.1.12 Is the physical layout of your home a barrier or facilitator when you are required to move around the home?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.2 Design properties of your home

2.2.1 Is gaining access to the entrance of the front door to your home a barrier or facilitator for you? (the entrance is defined as the area leading up to but not including the front door)

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.2.2 Are you a wheelchair user?

Yes	
No	

Motivate your response: _____
_____

2.2.3 Is gaining access to all doors in your home a barrier or facilitator for you?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.2.4 Is gaining access to the higher floors in your home (as identified in 1.10) a barrier or facilitator for you?

Barrier	
Facilitator	
Both	
Not applicable	

Motivate your response: _____
_____

2.2.5 Is the design and layout of the bathroom a barrier or facilitator for you when you are performing your bathing and/or showering activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.2.6 What type of toilet do you have in your home?

Arabic toilet	
Western toilet	
Both	

Motivate your response: _____
_____

2.2.7 Is the type of toilet (as identified in 2.2.4) a barrier or facilitator for you when you are performing toileting activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.2.8 Is the design and layout of the kitchen a barrier or facilitator for you when you are preparing a meal?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.3 Design of public buildings (e.g. malls, mosques, government buildings and hospitals)

2.3.1 Are you able to easily access malls in your area?

Yes	
No	

Motivate your response: _____
_____

2.3.2 Are you able to easily access mosques in your area?

Yes	
No	

Motivate your response: _____
_____

2.3.3 Are you able to easily access government buildings?

Yes	
No	

Motivate your response: _____
_____

2.3.4 Are you able to easily access hospitals?

Yes	
No	

Motivate your response: _____
_____

2.3.5 Is access to any of the public buildings (as mentioned above) a barrier or facilitator in your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.3.6 Are you able to access the higher floors in public buildings easily?

Yes	
No	

Motivate your response: _____
_____

2.3.7 Is access to the higher floors in public buildings (as mentioned in 2.3) a barrier or facilitator for you in your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

2.3.8 Is the design and layout of toilets in public buildings (as mentioned above) a barrier or facilitator for you in your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____

Section 3: The Natural environment

3.1 Is the geographical location of your home a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

3.2 What type of terrain do you have around your home?

Loose sand	
Stones	
Paved/asphalt area	

Motivate your response: _____
_____

3.3 Does the terrain around your home provide a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

3.4 Does the climate provide a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

Section 4: The cultural environment

4.1 Is your religious beliefs a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

4.2 Are the customs or traditions you practice a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

Section 5: Social factors

5.1 Is social acceptance by others a problem for you?

Yes	
No	

Motivate your response: _____
_____

5.2 Is social acceptance by others a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

5.3 Have you ever experienced social prejudice from others?

Yes	
No	

Motivate your response: _____
_____

5.4 Is social prejudice by others a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

Section 6: Social interaction

6.1 Does social interaction with others provide a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

6.2 Is social support by others a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

Section 7: Social and economic systems

7.1 After your injury, did you experience a change in your economic status?

Yes	
No	

Motivate your response: _____
_____

7.2 Is your current economic status a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

7.3 Are you able to easily access health services, if required?

Yes	
No	

Motivate your response: _____
_____

7.4 Is access to health services a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

7.5 Do you currently have a suitable assistive device? If no, please specify in the comments section.

Yes	
No	

Motivate your response: _____
_____

7.6 Is access to suitable assistive devices a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

7.7 Do you currently receive any governmental financial aid or support?

Yes (if yes answer 7.7)	
No	

Motivate your response: _____
_____

7.8 Is the governmental financial aid or support that you currently receive a barrier or facilitator for you in the performance of your daily activities?

Barrier	
Facilitator	
Both	

Motivate your response: _____
_____

Thank you for participating in this research study. Your cooperation is highly appreciated.

APPENDIX B

INFORMATION LETTER FOR THE PARTICIPANT

- **English**
- **Arabic**

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA
UFS UV

INFORMATION LETTER

Title: PEOP related environmental factors and occupational performance of persons with spinal cord injury in Saudi Arabia

Dear participant

I am an Occupational therapist currently pursing my postgraduate studies in Occupational Therapy. A part of the postgraduate studies is to perform a research project.

In the field of Occupational Therapy, the term “Occupation” is regarded as any meaningful activities that people perform in their daily lives. The performance of occupations is referred to as “occupational performance”. People with spinal cord injury may experience problems in their occupational performance. The objective of the study will be to identify the environmental factors that are either barriers or facilitators of occupational performance in people with spinal cord injury.

I would like to invite you to participate in this study and provide valuable insight into the topic mentioned above. **There are no known risks** involved for participants of this study, and **no remuneration** will be provided. You will be required to complete a questionnaire as well as an interview with a qualified Occupational Therapist. The questionnaire will not require any preparation. The interview will last approximately 30-45 minutes. Your identity and the information you provide will remain completely confidential. The findings will only be used for educational purposes and not for any personal gain. The findings of this research study will be published in an academic journal. You will also receive feedback of the study results via post.

All efforts will be made to ensure that personal information is kept confidential.

Absolute confidentiality however cannot be guaranteed. Personal information may be disclosed if required by law. **Participation is voluntary**, and you may withdraw from the study at any time.

If you have any further questions or queries, please do not hesitate to contact any of the following people:

Mr. Yarmon Moonsamy at King Fahad Medical City, Occupational Therapy department, Rehabilitation Hospital, First floor, Room 1063. He can also be contacted at 0553776263 during office hours.

Mrs Azette Swanepoel, Occupational Therapy Department, Faculty of Health Sciences, University of the Free State. She can also be contacted at +27514013078 during office hours.

Mrs Heleen van Wyk, Physiotherapy Department, Faculty of Health Sciences, University of the Free State. She can also be contacted at +27514013739 during office hours.

Ms MA Mulondo, University of the Free State, Faculty of Health Sciences, Health Sciences Research Ethics Coordinator (HSREC). She can be contacted on +27 51 401 7795 during office hours

خطاب معلومات

(PEOP)-العوامل البيئية ذات الصلة والأداء الوظيفي لأشخاص لديهم إصابة في الحبل الشوكي بالمملكة العربية السعودية.

عزيزي المشارك

أنا أخصائي علاج وظيفي وأتابع حاليا در اساتي فوق الجامعية في العلاج الوظيفي، علما أن جزءا من الدراسات فوق الجامعية هو القيام بمشروع بحث.

في مجال العلاج الوظيفي، فإن المصطلح " وظيفة" يعتبر أي أنشطة ذات معنى يقوم بها الناس في حياتهم اليومية وأن أداء الوظائف يشار إليه بـ " أداء وظيفي ". إن الأشخاص الذين لديهم إصابة في النخاع الشوكي قد تواجههم مشكلات في أدائهم الوظيفي. إن الهدف من الدراسة هو التعرف على العوامل البيئية التي قد تكون إما عوائق أو مسهلات للأداء الوظيفي لأشخاص لديهم إصابة في النخاع الشوكي.

أود أن أدعوكم للمشاركة في هذه الدراسة وتقديم رؤية قيمة في الموضوع المذكور أعلاه. لا توجد هنالك اخطار معلومة تتعلق بالمشاركين في هذه الدراسة، كما لا يتم تقديم أتعاب أو مكافأة. إنه سوف يكون مطلوبا منك تعبئة استبيان هذا بجانب مقابلة مع أخصائي علاج وظيفي مؤهل علما أن الاستبيان لا يحتاج لأي تحضير وسوف تستمر المقابلة لفترة ما بين 30-45 دقيقة تقريبا. سوف تبقى هويتك والمعلومات التي تقدمها سرية تماما، كما يتم استخدام النتائج فقط لأغراض تعليمية وليس لأي كسب شخصي ويتم نشر نتائج البحث في دورية أكاديمية كما انك سوف تحصل على تغذية مرتدة عن الدراسة بواسطة البريد.

تبذل كل الجهود لضمان أن تبقى المعلومات الشخصية في سرية، ومع هذا لا يتم ضمان سرية مطلقة حيث انه يجوز الإفصاح عن المعلومات السرية إن كان ذلك مطلوبا بالقانون. إن **المشاركة طوعية**، ويجوز لك لأن تنسحب من الدراسة في أي وقت.

يمكنك الحصول على مزيد من المعلومات من الباحث الرئيسي، يارمون مونسامي. إن كانت لديك أسئلة تتعلق بحقوقك كمفحوص في البحث، فإنه يمكنك الاتصال على مكتب مجلس المراجعة المؤسسية بمدينة الملك فهد الطبية على الرقم 288-9999 (011) تحويلة 26913

APPENDIX C

INFORMATION LETTER FOR MANANGEMENT

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA
UFS UV

INFORMATION LETTER

Title: PEOP related environmental factors and occupational performance of persons with spinal cord injury in Saudi Arabia

To whom it may concern

I am currently enrolled for a Magister degree in Occupational Therapy at the University of Free State (South Africa). A part of the postgraduate studies is to perform a research project.

Previous research studies have found that people with spinal cord injuries may experience problems in their occupational performance of their daily occupations. The objective of this study will be to identify the environmental factors that are either barriers or facilitators of occupational performance in people with spinal cord injury.

The study will be conducted on patients with spinal cord injury that have previously received rehabilitation intervention from our facility. Participation is voluntary. The participant will be required to complete a questionnaire as well as an interview with a qualified Occupational Therapist. The questionnaire will not require any preparation by the participant. The interview and test will last approximately 30-45 minutes. The identity of the participant will remain completely confidential during the entire research process. The results will only be used for educational purposes and not for any personal gain.

If there are any further questions or queries, please do not hesitate to contact any of the following people: Mr. Yarmon Moonsamy at King Fahad Medical City, Occupational Therapy department, Rehabilitation Hospital, First floor, Room 1063. He can also be contacted at 0553776263 during office hours. Mrs Azette Swanepoel, Occupational Therapy Department, Faculty of Health Sciences, University of the Free State. She can also be contacted at (051) 4013078 during office hours. Ms MA Mulondo, University of the Free State, Faculty of Health Sciences, Health Sciences Research Ethics Coordinator (HSREC). She can be contacted on +27 51 401 7795 during office hours

……...

Yarmon Moonsamy

Researcher

APPENDIX D

INFORMED CONSENT FOR PARTICIPANT

- English
- Arabic

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA
UFS UV

CONSENT TO PARTICIPATE IN RESEARCH

Informed consent for research subject

Prospective research participant: Please read this consent form carefully and ensure that you understand everything stated in this document. If you are unsure about anything contained in this document, please do not hesitate to contact Mr. Moonsamy (the researcher). You may ask as many questions as possible before you decide to participate in the study. Remember that your participation in the study is voluntary and no remuneration will be provided.

Name of the participant:

……

Project information:

Project title:	**Title: PEOP related environmental factors and occupational performance of persons with spinal cord injury in Saudi Arabia**
Researcher:	Mr. Y Moonsamy
Location:	King Fahad Medical City, Riyadh Saudi Arabia
Phone number:	0553776263

Procedures: The participant will be required to complete a questionnaire as well as an interview with an Occupational Therapist. No preparation will be required by the participant. The process will last approximately 30-45 minutes.

Signature of the participant:	
Signature of the researcher:	
Signature of the fieldworker:	

Disclaimer: King Fahad Medical City and the researcher will in no way be held responsible for any harm or personal loss incurred during the research project.

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

UFS UV

موافقة مسبقة على موضوع بحث

مشارك محتمل في بحث:
نرجو قراءة نموذج الموافقة هذا بعناية وتأكد أنك قد فهمت أي شيء وردج بيانه في هذه الوثيقة. إن كنت غير متأكد بشأن أي شيء ورد في هذه الوثيقة، نرجو الا تتردد في الاتصال على السيد/ مونسامي (الباحث). يمكنك أن تسأل أي اسئلة قبل أن تقرر المشاركة في الدراسة. تذكر أن مشاركتك في الدراسة طوعية ولا يتم تقديم اتعاب حيال ذلك.

اسم المشارك:

معلومات المشروع:

اسم المشروع	(PEOP)–العوامل البيئية ذات الصلة والأداء الوظيفي لأشخاص لديهم إصابة في الحبل الشوكي بالمملكة العربية السعودية.
الباحث	السيد/ ي. مونسامي
المقر	مدينة الملك فهد الطبية الرياض المملكة العربية السعودية
رقم الجوال	0553776263
الإجراءات:	يطلب من المشارك تعبئة استبيان بجانب إجراء مقابلة مع أخصائي علاج وظيفي علما أنه ليس مطلوبا أي تحضير من المشارك وأن العملية سوف تستغرق حوالي 30-45 دقيقة.
توقيع المشارك	
توقيع الباحث	
توقيع العامل الميداني	

APPENDIX E

CONSENT FORM FOR MANGEMENT

Appendix E: Consent Form for Management

Date:
Dr. Adel Al Dajani
Medical Director
Rehabilitation Hospital
King Fahad Medical City
Riyadh

Re: Permission to Conduct Research Study

Dear Dr. Adel

I have recently enrolled for a Magister degree in Occupational Therapy at the University of Free State (South Africa). A part of the studies requires me to complete a research project. I am humbly requesting permission to conduct the research project on the KFMC Rehabilitation Hospital premises. The topic of the study is: **PEOP related environmental factors and occupational performance of persons with spinal cord injury in Saudi Arabia.** The objective of the study will be to identify the environmental factors that may be barriers or facilitators of occupational performance of persons with spinal cord injuries.

The participants will be required to complete a questionnaire as well as an interview with an Occupational Therapist from our department. The questionnaire will not require any preparation by the participant. The interview and questionnaire will last approximately 30-45 minutes. Participation is voluntary and will pose no risks to the participants of this study. The identity of the participant will remain completely confidential during the entire research process.

The results of the research could be incorporated in our rehabilitation program to ensure that the occupational performance of our patients with spinal cord injury does not deteriorate after discharge from the rehabilitation hospital.

Your approval to conduct this study will be greatly appreciated.

Kind Regards

.....
Yarmon Moonsamy
Researcher

Approved by:

Dr. Adel A. AlDajani
Medical Director
Rehab Hospital

21 MAR 2019

.....
Dr. Adel Al Dajani
Medical Director
Rehabilitation Hospital
King Fahad Medical City

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