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**Exploring Quality of Life Perceptions Among Pre-Clinical and Clinical Phases
Saudi Medical Students**

by

Olfat Gushgari

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Submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy (PhD) in Health Sciences

Seton Hall University

2020

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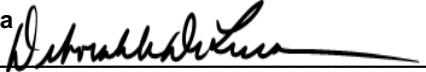
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SETON HALL UNIVERSITY
School of Health and Medical Sciences

APPROVAL FOR SUCCESSFUL DEFENSE

Doctoral Candidate, **Olfat Gushgari**, has successfully defended and made required modifications to the text of the doctoral dissertation for the Ph.D. during the **Fall Semester 2020**

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Dedication

I would like to dedicate this dissertation to my father, Yousef, for always believing in me and supporting my education.

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Abstract

Exploring Quality of Life Perceptions Among Pre-Clinical and Clinical Phases

Saudi Medical Students

By

Olfat Gushgari

Seton Hall University

2020

Dissertation Chair: Deborah DeLuca, MS, ChE, JD

Background: Medical students are widely recognized as a high-risk population for poor quality of life (QOL). Various studies have highlighted that medical students have a lower QOL than, compared to other students from different specialties tend to exhibit; specifically, the QOL of Saudi medical students is of growing concern, and it is imperative that Saudi medical schools recognize and address the QOL of these students.

Purpose: The purpose of this study was to explore the QOL of Saudi medical students during the pre-clinical and clinical phases of their studies. In addition, this study explored the QOL perceptions according to factors such as medical school year (from year 1 to year 6) and gender (male/female) among Saudi medical students.

Methods: This study design utilized a descriptive, exploratory, cross-sectional and correlational research design. A sample of 157 participants responded to the online survey and 154 of these respondents fully completed the WHOQOL-BREF instrument including the demographic questions.

Results: For the reliability of the WHOQOL-BREF domains, the physical health domain (0.645) and the environmental domain (0.684) fall slightly short of the acceptable degree of internal

consistency. The QOL domains scores were not statistically different for respondents in the medical school phase (physical health domain $p=.919$, psychological domain $p=.318$, social relationship domain $p=.472$, environmental domain $p=.661$). In regard to medical school year, there was no significant relationship in each of the four domains (physical health domain $p=.91$, psychological domain $p=.387$, social relationships domain $p=.393$, environmental domain $p=.388$). The QOL domains scores were, in contrast statistically different according to gender: female students demonstrated lower scores in the physical health domain ($p=.009$), psychological domain ($p=.003$), and social relationship domain ($p=.019$), but results for the environmental domain ($p=.30$) were not significant.

Conclusion: The findings of the study suggests that Saudi medical schools must address the QOL among female Saudi medical students; issues such as women's health care must be acknowledged within the Saudi medical school system. An additional conclusion of this study is that the WHOQOL-BREF instrument does not appear to be a good fit for assessing QOL among Saudi medical students. Thus, this study identifies the need to address situational validation when administering the WHOQOL-BREF among Saudi medical students. As a result, further investigation into the concept of and factors that influence QOL among Saudi medical students is recommended.

Keywords: quality of life, medical students, Saudi Arabia, medical school, physical health domain, psychological domain, social relationship domain, environmental domain

Chapter I

Introduction

Background of the Problem

Studies have reported that among healthcare professionals, medical school creates significant mental and physical challenges as a direct result of academic and professional demands, limited leisure time, and frequent academic examination (Henning et al., 2012; Shareef et al., 2015). Other challenges include the necessity of adapting to the different phase requirements of medical school, such as clinical rotations that combine a new learning environment with increased academic expectations (Dahlin, 2005; Dyrbye et al., 2005; Pagnin & Queiroz, 2015). Many notable life transitions can affect quality of life (QOL), but medical students appear to constitute a particularly high-risk population for poor QOL, even in comparison to students from other professional specialties (McNeill et al., 2014). Numerous studies have concluded that a medical student's QOL begins to deteriorate upon entry to medical school, but the exact reasons why these students fail to thrive remain obscure and unaddressed (Pagnin & Queiroz, 2015).

Exploration of the QOL of medical students in Saudi Arabia has been a major goal of researchers in recent years. Saudi medical students face many challenges and stressors during their journey to becoming practitioners of medicine, which can negatively affect their QOL (Shareef et al., 2015). Siddiqui et al. (2014) suggested that the dramatic increase of academic workload through the transition from high school to medical school presents a major difficulty for Saudi students. Some students arrive at medical school unprepared for these new challenges

and face difficulties in coping with the demands of the academic requirements of their medical program. This failure to adjust, unsurprisingly, often results in poor academic performance.

Because Saudi medical colleges aim to provide an optimal learning environment to students, it is essential to direct further attention needs to be directed toward consistent measurement of students' QOL. The identification of issues that affect the health and quality of life of medical students should form the foundation of this endeavor, especially because there are limited number of existing studies on the QOL of Saudi medical students. Responses to a stressful environment differ significantly and depend on an individuals' baseline levels of stress, their values, their culture, and the availability of social support (Enns et al., 2016). Indeed, today's medical students represent a broad spectrum in terms of culture, experience, and ethnicity, and one's QOL is viewed as a multidimensional construct that emerged from the evaluation of multiple needs of the individual, community, at both national and global levels (Costanza et al., 2007).

The objective of this study was to explore medical students' quality of life (QOL) in Saudi Arabia, perhaps to provide a basis for the development of student wellness programs and activities that could have a positive effect on the QOL. Enns et al. (2016) identified that, in medical school, a low QOL can have a direct correlation with the phenomenon of burnout, and subsequently, higher drop-out rates. The QOL of medical students is also likely to have implications for their future competence as clinicians (Henning et al., 2009). Additionally, a student's QOL does not remain static throughout medical school; a review of existing literature reveals that the different phases of medical school and the accompanying shifts in requirements have a direct impact on the individuals' QOL. Heidari et al. (2013) illustrated that, as the educational level of medical students increased, their QOL decreased. It can be inferred from

existing studies that pre-clinical students suffer more impairments as a result of their academic load (Shareef et al., 2015; Zhang et al., 2012). A gender-specific effect has also been observed: female medical students exhibited lower scores in QOL domains than male medical students (Pagnin and Queiroz, 2015; Shareef et al., 2015; Zhang et al., 2012).

Only a limited number of studies have been conducted on QOL among Saudi medical students that directly analyze medical school phase, medical school year and gender. Therefore, assessing QOL of Saudi medical students under these parameters can provide a new insight into their perspectives on health and other factors relevant to the optimization of their training. New data on the experiences of students could also help identify the main elements that affect the students' QOL. This study will address the QOL of Saudi medical students on the basis of all three criteria: medical school phase (pre-clinical/clinical), medical school year (from year 1 to year 6) and gender (male/female).

Need for the Study

The academic environment for Saudi medical students is challenging and more demanding than that of general schooling. Moreover, the transition from high school to medical school for Saudi students is a difficult period that often results in frustration and poor academic performance (Siddiqui et al., 2014). Medical education, despite the emphasis on health care, has ironically been shown to be hazardous to students' health and to create an environment of psychological toxicity (Wolf, 1994). To function effectively as students and caregivers, medical students must maintain functional levels of QOL (Eckleberry-Hunt et al., 2009; Haivas & Villanueva, 2006). Admission to medical school alone has an impact on a students' health and QOL because the subsequent transition requires considerable adaptation and lifestyle changes. It is well-known that the process of medical education entails long years of study and intense

academic pressure. Researchers have observed that, during the first year of medical school, students had a deficit in hours of sleep, physical activity, and social interactions (Parkerson et al., 1990). Clearly, of all students in higher education institutes, medical students appear to face more emotional challenges, as well as physical and mood disorders, as they progress toward their professional goals (Wilkinson et al., 2006).

The aim of medical education is to train medical students to acquire the necessary knowledge and skills to react to the health needs of their community, and once they become practitioners, they should strive to achieve these health objectives with care and compassion. Unfortunately, in a continually changing health care environment, there is a concern that Saudi medical students are not well prepared to provide optimal health care to the community they will serve (Al-Muhanna, 2009). Therefore, the QOL of Saudi medical students is of growing concern, and it is of paramount importance that Saudi medical schools address the QOL of their aspiring physicians.

Purpose of the study

The purpose of this research study is to assess QOL perceptions in four domains (physical health, psychological, social relationships and environmental) among Saudi medical students in relation to medical school phase (pre-clinical/clinical), medical school year (from year 1 to year 6) and gender (male/female).

Research Questions

This research study addressed the following research questions and hypotheses:

Research Questions 1

- Are there differences in quality of life perceptions (among the four domains) among pre-clinical and clinical phases Saudi medical students?

- H10_a: There are no differences in quality of life perceptions among pre-clinical and clinical phases Saudi medical students.
- H1_b: There are a difference in quality of life perceptions among pre-clinical and clinical phases Saudi medical students.

Research Questions 2

- Are there a relationship exists between quality of life perceptions (among the four domains) and year of study (from year 1 to year 6) among Saudi medical students?
 - H20_a: There are no relationship between quality of life perceptions (4 domains) and year of study among Saudi medical students
 - H2_b: There is a relationship between quality of life perceptions (4 domains) and year of study among Saudi medical students

Research Questions 3

- Are there differences between quality of life perceptions (among the four domains) between male and female Saudi medical students?
 - H30_a: There are no differences (4 domains) between quality of life perceptions between male and female Saudi medical students
 - H3_b: There are a difference between quality of life perceptions (4 domains) between male and female Saudi medical students.

Conceptual Framework Overview

This study utilizes the conceptual framework developed by the World Health Organization (WHO) that focuses on the conceptualization and measurements of people's subjective QOL (The WHOQOL Group, 1998). Thus, the conceptual model reflects the view that one's QOL refers to subjective evaluation, which is embedded in a social, cultural, and

environmental context. In addition, the conceptual framework will be focusing on respondents' perceived QOL. Also, the WHOQOL Group's emphasis that the assessment of QOL should be based on a broad range of criteria, not on a single issue. Therefore, the conceptual framework emphasizes that a Saudi medical student's QOL should be assessed by exploring what effect it has on an individual's physical health, psychological, social relationships and, environmental contexts, which together constitute the multidimensionality concept of quality of life. The conceptual framework will guide the study to identify Saudi medical students' perspectives in relation to the four QOL domains.

Chapter II

Literature Review

Definition of Quality of Life

In recent years, the concept of quality of life (QOL) has become an essential factor in assessing healthcare outcomes. QOL is a broad concept that encompasses both health and non-health aspects of an individual's experiences. The World Health Organization Quality of Life Group (The WHOQOL) has offered a more tangible definition of QOL:

Quality of life is an individual's perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment. (The WHOQOL Group, 1998, p.11)

Within this definition, the WHOQOL emphasizes the subjective nature of QOL measurements as well as on the need to explore all perspectives that might affect an individual's QOL perceptions.

The multi-dimensionality of QOL as a concept stems from the wide range of physical, psychological, and social phenomena that form an individual's expectations and perceptions (The WHOQOL Group, 1998). Nevertheless, despite its high level of subjectivity, QOL is generally acknowledged to have two fundamental aspects: internal, referring to the personal traits and skills that affect an individual's autonomous actions; and external, referring to the environmental conditions of an individual's life. Rogerson (1995) determined that internal

factors affect individuals' feelings of life fulfillment, and external aspects influence those internal factors at an individual or community level. Although health-related domains remain an integral part of QOL measurement, many assessment models also place importance on potential links between traditional population statistics and the shared personal values, preferences, and expectations of the same populations. According to Chaturvedi and Muliya (2016), early concepts of quality of life included non-health focused criteria like work, family, spirituality, and environment. Young (2008) has also observed that definitions of QOL differ in many cases depending on the psychological aspects of what individuals consider essential:

Nevertheless, though some differences exist by virtue of individual subjectivity, there is still a consistency of definitional terminology due to the uniformity of scientific examination practices applied to quality of life systems. Mainly, this consists of the accurate validation of commonalities and differences among group preferences, opinions, behaviors, and values, which give, as stated by experts, solid meaning to and understanding of what constitutes quality of life. (p.3)

Given the multiple factors that can affect QOL assessment, the determination of an individual's QOL should include their own personal perceptions.

Quality of Life Measurement Challenges

Concept Clarification. Although the QOL concept is widely used, the concept itself is difficult to define (Pukeliene & Starkauskiene, 2011). In a review of published studies by Gill and Feinstein (1994), the authors explained that among the reviewed studies, 75% failed to define QOL, and 64% failed to justify the applicable tools for selection. The QOL concept cannot be precisely defined for several reasons. A QOL framework revolves around the selection of applicable indicators to be included in the measurement. Additionally, whether QOL is

assessed at individual or general population levels depends on the choice of domains along with the weights assigned to each domain. Each of the existing methods available for measuring QOL has its own advantages and drawbacks.

The selection criteria of Bergner and Rothman (1987) emphasized that the most important evaluation component involves conceptual considerations specific to a given population and setting, including the following: (a) definition of the meaning of QOL, and (b) selection of specific health constructs relevant to the study's objectives. Therefore, the primary challenge is to match the focus of each investigation to related specific concepts. Because there is little agreement on the meaning of QOL, measurements should be based on several conceptual models or theories of QOL. As Hunt (1997) argued, "QOL has been constructed as the emotional response to circumstances, the impact of illness on social, emotional, occupational and family domains, personal well-being, the match between expectations and reality, the ability of a person to meet his or her needs and an individual cognitive approach". (p. 208). Related to the importance of this conceptual consideration, Pukeliene and Starkauskiene (2011) emphasized that how QOL is measured clearly relates to how the concept is defined and what is being measured. For this reason, the concept of QOL must be clearly and carefully defined, and the explicit number of dimensions should be highlighted.

It can be said that what constitutes a good life and how it can be measured differ among individuals as well as among societies and cultures. No one definition of QOL exists; rather, QOL is a broad and multidimensional concept, which implies that individuals who are the only suitable judge for their own life experiences.

Methodological Consideration. In addition to the conceptual consideration, one must also consider the methodological consideration which includes validity, degree of reliability,

respondent, and the location (McHorney, 1999). The respondent measure needs to be evaluated correctly and to include pilot testing within the target population. It is important to provide evidence for the use of respondent measures in the target population or setting, which should be considered as the psychometric properties of health status measures that are population dependent as not everyone will value the various components in the same way. Although it is perceived as desirable that QOL should be based upon the respondents' views, the content of only a few current measures reflects the concerns of respondents.

It should be noted that measures of validity and reliability are both relative; nevertheless, they are not only generalizable features of QOL measurement tools but also dependent on the population in which they are assessed. Fitzpatrick et al. (1992) addressed the difficulty of ascertaining the validity of QOL measures due to these instruments measuring an inherently subjective phenomenon. Furthermore, the authors focused on an essential approach that is to examine face and content validity, and whether the instruments intend to cover relevant topics in regard to the target population.

How an individual expresses and experiences different perspectives in life is likely due to changes over the passage of time in terms of societal, cultural and life experiences. It is important to emphasize that an individual's perception typically changes when the situation changes; thus, validity generalization causes a concern regarding QOL measurements. Therefore, there is a need for a situationally specific validation at any new settings. Fitzpatrick (2000) highlighted the need to re-examine methodological principles regarding QOL because QOL methodology has been developed for a range of different purposes, including healthy individuals and patients with different health perspectives. As these assessments may be well suited to one

specific setting, they may not be applicable to other settings. Furthermore, QOL instruments should always be appropriate, acceptable, feasible and interpretable (Fitzpatrick, 2000).

The main concern with the fundamental assumption regarding QOL measurement is the “one size fits all” approach that previously established measures can meet the needs of different populations. Such an approach can lead to the creating of barriers in regard to QOL measurement. Additionally, different measurements in different populations or settings require different concepts and different degree of precision. Therefore, there is a need for methodological progress in creating a precise and conceptually targeted population that will significantly enhance QOL measurements and research outcomes (McHorney, 1999).

Quality of Life Measurement

QOL frequently appears as a point of discussion in medical literature, and researchers have utilized a diverse set of approaches, methods, and assessment instruments to measure QOL among populations. Although the various criteria used to assess QOL can differ dramatically, Coons et al. (2000) remarked that no assessment performs uniformly worse or better than any other. An appropriate method to measure QOL should be determined on a study-by-study basis, factoring in the characteristics of the population (e.g., age, health status, language, and culture) as well as the environment in which the assessment is performed (e.g., clinical trial, routine physician’s visit). Theofilou (2013) suggested that QOL assessment should also consider the scale of the research and the characteristics of the assessment instrument itself. Variables like the time required to complete an assessment instrument or the time that subjects have available to participate in a study can have a significant effect on results. Researchers should also consider whether a given instrument is designed for self-administration or if it is more desirable for subjects to complete an assessment under supervision.

Following are examples of currently used tools for measuring QOL:

Quality of Life Scale (QOLS) (Flanagan, 1978)

- QOL measurement from a patient's perspective that also helps to determine the impact of providing healthcare in situations where a cure is not possible.
- Adapted for use in chronic illness groups
- 15-items instrument
- Measures QOL along the basis of five conceptual domains (material and physical well-being, relationships with other people, social, community and civic activities, personal development and fulfillment, and recreation)

SF-36 Questionnaire (Ware, Sherbourne, 1992)

- Subjective measure of functional health and wellbeing
- Monitors health-related QOL in specific populations, covering a wide range of diseases and health conditions
- 36-items instrument
- Measures QOL across eight domains (physical functioning, amount of limitations caused by physical problems, bodily pain, general health perceptions, vitality, social functioning, limitations created by emotional problems, and mental health).

WHOQOL-BREF (The WHOQOL Group, 1998)

- Subjective measure for QOL that places primary importance on an individual's own perceptions
- Designed with the intention for use as a cross-cultural assessment
- 26-item instrument

- Assesses QOL multi-dimensionally among four domains (physical health, psychological, social relationships, and environmental)

As previously indicated, the choice of instrument for a given study should involve examination of the type of research being conducted as well as the characteristics of the study's subjects. The first two instruments mentioned above-the QOLS and the SF-36- feature disease-specific items that are often used to measure QOL in people suffering from chronic illnesses. As people with chronic illnesses face unique challenges and limitations compared with those who are healthy, these instruments are an appropriate choice to measure the priorities and standards for QOL of the former population.

Although there are disease-specific versions of the WHOQOL-BREF, the generic version has been used widely- including with medical students internationally as well in Saudi Arabia (Heidari et al., 2013; Mahmoud & Fareed, 2018; Malibary et al., 2019; Pagnin & Queiroz, 2015; Shareef et al., 2015; Zhang et al., 2012). The reason for selecting the WHOQOL-BREF is that medical students are typically healthy enough to undertake a rigorous multi-year program of education and training. Furthermore, the scales used to measure one's QOL often include several domains related to health, but these tools also originally included many other non-health related issues (Chaturvedi & Muliya, 2016). The generic form of the WHOQOL-BREF instrument which was designed for healthy adults to use, incorporates the latter structure by utilizing a multidimensional structure containing four domains: physical health, psychological, social relationships, and environmental.

Further details on the use and psychometric properties of the WHOQOL-BREF are discussed in Chapter III.

Medical Education in Saudi Arabia

The Bachelor of Medicine in Saudi Arabia is a six-year program, composed of three years in a pre-clinical academic environment followed by three years of clinically based study. After the sixth year, students start the internship year at the hospital. The Saudi medical education curriculum applies a British-style execution of the Flexnerian concept, in which the curriculum features a clear separation between the basic and clinical sciences (Al-Gindan et al., 2000). In 1969, the Ministry of Education founded the first Saudi Arabian medical school, King Saud University, in Riyadh (Al-Muhanna, 2009). The number of medical schools in Saudi Arabia has since expanded, with several schools established across different regions in the Kingdom.

A core goal of all institutions of higher education – including Saudi medical schools- is to maintain and ensure a quality academic environment. The Saudi medical profession has found success in promoting both the medical profession and the need for improved public health outcomes; nevertheless, many perceive that the system needs to address several needed reforms to successfully adapt and provide adequate healthcare as the needs of the population continue to evolve. Al-Muhanna (2009) posited that the Saudi medical community could address many of these issues by utilizing the experience of physicians currently involved in the educational process to gain a better sense of current strengths and weaknesses. Addressing another educational hurdle for Saudi medical schools, Hassanien (2018) suggested a need to improve the physical learning environment by making use of resources like technological integrations and established studying centers.

Regardless of the angle of approach, researchers generally agree that systematic changes must be made on a systematic level to ensure equal quality of development across all Saudi

medical students (Shawky & Soliman, 2001) However, the current system lacks a standardized structure for medical colleges to determine their efficacy as a collective. Telmesani et al. (2011) suggested that this unfortunate lack of central organization will make the process of educational reform a tedious undertaking.

Most preliminary efforts at reform have been directed toward the content of the curricula rather than the developing of essential skills, behaviors, standards, and knowledge that physicians need for success in their professional careers. Although Saudi medical colleges admit only the top-performing students from each high school graduating class, the attrition rate in Saudi medical schools remains high. To explore a possible explanation for this problem, Almoallim et al. (2010) have conducted studies on the primary difficulties that first-year medical students face. Among the students sampled, 85% stated they would have liked an introductory course designed to prepare them for the new learning environment prior to the official start of the first-year curriculum. Among these same students, 80% would have also welcomed the assignment of a mentor in their first year of medical school.

The prevalence of stress is another major factor affecting the success of Saudi medical students. Among the students who participated in a study that Alsunni and Latif (2014) conducted, 71% reported their education caused them noticeable stress. The incidence of stress among Saudi medical students is dramatically higher than among European countries sampled in which British and Swedish medical students reported levels of stress at 31.2% and 12.9%, respectively. One explanation for this disparity involves the added challenges of a language barrier; instructors at European medical schools typically teach students using their shared native language whereas Saudi medical schools provide instruction to their Arabic-speaking students exclusively in English (Alsunni, & Latif, 2014).

The presence of functional support centers also seems to play a vital role in helping students adjust to the dramatic changes they experience in their academic environment. Without access to the types of support systems that European medical colleges provide to their fellow students, Saudi medical students are left alone to navigate the many challenges of medical school. If these unsupported students fail to cope with the challenges and stressors of medical school, the inevitable result is an increase in dropout rates (Almoalim et al., 2011). Even students who achieve academic success are not immune to the psychological effects of long-term stress, which can also induce permanent changes in personality. As a result, some of these students develop into practicing physicians who, despite their extensive training, lack the necessary personality traits to communicate effectively with patients and provide quality care (Naseem et al., 2016).

Saudi Medical Students and Quality of Life

Although Saudi medical colleges strive to provide an optimal learning environment for students, more attention needs to be directed toward their ability to enable medical students to maintain a satisfactory QOL. Nevertheless, a paucity of existing studies addresses QOL among medical students in Saudi Arabia.

A study by Shareef et al. (2015) explored the relationship between QOL and academic performance among pre-clinical phase students ($n=335$) utilizing the WHOQOL-BREF instrument. The findings revealed a direct connection between academic performance and student QOL. Students with a record of higher academic performance scored better than their less-accomplished peers in all four domains of the WHOQOL-BREF instrument. Gender appeared to have an influence in psychological and physical health domains, as male students scored higher than their female peers. The results of this study may be useful to guide further

investigation. However, because the study's design involved a small sample size of students drawn from one private institution, the results cannot be extrapolated across all Saudi medical schools.

In a study investigating QOL as related to medical school phase, Mahmoud and Fareed (2018) assessed male Saudi medical students ($n=983$), using the Arabic-language version of the WHOQOL-BREF. Although the results provided some interesting insights, a wider application of the findings may be limited because data were gathered from male students at a single Saudi medical school.

Mahmoud and Fareed (2018) found that both year of study and living arrangement have a significant influence on student QOL. Students who had advanced to the second phase of medical school-the clinical phase- reported higher scores in the social and environmental domain than students in the pre-clinical phase. The authors theorized that the emotional maturity and experiences that accompany age may contribute to the higher QOL scores of students in the clinical phase. Because the clinical phase of medical school takes place during the final three years of the program, the initial adjustment period has long passed, and students have had ample time to adapt to the competitive academic environment and find ways to balance their coursework with their social needs.

Another notable highlight of the study was the positive influence of family support: students who lived with family scored higher in the physical health domain than students who lived alone or in hostels. These students also enjoyed better psychological health and perceptions of their living environment (Mahmoud & Fareed, 2018). Higher standards of personal care and access to better facilities may also play a part in the improved mental and physical health of these students.

Connections can be drawn between the results of the study conducted by Mahmoud and Fareed (2018) and those by Almoallim et al. (2011) regarding the value of support systems for students. The protective environment afforded by family presence, while not specifically geared toward academic success, may provide a boost to the psychological strength that students need to cope with stressful situations. To further bolster students' success, medical colleges should aim to provide similar levels of support for those who lack this support. Providing resources to help students develop communication skills, professionalism, and techniques to manage stress could be extremely beneficial to students' academic and emotional well-being (Mahmoud & Fareed, 2018).

A recent study conducted by Malibary et al. (2019) used the Arabic-language version of the WHOQOL-BREF to assess QOL among Saudi medical students ($n=630$) in the second, fourth, and sixth years of their program. By conducting this study, the authors hoped to gain a better understanding of the general condition of medical students and then apply any promising findings toward the development of interventions to improve student QOL. Specific, context-sensitive, and appropriate interventions by medical administrators would both promote better QOL and reduce the chances of medical students developing psychological problems from chronic stress. In turn, these outcomes should translate into better quality of care for future patients.

Unlike Mahmoud and Fareed (2018), Malibary et al. (2019) found no significant differences in WHOQOL-BREF domain scores based upon students' academic year. This result could potentially be attributed to differences in the curriculum at each medical school, which may draw further attention to the need for standardization in Saudi medical schools. If an individual school's curriculum includes various preparatory experiences during the pre-clinical

years of study, students may respond better to the changes in their learning environment and academic workload. Regular exposure to the clinical aspect of a medical education program during a student's pre-clinical phase may also ease the transition (Malibary et al., 2019).

Malibary et al. (2019) also found no significant differences in QOL between male and female students. This result remained consistent across all four domains of the WHOQOL-BREF. Furthermore, the authors pivoted to consider other factors that had the potential to affect student QOL. A student's grade point average (GPA) emerged as an important indicator of QOL. Interestingly, students with lower GPAs reported higher QOL scores in the psychological and social relationship domains, whereas students with higher GPAs appeared to suffer from poorer psychological health and reduced quality of social relationships. Malibary et al. (2019) suggested that student attitude toward academics may be related to their findings. The authors posited that high-achieving students are under constant pressure to not only sustain but also improve their academic performance. Conversely, low-achieving students are neither interested in peer competition nor the acquisition of high marks. A lack of effort applied to academics would provide low-performing students with more time to spend socializing and engaging in other leisure activities which, in turn, could boost their psychological state (Malibary et al., 2019).

Despite the various conclusions that can be drawn from the three studies discussed above, definitive research findings regarding QOL for Saudi medical students remain limited due to the flaws of each study's design. Shareef et al. (2015) only investigated a relatively small sample size of pre-clinical phase students from a single Saudi medical school. Mahmoud and Fareed (2018) targeted only male students from another individual Saudi medical school. Malibary et al. (2019) also based their study on data from one Saudi medical school, and their sample only involved second, fourth, and sixth year students. In summary, all three previously discussed

studies fail to generate a comprehensive understanding of QOL for Saudi medical students. Such significant data limitations negatively affect their generalizability. In contrast, this current study, seeks to create a more thorough exploration of QOL perception among Saudi medical students by accounting for medical school phase, medical school year and gender.

International Literature Review

Given the limited availability of research targeting QOL among Saudi medical students, the primary investigator expanded the scope of the literature review to investigate QOL studies conducted on medical students in other countries.

An offer of acceptance to medical school brings expectations for adaptation and substantial lifestyle changes that can be psychologically daunting for students and negatively affect their QOL (Tempski & Fiedler, 2008). In a qualitative study, Tempski et al. (2012) used focus groups to assess Brazilian medical students' perception of their QOL. The size of each group ranged from 6 to 15 students, with a total sample size across all schools of n=56. As a baseline acknowledgment, the study authors recognized medical school as a source of numerous stressors that can negatively affect QOL. Many students reported feeling as though they could not balance the demands of medical school with their desire to participate in age-appropriate experiences. Academic competition, challenging coursework, and grueling scheduling requirements were all cited by students as factors contributing to a general belief that they could not enjoy life to the same extent as some of their peers.

The experience of students in medical school not only affects their personal and professional environment but also fosters a level of psychological toxicity detrimental to their overall QOL. To promote a healthier psychological environment, students must be provided with

meaningful opportunities to learn, grow, and participate in positive interactions with their communities (Tempski et. al., 2012).

Zhang et al. (2012) conducted a cross-sectional study in China involving n=1,686 medical students throughout the various academic years of medical school, and confirmed year of study as a significant influence on QOL in medical students. Students in their third year showed the greatest impairment in the psychological and social relationships domains and also scored poorly on physical health and environment. The authors have rationalized this result through the context of Chinese medical school structure: the third year of medical school serves as a transition point between pre-clinical and clinical studies, and third-year students face pressure from academic coursework in both science and clinical medicine. Gender also appeared to have some effect on student QOL in this context. Male students scored significantly higher than female students in the psychological domain. The authors attributed this result to potential cognitive and social differences between men and women.

Heiddari et al. (2013) investigated the QOL of n=242 Iranian medical students using the WHOQOL-BREF instrument. Students showed a decrease in all four QOL domains as they progressed through the years of medical school, and the onset of the clinical phase had a particularly negative effect on student wellbeing. As a result, Heiddari et al. (2013) indicated that medical schools should target students undergoing the transition from the pre-clinical to clinical phase for additional QOL observation and access to support services. One interesting finding from this study is the effect marriage can have on student QOL; apparently the status of marriage can boost student QOL, as well as improve their ability to adapt to stressful environmental conditions during their education.

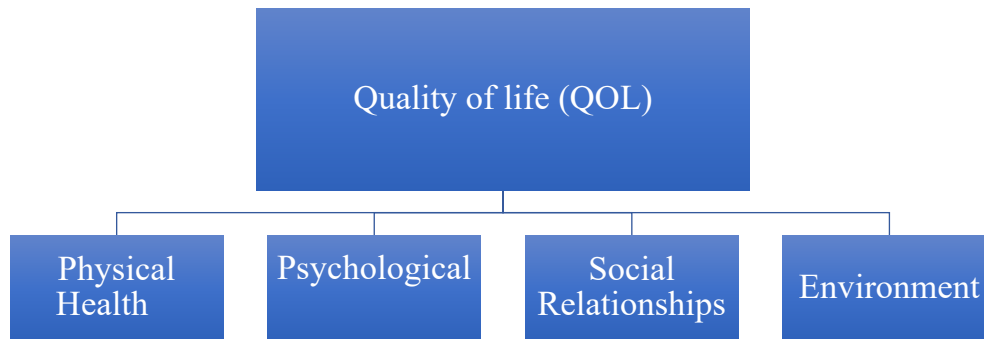
In a study of Brazilian students in their second, fourth, or sixth year of medical school. Pagnin and Queiroz (2015) reported significantly lower scores in the psychological and social relationship among n=206 Brazilian medical students compared to the control sample of n=199 young people in the general population. The authors found no significant difference in QOL between the three class years examined, but gender seemed to have a notable effect. Female students scored lower on the physical health and psychological domains than male students, which can possibly be explained by prevalence of dysmenorrhea and premenstrual dysphoric disorder (Tanmahasamut & Chawengestakul, 2012). To moderate this gender disparity, medical schools must better address the healthcare needs of their female students.

To develop into effective physicians, students need the resources and mental support systems to cultivate empathy, professionalism and frustration tolerance (Dunn et al., 2008). By taking interest in understanding the factors that influence medical student wellbeing QOL, educators can better help mitigate how stress affects these students. Using evidence -based curricula and learning activities, as well as placing importance on fostering healthy coping skills for stress, can help students develop the tools, they need to build a strong foundation as medical professionals.

Conceptual Framework

Figure 1

Quality of Life Conceptual Framework



Note. This figure illustrates the conceptual framework for this study. Adapted from The WHOQOL Group,1998.

The approach of the World Health Organization (WHO) to QOL assessment incorporates the physical, psychological, social and environmental aspects of an individual's experience (The WHOQOL Group, 1998). The conceptual framework of this study as illustrated in Figure 1, uses the same methodology applied specifically to medical school students in Saudi Arabia.

Additionally, the conceptual framework implies the multi-dimensionality concept of QOL that blends evaluations of health and different perspectives like personal satisfaction, expectations, and goals (Orley et al., 1998). Ferrans (1996) emphasized the underlying ideology of QOL is based on an individualistic view, which is grounded in the experience of life, so the individual is the only suitable judge of their experience.

The WHOQOL conceptual framework has been used frequently to predict the QOL among medical students in different countries such as China (Zhang et al., 2012), Iran (Heiddari et al., 2013), Brazil (Pangnin & Queiroz, 2015), and as well in Saudi Arabia (Shareef et al., 2015; Mahmoud & Fared, 2018; Malibary et al., 2019). Therefore, this conceptual framework

assists in understanding medical student's QOL perspectives through four dimensions, which is essential to help policy holders in the ministry of education in Saudi Arabia to design and implement specific support and care for these students.

The QOL framework consists of four domains: physical health domain, psychological domain, social relationships domain and environmental domain. In-depth description explaining each of these domains follow below.

Physical Health Domain

The physical health domain assesses an individual's overall health and includes items related to the activities of daily living, pain, discomfort, sleep, and rest (The WHOQOL Group, 1998). Historically, health and physical functioning have been the most-measured domains in QOL research related to nursing and medicine (Ferrans & Power, 1992). For medical students, a lower score in the physical health domain is associated with an unhealthy lifestyle, health problems and academic underachievement. In turn, these issues carry a significant negative impact on a student's professional development.

According to Lins et al. (2015) the health-related aspects of QOL for medical students can be negatively affected by many acute and long-term stressors they face during medical school. These stressors include academic competition and pressure, the requirements to constantly process and learn large amounts of new information, and regular exposure to disease and death. They can contribute to the onset of depressive symptomatology among medical students.

Ball and Box (2002) have demonstrated that medical students experience significant negative changes in health habits during their first year of medical school, including a reduction in levels of physical exercise. Its well-known that physical inactivity is a serious risk factor for

many diseases while regular exercise is an important aspect of a healthy lifestyle. To foster better health outcomes, medical schools should implement programs that promote physical exercise and healthy eating habits among their student population. Offering support to students to make their health a priority from the beginning of medical school can build a strong foundation for the development of physicians who understand they can better serve their patients by first taking care of themselves.

Psychological Domain

The psychological domain examines the prevalence of positive and negative feelings in an individual, and it includes items related to depression, self-esteem, thinking, learning and concentration (The WHOQOL Group, 1998). The literature emphasized that medical education is perceived as stressful for students, and this stress is characterized by undesirable psychological changes like emotional dysregulation and reduced cognitive processing abilities (Dahlin et al., 2005). Stress-related issues for medical school students often present most intensely during the first year of study (Abdulghani, 2008).

When Aboalshamat et al. (2015) conducted a study to assess the psychological well-being of Saudi medical and dental students, they found a high incidence of depression (69%), anxiety (66.4), and general stress (70.9%). Based on these results, the authors concluded that more attention should be directed toward reducing the alarming prevalence of mental illness and psychological distress among students in professional healthcare education. Furthermore, it is important to acknowledge that medical students in particular experience poor psychological well-being relative to their general population peers, and this mental distress interferes with their learning processes and leads to lower academic performance (Abdullah & Gabrh, 2014).

Dyrbye et al. (2005) have also pointed out the critical importance of addressing medical students' psychological needs. Students with untreated mental health issues can develop significant barriers to learning, and nearly half of these students eventually end up dropping out of medical school. To minimize these issues, it is important that medical schools foster an environment in which mental health is openly discussed rather than stigmatized. School administration should collaborate with mental health providers to offer to students the resources, activities, and programs needed to promote psychological well-being and treat mental illness on a preventive basis.

Social Relationships Domain

The social relationships domain concerns the extent to which an individual feels the commitment, approval, and availability of practical assistance from family and friends (The WHOQOL Group, 1998). As humans are relatively social creatures, the strength of an individual's social network, or social capital, is so integral to wellbeing that it can affect other QOL factors (Diener & Suh, 1997). Helliwell et al. (2013) have observed that individuals who have frequent social contact with the family, friends, and relatives express a greater overall QOL than people who do not enjoy regular social interaction.

Those who enjoy the support of caring friends are happier, and strong social relationships can develop common values and strengthen trust at a common level (Koroveski, 2011). According to Nikolaev (2014), strong social networks can improve the quality of the local environment, encourage more people to pursue higher education, and discourage people from engaging in socially destructive behaviors such as crime.

Applying these ideas to medical education, Tempiski et al. (2012) have pointed out the importance of improving relationships between students and faculty in the medical school

environment. To set an example of how to maintain a high QOL while practicing medicine, faculty must create opportunities for students to participate in research, get involved in social development projects, and enroll in continuing education programs. Initiatives that promote contributing to society, acquiring knowledge, and providing help to individuals in need can grant medical students a much-needed sense of purpose and motivation to follow their academic and professional goals despite challenges they may face throughout their education.

Environmental Domain

The environmental domain assesses the levels of comfort, safety, and security that an individual experience in their home and community (The WHOQOL Group, 1998). Regarding the qualities of the larger community, access to health and social care, the availability of recreation and leisure activities, and access to transport and information services are all considered as potential influences on an individual's environmental QOL.

Chazan et al. (2015) have discussed the importance of home environment and its effect on medical students. If a student enrolls in a medical school located a considerable distance from their hometown, they will experience the added stress of separation from their family. This process may be linked to difficulties adjusting to the new environment, which subsequently has a negative impact on their QOL. Additionally, the authors highlighted that as an individual's view of their parents can also influence their QOL. If a student views their parents as people with high academic and professional qualifications, they are more likely to internalize the image of their parents as hardworking and develop a greater appreciation of the value of learning. Students with this positive view of their home environment and caregivers often display more motivation to work hard and successfully overcome potential challenges; as a result, they tend to experience better QOL (Chazan et al., 2015).

Chapter III

Research Methods

Research Design

This study utilized a quantitative, non-experimental, descriptive – exploratory, correlational, and cross-sectional research design using a self-reporting questionnaire (the WHOQOL-BREF instrument). Because this study explored the quality of life perceptions among pre-clinical and clinical phases Saudi medical students, a quantitative approach was utilized. Additionally, exploratory research turns to tackle new problems on which limited, or no previous research has been done (Brown, 2006). Thus, this study is exploratory because there is limited research on the quality of life of Saudi medical students in regard to the medical school phase, medical school year and gender. Participants were surveyed at a single point in time and they completed the survey aiming to identify their perspective on the quality of life in regard to four domains: physical health, psychological, social relationships and environmental. A correlational design was used to explore whether a relationship exists between the quality of life perceptions (the four domains) and medical school year (from year 1 to year 6).

The quantitative research design consists of two main sections: descriptive statistics, and inferential statistics. Participants who meet the inclusion criteria and were willing to voluntarily participate in the study accessed the survey through a SurveyMonkey link provided in the solicitation letter. The link contained the WHOQOL-BREF questionnaire and demographic questions.

Instrumentation

The instrumentation for this study consisted of a WHOQOL-BREF English generic version questionnaire which was used to gather data to answer the study's research questions and demographic questions the primary investigator created.

WHO Quality of Life –BREF (WHOQOL-BREF)

The World Health Organization Quality of Life (WHOQOL) project was an initiative to develop an instrument capable of assessing an international comparable quality of life at a transcultural level (The WHOQOL-Group, 1998). This instrument assesses the individuals' perceptions within their culture and value system, as well as their concerns, standards and personal goals. The WHOQOL-BREF is an abbreviated 26-item version of the WHOQOL-100. Although the WHOQOL-BREF can be used in a specific cultural setting, the results can be compared across many cultures simultaneously. To date, the WHOQOL-BREF has been designed for more than 20 different languages.

The WHOQOL-BREF is based on the WHO's definition of QOL. This definition reflects the domains of quality of life, including physical health, psychological, social relationships and the environment with, respectively, seven, six, three, and eight items. In addition, there are two other items that evaluate the overall quality of life and general health. Scores are represented by each domain, as there is no total score. To interpret these scores, the WHO according to its guidelines, has suggested higher scores for the subjects' reported higher QOL per domain. Therefore, the scores are rated in a positive direction within a range of 0-100. The items are rated on an ordinal scale, including five response options, with the highest value being the best score. The raw scores are obtained through the addition of items in each domain. These scores are then transformed to values within a range of 0-100 per domain. To draw more meaningful results and

facilitate insightful discussions, the results obtained in this study will be reported based on a 0-100 scale. The survey is designed to take about 10 min to complete (The WHOQOL-Group, 1998).

Skevington et al. (2004) evaluated the performance of the WHOQOL-BREF through testing its psychometric properties based on data collected from 23 countries ($n=11,830$). The reliability of the instrument's domains was as follows: the physical health domain total reliability was 0.82, with a score ranging from 0.55 to 0.88; the psychological domain total reliability was 0.81 with a score ranging from 0.65 to 0.89; the social relationship domain total reliability was 0.68, with a score ranging from 0.55 to 0.77; and the environmental domain total reliability was .80, with a score ranging from 0.65 to 0.87 (Skevington et al., 2004). According to the authors, the Cronbach's alpha is sensitive to items with lower values because these numbers range from 3 to 8 per domain. Furthermore, the instrument has items focusing on the meaning of different aspects of life with respect to the respondents' answers. These items, specifically, focused on the level of satisfaction of each respondent and the challenges throughout their lives. Therefore, various ratings can result in different outcomes and affect the reliability. The analysis results obtained from the evaluation of item-total correlation, internal consistency, construct validity through confirmatory factor analysis and discriminate validity, indicate that the WHOQOL-BREF has a good to excellent psychometric properties of reliability and performs well in preliminary validity tests.

Skevington et al. (2004) suggested acceptable performance of psychometric properties for the WHOQOL-BREF across different populations. However, the frequency of use of an instrument does not necessarily mean the best or most appropriate use of measuring QOL. Recognizing the validity of any instrument is situational, it is critical to assess reliability and

validity of participant responses for each WHOQOL-BREF study. It is copyrighted by the WHO and can be obtained with the permission of the WHO. The primary investigator granted permission to utilize the generic WHOQOL-BREF instrument from WHO (Appendix A).

Setting

The research was conducted online at SurveyMonkey through an internet browser in the participants' location of choice; they only needed internet access.

Access

A Saudi medical school, located in Jeddah, Saudi Arabia, has agreed to be the approval site for this study.

Sample

The study participants will represent a sample of Saudi medical students in their pre-clinical (first, second, and third year) and clinical (fourth, fifth, and sixth year) phases.

Participant and Selection Criteria

The study participants were included in or excluded from the study based on the criteria listed below.

Inclusion Criteria (Eligibility):

- Full-time pre-clinical and clinical phases Saudi medical students enrolled in a medical school in Saudi Arabia.
- Must be 18 years of age or older
- All participants must have internet access
- Saudi Nationality
- Ability to read and write in English

Exclusion Criteria:

- Not a full-time pre-clinical and clinical phases Saudi medical students enrolled in a Saudi medical school.
- Individual below 18 years of age
- Participants who do not have internet access
- Non-Saudi Nationality
- Cannot read and write in English.

Sampling procedure and number of participants

This study required a sample size of 128 individuals, according to G-Power version 3.1.9.2, with a medium effect size of .5 at 80% statistical power and 5% maximum type I error (Cohen, 1988). (Figure 2).

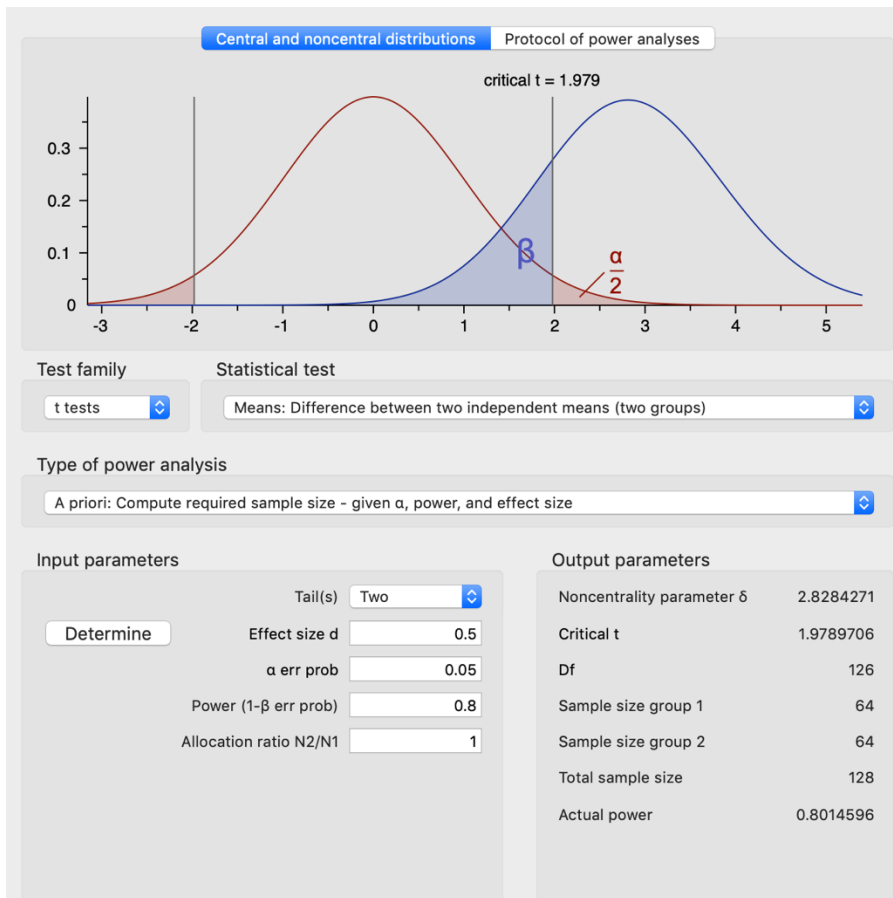
Convenience sampling including purposive and Non-purposive (snowball) sampling was utilized within the study. Conducting a study online benefits not only the researchers but also participants because they have advantages compared to other traditional data collection methods; they are free to engage and participate at their own pace with no perceived time pressure from a researcher and can complete the survey at a time convenient to them (Gosling & Johnson, 2011).

Furthermore, snowball sampling is a recruitment technique that involves individuals recruiting other individuals to take part in a research study. They may share common characteristics, traits, and other social factors among those individuals that help to break down some of the natural barriers that prevent such individuals from taking part (Biernacki & Waldorf, 1981). In addition, snowball sampling may also be an effective sampling strategy to target Saudi medical students' groups on social media. Moreover, it allows for the collection of a large amount of data over a short time period at a low-cost, and provides convenience for busy medical students, allowing them to complete the survey in their own time. Despite that medical

students being busy with extensive courses and clinical rotations, the snowball technique will ensures their convenient reach and also anonymity in participation, encouraging them to give honest responses, which leads to decreased bias.

Figure 2

*A Priori G*Power Analysis*



Note. A priori G*power analysis for the independent samples t-test. This figure shows that 128 participants is required to achieve at least 80% power with a medium affect size.

Ethical Assurance

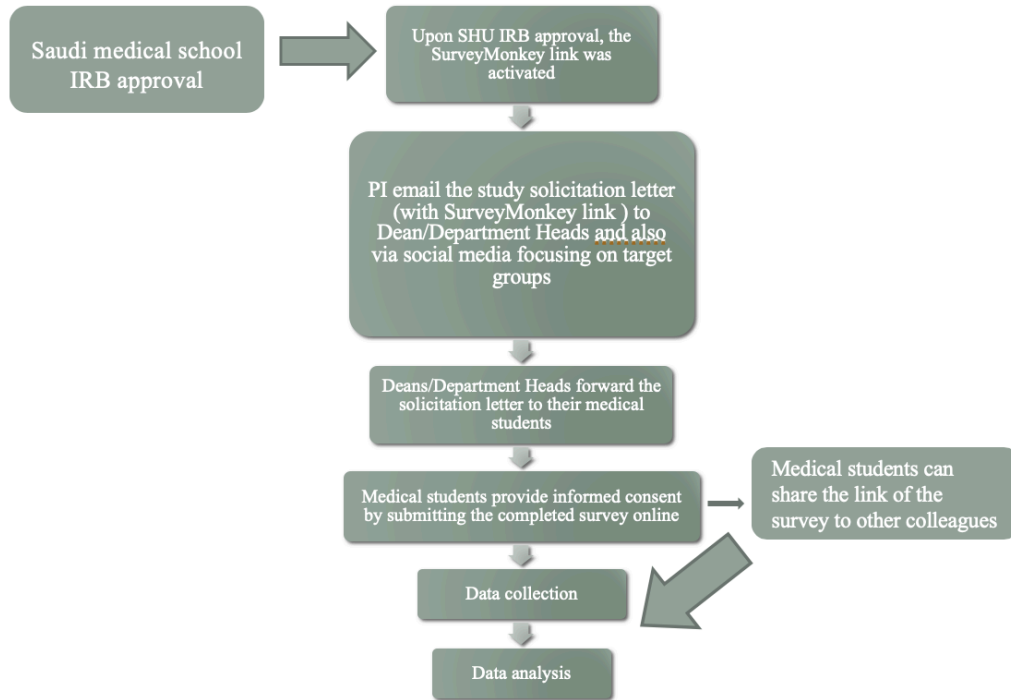
Assurance of the voluntary and anonymous nature of participation was important. Participants were free to choose not to participate entirely or stop participation at any time and their choice whether to participate in the survey or not will have no impact or any other penalty or loss of benefit that they receive. Protection and confidentiality were provided throughout the duration of the research study. No personal information from participants was collected as part of this study. The responses were completely anonymous and confidential. All data were stored in a flash drive that was kept securely locked in a cabinet with access only by the primary investigator.

Study Procedure

After receiving the Saudi medical school Institutional Review Board (IRB) approval (Appendix C), the primary investigator applied to Seton Hall University IRB. Once the approval was granted (Appendix D), the SurveyMonkey link that included the questionnaire and the demographic questions was activated, and the primary investigator sent an email to the director of the School of Medicine located in Jeddah, Saudi Arabia, including the solicitation letter with the SurveyMonkey link. The email included a letter of solicitation (Appendix E) explaining the study and requesting that the director to forward the email to all Saudi medical students who meet the inclusion criteria. The director's email distribution is the starting point for the use of a purposive sampling technique in this study. In the second step, these students are encouraged to share the SurveyMonkey link that was included at the end of the survey with other Saudi medical students who they might think meets the inclusion criteria is the start of the snowball sampling technique. Figure 3 illustrates this study procedure.

Figure 3

Study Procedure



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Data Collection

The data collection period was from January 2019 to October 2019. In October 2019, the primary investigator ended data collection and downloaded the data of $n=157$ participants from SurveyMonkey as an Excel file and stored it on a portable USB flash memory drive. The data containing flash drive was kept securely locked in a cabinet with access only by the primary investigator. The data were then reviewed for completeness and $n=3$ participants were excluded from final analysis. The final analysis included only participants who completed the questionnaire ($n=154$ participants).

Data Analysis

Descriptive statistics were used to report and summarize participants' demographics and responses. Frequency of responses was used to report and summarize gender, medical school phase, medical school year and marital status. Mean scores were reported for each of physical health, psychological, social relationships and the environment domain.

Inferential Statistics

- **An Independent t-test** was used to determine whether there are differences in quality of life perceptions (among the four domains: physical health, psychological, social relationships and environmental) among pre-clinical and clinical phase Saudi medical students.
- **Kendall's Tau** was used to determine whether a relationship exists between quality of life perceptions (among the four domains: physical health, psychological, social relationships and environmental) and year of study in medical school (from year 1 to year 6).
- **An Independent t-test** was used to determine whether there are differences in quality of life perceptions (among the four domains: physical health, psychological, social relationships and environmental) between male and female Saudi medical students.
- Prior to analysis, data were explored to ensure assumptions for inferential analyses were met.
- The study utilized a scale (0-100) score for the domains according to the WHO's guidelines = $[(\text{Scale4-20 Score} - 4) / 16] \times 100$

Mathematically, the 0-100 score is a linear transformation of the sum of Likert scores for items in a particular Domain. Technically, a sum or any linear transformation of a set of

Likert variables produces a composite variable that is ordinal (but not interval) in nature. Sweet and Grace-Martin (2012) and Sullivan and Artino (2013) suggested that parametric statistical methods can be used with a composite variable that is a sum or a linear transformation of a set of Likert variables provided that the following conditions are met:

- The Likert scale for each of the individual survey items contributing to the composite variable consists of at least five points.
 - The composite variable is normally distributed for the subjects in each of the groups used in the statistical tests. (This condition may be relaxed if the sample size for a particular group is at least 30 by the Central Limit Theorem.)
 - There is a minimum sample size of five subjects in each of the groups used in the statistical tests.
 - All these conditions were met, and the primary investigator proceeded with the parametric tests for the first and third research questions.
- For the statistical analysis, the alpha level was at 0.05, with a corresponding power of .80 to protect against type II error.
 - IBM SPSS software 24 version was utilized in this study.

Chapter IV

Results

This chapter presents the demographic characteristics, followed by a detailed presentation of the results of the statistical tests of the dissertation study.

Data Cleaning

Data were obtained from 157 participants. Upon analysis of the response data, 3 were found to have not completed the survey. After removing the incomplete responses, the final data considered of a total 154 responses, which is more than adequate as the a priori analysis required the sample size of 128 as noted in chapter 3 (Appendix F).

Cronbach's Alpha: Reliability of the WHOQOL-BREF

Table 1

<i>Cronbach's Alpha</i>	
Quality of Life Domain	Cronbach's Alpha
Physical Health	.645
Psychological	.778
Social Relationships	.699
Environmental	.684

Table 1 displays the internal consistencies as measured by Cronbach's alpha of the WHOQOL-BREF by domain for the sample of n=154 participants utilized in this study. Cronbach's alpha value of .70 is often used as the minimum acceptability threshold for internal consistency (Nannally, 1978). Based on this standard, both the psychological and social relationship domains have acceptable degree of internal consistency, while the physical and environmental domains each fall slightly short of this standard. Moreover, the Cronbach's alpha

obtained for the physical health and environmental domains in this study are somewhat lower than those other studies on medical school students reported in the literature.

There are several possible reasons why the Cronbach's alpha based on this study's data were lower than what one might expect. One such reason is the relatively small numbers of items comprising each domain on the WHOQOL-BREF. These range from three items for social relationships domain to eight items on the psychological domain. According to Nannally (1978) and Skevington et al. (2014), Cronbach's alpha generally increases as the number of items in the instrument increases. Thus, scales consisting of between three and eight items would tend to have suppressed values of Cronbach's alpha.

Another possible explanation is based on the notion that the measurement of one's quality of life is subjective (The WHOQOL-Group, 1998). Also, since WHO provides no guidance on either what constitutes a minimum quality of life or any objective approaches for a person to measure his or her own quality of life, the evaluation of this concept remains subjective and individualistic (Tempski et al., 2012). Moreover, the variations in the responses on the various items comprising the WHOQOL-BREF might have been due to differences in the respondents' personal views of what constitutes a good quality of life. The increased level of responses variations can reduce the reliability measurements of instrument.

A third possible reason for the lower than expected Cronbach's alphas in this study was the use of the English version of the WHOQOL-BREF tool even though the subjects' native language was Arabic, while in fact English is a required subject in Saudi medical school. The study of Malibary et al. (2019) conducted a quality of life study on a sample of n= 630 Saudi medical students assessed the validity and reliability of Arabic version of the WHOQOL-BREF. The study resulted in a Cronbach's alpha ranged from .76 to .80 which were somewhat higher

than what was obtained from the current study. Therefore, the result of the Malibary et al. (2019) provides further evidence of the possibility of language barriers and sample size that affected the level of reliability. Further explanation to justify other properties in regard to the use of WHOQOL-BREF is discussed in chapter 5.

Principal Axis Factoring

In order to gain better insight into the domains which produced Cronbach alpha values below .70, principal axis factoring analyses were performed on both the physical health and environmental domains. A principal axis factoring analysis was not run for the social relationship domain due to fact this domain consisted of only three items. The purpose of a principal axis factoring analysis is to determine what constructs underlie a set of survey items and how each item maps onto these constructs. The following parameters were employed when running the principal axis factoring analyses in SPSS for both physical and environmental domains:

- Extract factors with eigenvalues greater than 1 (Kaiser's recommendation)
- Orthogonal rotation (varimax)
- Suppress factor loadings below .30

The results of the principal axis factoring analysis are shown in Table 2, Table 3, and Table 4.

Table 2*Physical Health Domain Rotated Factor Matrix^a*

Item	Factor	
	1	2
How satisfied are you with your ability to perform your daily living activities?	.738	
Do you have enough energy for everyday life?	.687	
How satisfied are you with your capacity to work?	.670	
How satisfied are you with your sleep?	.549	
How well are you able to get around?	.501	
How much do you need any medical treatment to function in your daily life?		.684
To what extent do you feel that physical pain prevents you from doing what you need to do?		.535

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

^a Rotation converged in 3 iterations.

- There were two principal factors for the physical health domain with the first five items mapping onto factor 1 and the latter two items mapping onto factor 2.
- The number appearing in the body of the table are factor loadings. The factor loading (which range from -1 to +1) is a measure of the correlation given item and the particular principal factor.
- An examination of the five items mapping into factor 1 reveal that they all deal with the ability to perform and the satisfaction from the activities of a person's daily life.
- An examination of the two items mapping to factor 2, both focus on impediments to one's physical functioning – pain and necessary medical treatment.

Table 3*Environmental Domain Rotated Factor Matrix^a*

Item	Factor	
	1	2
How satisfied are you with the conditions of your living place?	.554	.340
How satisfied are you with your access to health services?	.554	
How available to you is the information that you need in your day-to-day life?	.481	
How healthy is your physical environment?	.356	
How safe do you feel in your daily life?		
To what extent do you have the opportunity for leisure activities?		.519
How satisfied are you with your mode of transportation?		.498
Have you enough money to meet your needs?	.327	.419

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

^a Rotation converged in 3 iterations.

- There were two principal factors for the environmental domain with the first four items mapping onto factor 1 and three items mapping onto factor 2.
- The fifth item - How safe do you feel in your daily life? - is not mapped to either principal factor in the above Table 3. This is due to the fact that factor loadings less than .30 are not shown on the table in order to make the table easier to read and interpret. If the factor loading suppression threshold were reduced to .10, the rotated factor matrix table would show for this item factor loadings of .295 and .255 for factor 1 and factor 2, respectively. Hence, this item should be mapped to factor 1.
- An examination of the five items mapping to factor 1 reveal that they all deal with aspects of the environment in which a person resides (ranging from his/her home to his/her community).
- An examination of the three items mapping to factor 2 reveal that they all deal more with a person's individual circumstances or choices than with his or her environment.

Implications from the Principal Axis Factoring Analyses

Table 4

Implications from the Principal Axis Factoring Analyses

	Physical Health	Environmental
Subdomain A	Daily life activities	Aspects of a person's environment
Subdomain B	Physical functioning	Individual circumstances and choices

Principal axis factoring analyses performed on the physical and environmental domains suggest that each of these domains could be properly split into two subdomains (Table 4). The physical health domain could be broken out into one subdomain dealing with a person's performance of and satisfaction with daily life activities and another subdomain focusing on the impediments to person's physical functioning. Likewise, the environmental domain could be split into the following two subdomains: the first dealing with various aspects of the environment in which the person resides and the second concentrating on one's individual circumstances and choices.

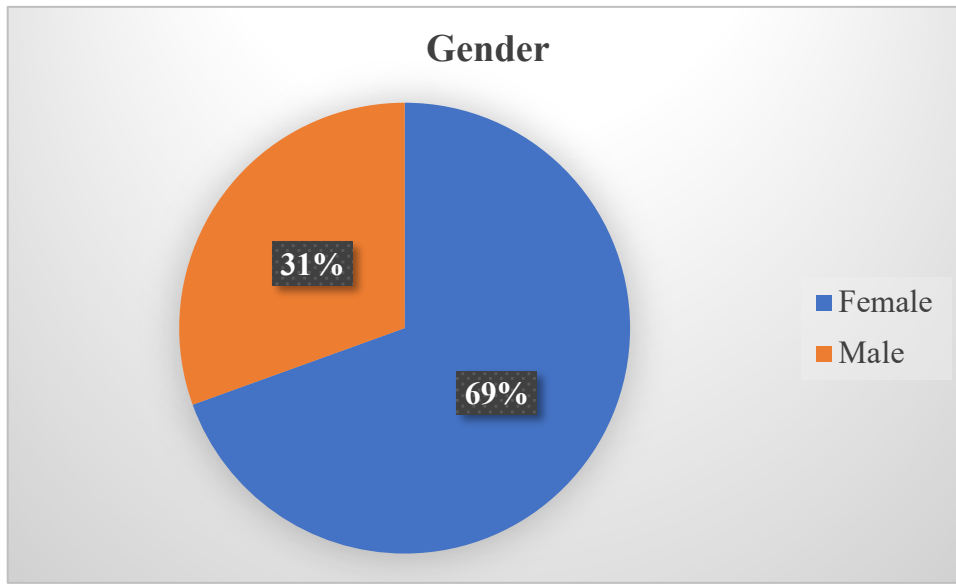
Descriptive Statistics

Sample Characteristics

A total of n=154 Saudi medical students participated in the study. Prior to performing statistical analysis to answer the research questions, various descriptive statistics were generated to better understand the collected sample.

Figure 4

Distribution of Study Participants by Gender



As shown in Figure 4, 107 (69%) of the study participants were female, and 47 (31%) of the subjects were male

Figure 5

Distribution of Study Participants by Marital Status

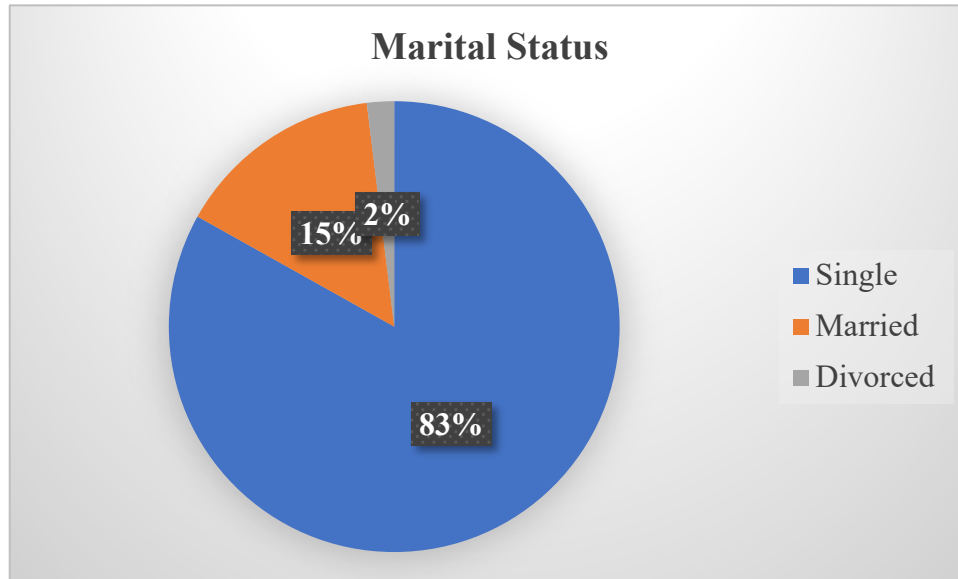


Figure 5 reveals that the vast majority, 128 (83%), of the study participants were single, while 23 (15%) of the subjects were married and the remaining 3 (2%) were divorced

Figure 6

Distribution of Study Participants by Medical School Year

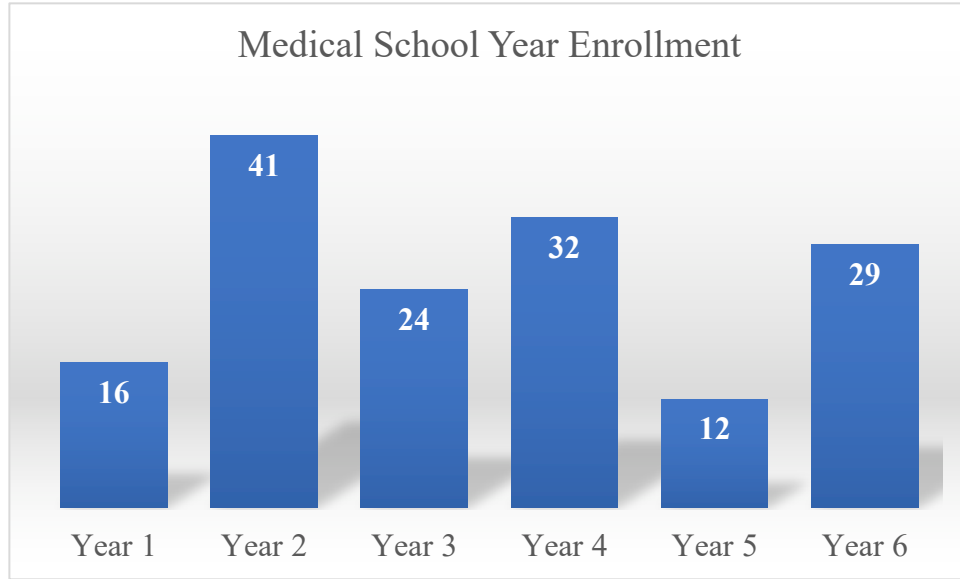
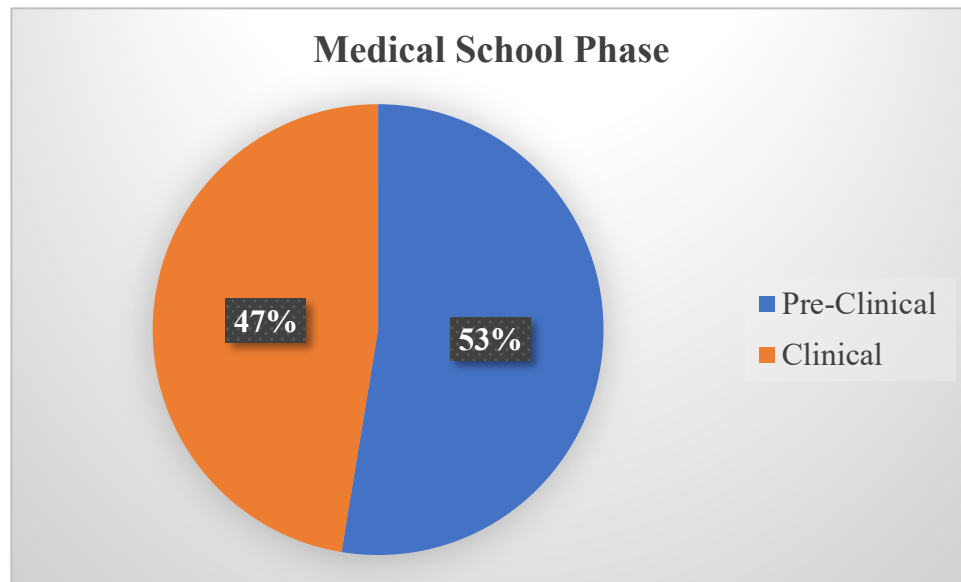


Figure 6 displays the breakout of the students included in the study sample among the six years of medical school. The year with the greatest number of participants was year 2, with 41 students (26.6%), followed by year 4 with 32 (20.8%), year 6 with 29 (18.8%), year 3 with 24 (15.6%), year 1 with 16 (10.4%) and year 5 with 12 students (7.8%).

Figure 7

Distribution of Study Participants Medical School Phase



The class years in Saudi medical schools are grouped into the pre-clinical phase (consisting of years 1-3) followed by the clinical phase (years 4-6). Figure 7 shows that the study sample was approximately equally split between 81 (53%) pre-clinical students and 73 (47%) clinical students.

Figure 8

Study Participants' Response to "How would you rate your quality of life?"

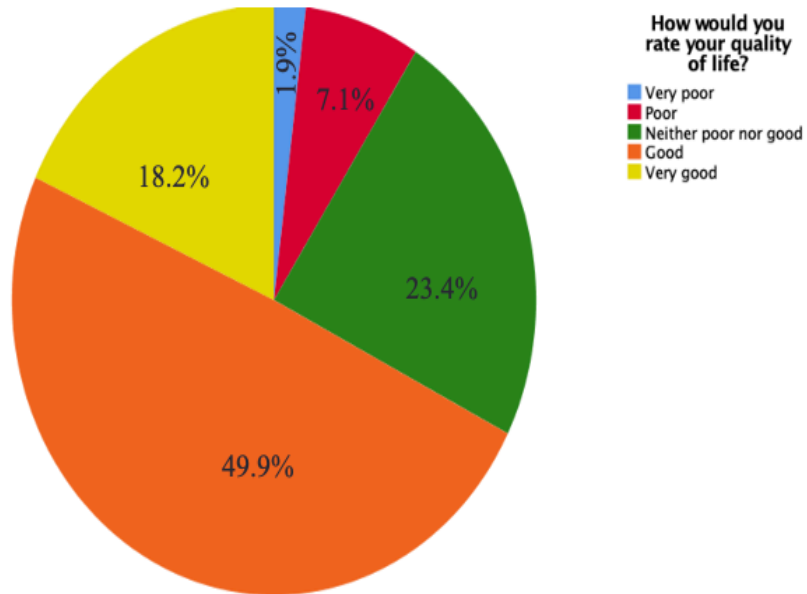
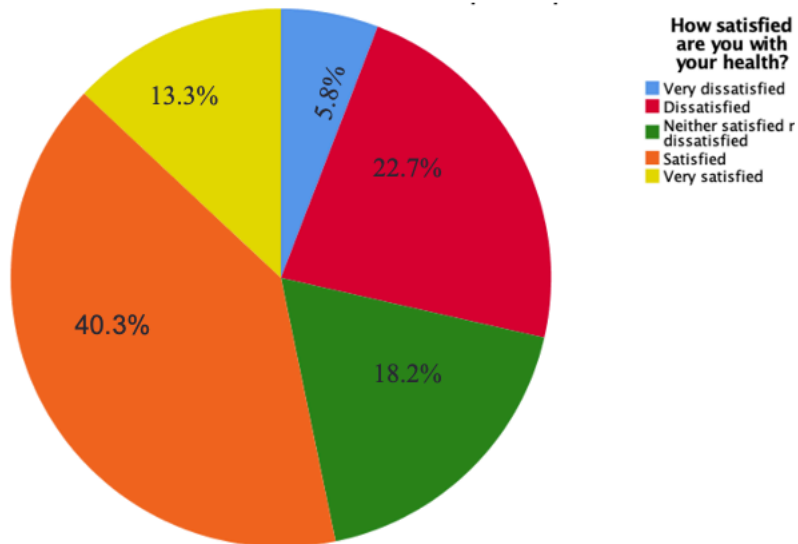


Figure 9

Study Participants' Response to "How satisfied are you with your health?"



In addition to the 24 questions on the WHOQOL-BREF which are mapped to the four domains of this instrument, the tool contains two additional items. One item asks about the individual's overall quality of life, and the other asks about the person's overall health status. For the purpose of this study, both these items were included for informational purposes only as they were not included as part of the domain scores used to answer the research questions. Figures 8 and 9 display the distribution of the study participant's' responses to these two questions. For the question asking about overall quality of life, about half of the students (49.9%) rated their quality of life as good and almost a quarter of the participants (23.4%) felt that their life was neither poor nor good, followed by 18.2%, 7.1%, and 1.9% who believed that their lives were very good, poor, and very poor, respectively. With regard to the overall health status question, 40.3% of the students were satisfied with their health, and 22.7% of the participants were dissatisfied with their level of health, while the health ratings of "neither satisfied nor dissatisfied", "very satisfied", and "very dissatisfied" received 18.2%, 13.3%, and 5.8% of the responses, respectively.

As explained in Chapter III, composite scores for each of the four domains by participant were obtained by summing the Likert scores for the items that mapped to each domain. These composite scores by domain were then each converted to a 0-100 scale by applying linear transformation. The scores were scaled so that a higher score denotes a better quality of life (WHOQOL-Group, 1998). As shown in Table 5, for the study sample the environmental domain had the highest mean scaled score of 63.53, followed by social relationships with a mean score of 58.87, physical health with 57.25 and psychological health with 53.78.

Table 5*Mean Scaled Scores by WHOQOL-BREF Domain*

QOL Domain	n	Mean Score (0 - 100 Scale)
Physical Health	154	57.25
Psychological	154	53.78
Social Relationships	154	58.87
Environmental	154	63.53

Inferential Statistics**Quality of Life Perceptions and Medical School Phase (Pre-Clinical and Clinical)**

- **Research Question 1.** Are there differences in quality of life perceptions (among the four domains) among pre-clinical and clinical phases Saudi medical students?
 - H10_a: There are no differences in quality of life perceptions among pre-clinical and clinical phases Saudi medical students.
 - H1_b: There are a difference in quality of life perceptions among pre-clinical and clinical phases Saudi medical students.

Assumptions. To check the normality assumptions, both the Kolmogorov-Smirnov and Shapiro-Wilk tests of normality were run, the results of which are given in Table 6. According to both Gasemi and Zahediasi (2012) and Razali and Wah (2011), the Shapiro-Wilk normality test is more powerful than the Kolmogorov-Smirnov test for sample size up to n=2,000. Therefore, the primary investigator relied on the Shapiro-Wilk test results to assess the normality of the data. The Shapiro-Wilk test revealed that the normality assumption was met for the pre-clinical group across all four domains as well as for the clinical group for the physical health and environmental domains. For both the psychological and social relationships domain for the

clinical group, however, the distribution of the scores were significantly different from normal since the corresponding p-values were both less than .05. Despite these significant results indicating non-normality, the sample distributions (i.e., distribution of sample means) for the clinical group's psychological and social relationships domains were deemed to be approximately normal due to the Central Limit Theorem since the sample size for this group more than $n=30$. This was sufficient to meet the normality assumption for clinical phase students' scores in these two domains (Field, 2013)

Table 6*Tests of Normality*

Domain	Medical School Phase	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	Df	p	Statistic	df	P
Physical Health	Pre-clinical	.11	81	.016	.99	81	.489
	Clinical	.10	73	.083	.97	73	.062
Psychological	Pre-clinical	.10	81	.060	.98	81	.306
	Clinical	.12	73	.012	.93	73	.001
Social Relationships	Pre-clinical	.10	81	.062	.97	81	.070
	Clinical	.16	73	.000	.94	73	.001
Environmental	Pre-clinical	.07	81	.200*	.98	81	.427
	Clinical	.12	73	.018	.98	73	.372

* This is a lower bound of the true significance.

^a Lilliefors Significance Correction

Table 7 and Figure 10 displays the mean domain scores (each on a 0-100 scale) of the collected sample for the pre-clinical and clinical phase Saudi medical students.

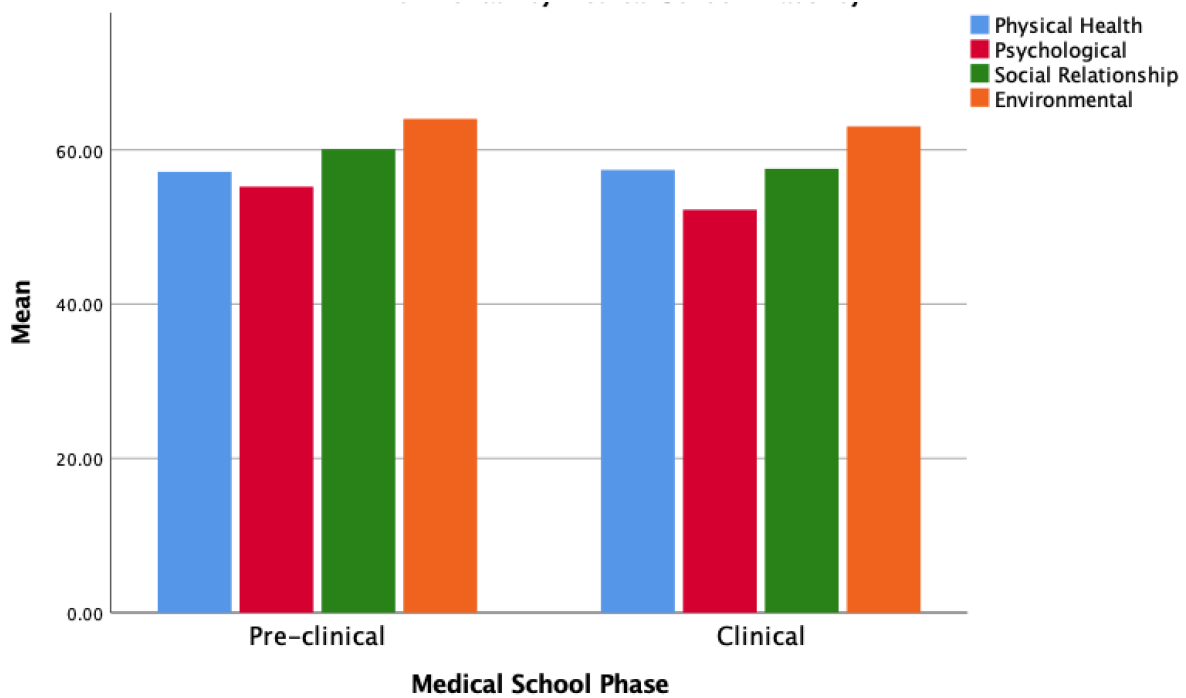
Table 7

Group Statistics

Domain	Medical School Phase	N	M	SD	SE
Physical Health	Pre-clinical	81	57.14	15.44	1.72
	Clinical	73	57.39	14.25	1.67
Psychological	Pre-clinical	81	55.20	19.08	2.12
	Clinical	73	52.23	17.51	2.05
Social Relationships	Pre-clinical	81	60.08	23.00	2.56
	Clinical	73	57.53	20.66	2.42
Environmental	Pre-clinical	81	64.00	14.41	1.60
	Clinical	73	63.01	13.42	1.57

Figure 10

Mean Quality of Life by Domain for Pre-clinical and Clinical Phase Saudi Medical Students



For each of the four domains, the non-significant, Levene's test results shown on Table 8 shows that the variances of the scores for the pre-clinical versus the clinical groups were approximately equal. Hence, the homogeneity of variance assumption was met for each domain.

- Physical health domain: $F(1,152) = .34, p=.560 > .05$
- Psychological domain: $F(1, 152) = .68, p=.412 > .05$
- Social relationships domain: $F(1, 152) = .73, p= .395 > .05$
- Environmental domain: $F(1, 152) = .45, p=.505 > .05$

Given that the homogeneity of variance assumption was met for each domain, the “equal variance assumed” independent sample t-test results shown on Table 8 for the four domains were used. These t-test results were all non-significant.

- Physical health domain: $t(152) = -.10, p = .919 > .05$
- Psychological domain: $t(152) = 1.00, p = .318 > .05$
- Social Relationships domain: $t(152) = .72, p = .472 > .05$
- Environmental domain: $t(152) = .44, p = .661 > .05$

Based on these non-significant results, for each of the four domains there was no meaningful differences in quality of life perceptions between Saudi students in the pre-clinical versus the clinical phases of their medical educations.

Table 8*Independent Samples Test*

Domain		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	p	t	df	p (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
		Physical Health	Equal variances assumed	.34	.560	-.10	152	.919	-.24	2.40
	Equal variances not assumed			-.10	151.91	.919	-.24	2.39	-4.97	4.48
Psychological	Equal variances assumed	.68	.412	1.00	152	.318	2.97	2.96	-2.88	8.82
	Equal variances not assumed			1.01	151.94	.316	2.97	2.95	-2.86	8.80
Social Relationships	Equal variances assumed	.73	.395	.72	152	.472	2.55	3.54	-4.44	9.54
	Equal variances not assumed			.72	152.00	.470	2.55	3.52	-4.40	9.50
Environmental	Equal variances assumed	.45	.505	.44	152	.661	.99	2.25	-3.46	5.44
	Equal variances not assumed			.44	151.83	.659	.99	2.24	-3.44	5.42

Quality of Life Perceptions and Year of Medical School (from year 1 to year 6)

- **Research question 2.** Are there a relationship exists between quality of life perceptions (among the four domains) and year of study (from year 1 to year 6) among Saudi medical students?
 - H2_a: There are no relationship between quality of life perceptions (4 domains) and year of study among Saudi medical students
 - H2_b: There is a relationship between quality of life perceptions (4 domains) and year of study among Saudi medical students

To determine which relationship test between the two variables would be most appropriate to use, the principle investigator considered a few issues. While a rationale could be made to treat the domain scores as interval variable (as explained in Chapter III based on the results of Sweet and Grace-Martin (2012) and Sullivan and Artino (2013), the class year variable was ordinal – but not interval or ratio- in nature. This class year variable did not meet the criteria to be considered an interval level variable as outlined by these authors. Because of this, the use of non-parametric relationship test was appropriate. The Spearman's rho and the Kendall's tau are two non-parametric relationship test that can be used when both variables are ordinal or when one variable is ordinal and the other is interval/ratio in nature. When at least one of the variables has many tied ranks, the Kendall's tau is preferred over Spearman's rho (Field, 2013). This was indeed the case with the class year variable, because the number of participants at each of the six possible values for this variable – i.e., year 1 through year 6- ranged from 12 to 41. Therefore, the Kendall tau is the preferred choice of test to evaluate Research Question 2.

The results of Kendall's tau correlation tests which are shown in Tables 9 through 12 are non-significant for all the domains.

- Physical health domain (($T_b = .007$, $p = .910 > .05$))
- Psychological domain (($T_b = -.053$, $p = .387 > .05$))
- Social relationships domain (($T_b = -.053$, $p = .393 > .05$))
- Environmental domain (($T_b = -.052$, $p = .388 > .05$))

Based on these non-significant results, for each of the four domains there was no meaningful relationship between quality of life perception and year of study among Saudi medical students.

Table 9

Correlations

			Physical Health	Medical School Year
Kendall's tau_b	Physical Health	Correlation Coefficient	1.000	.007
		Sig. (2-tailed)	.	.910
		N	154	154
	Medical School Year	Correlation Coefficient	.007	1.000
		Sig. (2-tailed)	.910	.
		N	154	154

Table 10

Correlations

			Psychological	Medical School Year
Kendall's tau_b	Psychological	Correlation Coefficient	1.000	-.053
		Sig. (2-tailed)	.	.387
		N	154	154
	Medical School Year	Correlation Coefficient	-.053	1.000
		Sig. (2-tailed)	.387	.
		N	154	154

Table 11*Correlations*

			Social Relationship	Medical School Year
Kendall's tau_b	Social Relationship	Correlation	1.000	-.053
		Coefficient		
		Sig. (2-tailed)	.	.393
		N	154	154
	Medical School Year	Correlation	-.053	1.000
		Coefficient		
		Sig. (2-tailed)	.393	.
		N	154	154

Table 12*Correlations*

			Environmental	Medical School Year
Kendall's tau_b	Environmental	Correlation	1.000	-.052
		Coefficient		
		Sig. (2-tailed)	.	.388
		N	154	154
	Medical School Year	Correlation	-.052	1.000
		Coefficient		
		Sig. (2-tailed)	.388	.
		N	154	154

Quality of Life Perceptions and Gender (Male/Female)

Research question 3. Are there differences between quality of life perceptions (among the four domains) between male and female Saudi medical students?

- H3_a: There are no differences (4 domains) between quality of life perceptions between male and female Saudi medical students
- H3_b: There are a difference between quality of life perceptions (4 domains) between male and female Saudi medical students.

Assumptions. To test the hypotheses associated with Research Question 3, the primary investigator performed a separate independent samples t-test for each of the four domains. Before running these analyses, the primary investigator checked to see if the assumptions needed for this particular statistical test were satisfied.

Table 13*Tests of Normality*

Domain	Gender	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	Df	p	Statistic	df	p
Physical Health	Male	.10	47	.200*	.97	47	.378
	Female	.08	107	.066	.99	107	.260
Psychological	Male	.19	47	.000	.92	47	.003
	Female	.13	107	.000	.97	107	.017
Social Relationships	Male	.15	47	.015	.95	47	.041
	Female	.13	107	.000	.97	107	.010
Environmental	Male	.11	47	.200*	.97	47	.281
	Female	.07	107	.200*	.99	107	.783

* This is a lower bound of the true significance.

^a Lilliefors Significance Correction

To check for normality assumptions, both the Kolmogorov-Smirnov and Shapiro-Wilk test of normality were run, the results of which are given in Table 13. According to both Gasemi and Zahediasi (2012) and Razali and Wah (2011), the Shapiro-Wilk normality test is more powerful than the Kolmogorov-Smirnov test for sample sizes up to $n=2,000$. Therefore, the primary investigator relied on the Shapiro-Wilk test results to assess the normality of the data.

The Shapiro-Wilk test revealed that the normality assumption was met for both male and females for the physical health and environmental domains but not for the psychological and social relationships domains as the corresponding p-values for these domains were less than .05. Despite these significant results indicating non-normality, both male and female sampling distributions (i.e., distributions of sample means) for the psychological and social relationships domains for both males and females were deemed to be approximately normal due to the Central Limit Theorem since the sample sizes for both gender groups was more than $n=30$. This was sufficient to meet the normality assumption for the psychological and social relationships domain (Field, 2013).

Table 14 and Figure 11 display the mean domain scores (each on a 0-100 scale) for the collected sample separately for male and female students. The figure reveals that the female students had lower quality of life scores in each of the four domains than the male students.

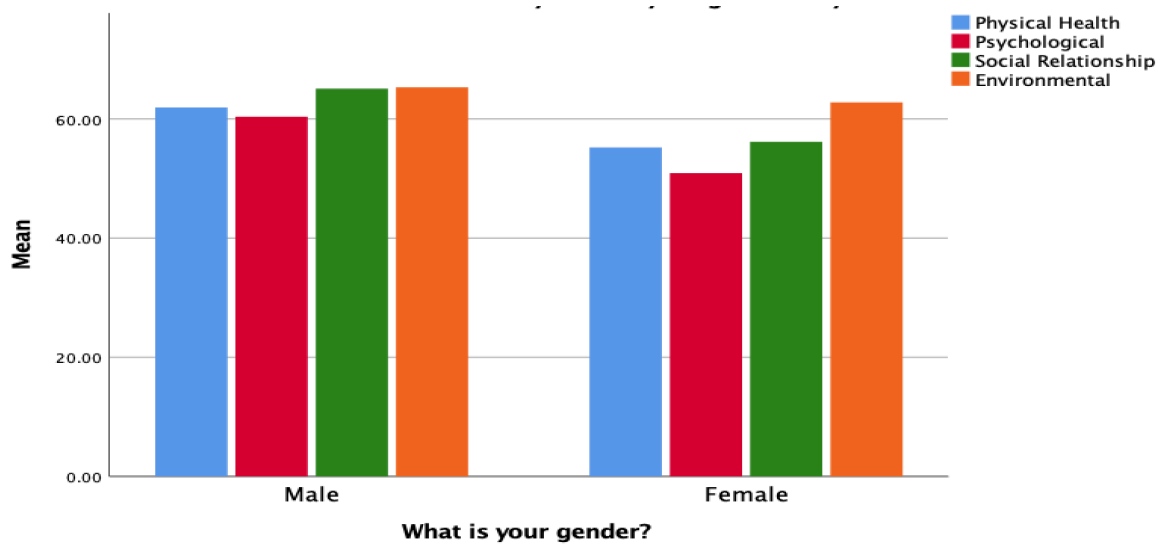
Table 14

Group Statistics

Domain	Gender	N	M	SD	SE
Physical Health	Male	47	61.93	13.60	1.98
	Female	107	55.21	14.96	1.45
Psychological	Male	47	60.37	16.13	2.35
	Female	107	50.90	18.59	1.80
Social Relationships	Male	47	65.07	22.90	3.34
	Female	107	56.15	20.96	2.03
Environmental	Male	47	65.29	12.62	1.84
	Female	107	62.76	14.44	1.40

Figure 11

Mean Quality of Life Scores by Domain For Male Versus Female Saudi Medical Students



Data Analysis. An Independent t-test was conducted, and the assumptions for the independent samples t-test were met by this particular research question.

For each of the four domains, the non-significant Levene's test results shown on Table 15 imply that the variances for the scores for male versus female students' groups were approximately equal. Thus, the homogeneity of variance assumption was met for each domain.

- Physical health domain: $F(1, 152) = .50, p = .479 > .05$
- Psychological domain: $F(1, 152) = .24, p = .627 > .05$
- Social Relationships domain: $F(1, 152) = .44, p = .510 > .05$
- Environmental domain: $F(1, 152) = 1.52, p = .219 > .05$

Given that the homogeneity of variance assumption was met for each domain, the “equal variances assumed” independent samples t-test results are shown on Table 15 for the four domains. The results of these t-test were as follows:

- Physical health domain (($t(152) = 2.64, p = .009 < .05$))
- Psychological domain (($t(152) = 3.03, p = .003 < .05$))
- Social relationships domain (($t(152) = 2.36, p = .019 < .05$))
- Environmental domain (($t(152) = 1.04, p = .300 > .05$))

The independent samples t-test produced statistically significant results for the physical health, psychological, and social relationships domain, but not-significant results for the environmental domain. Therefore, for the first three domains, the null hypothesis was rejected but was retained for the environmental domain. Since mean quality of life scores for female students were lower than those for male students in each of the domains registering significant results, the principle investigator concluded that women attending Saudi medical schools have a

poorer quality of life as compared to their male counterparts in regard to physical health, psychological, and social relationships.

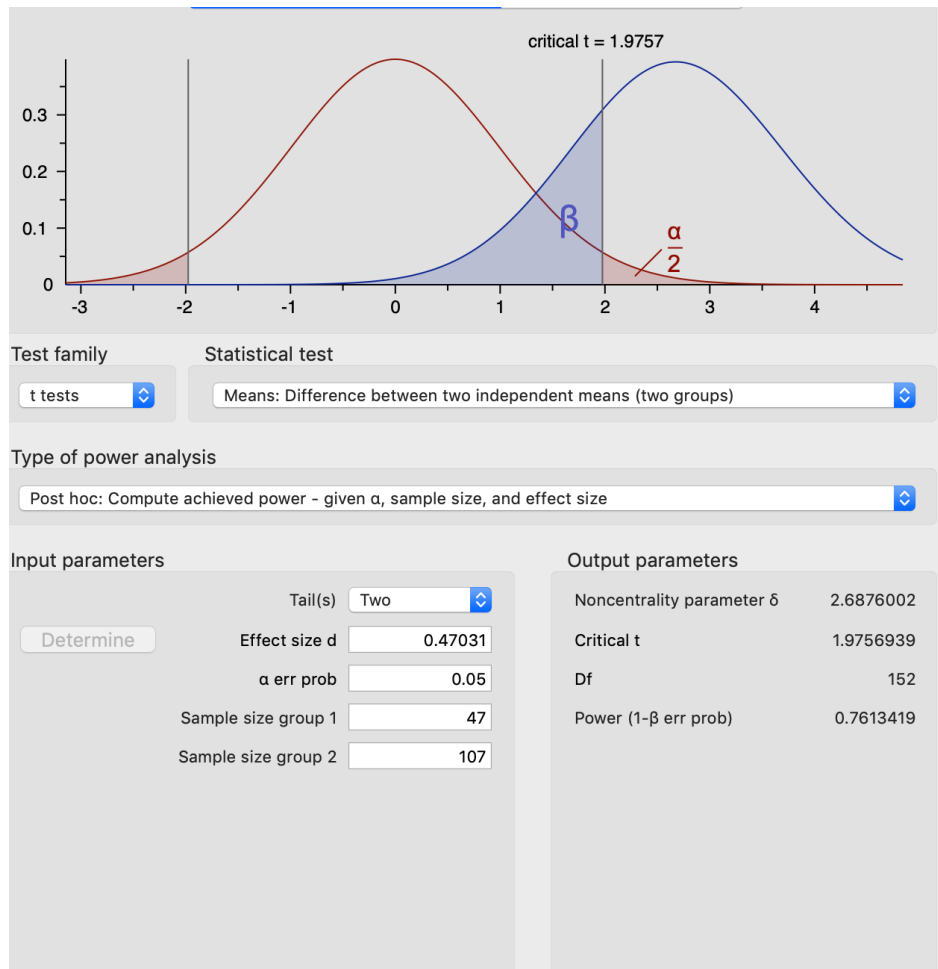
Table 15*Independent Samples Test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	p	t	Df	p (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Domain									Lower	Upper
Physical Health	Equal variances assumed	.504	.479	2.64	152	.009	6.72	2.55	1.69	11.76
	Equal variances not assumed			2.74	96.16	.007	6.72	2.45	1.85	11.60
Psychological	Equal variances assumed	.237	.627	3.03	152	.003	9.48	3.13	3.29	15.66
	Equal variances not assumed			3.20	100.47	.002	9.48	2.96	3.60	15.35
Social Relationships	Equal variances assumed	.437	.510	2.36	152	.019	8.92	3.77	1.46	16.37
	Equal variances not assumed			2.28	81.32	.025	8.92	3.91	1.15	16.69
Environmental	Equal variances assumed	1.52	.219	1.04	152	.300	2.53	2.43	-2.28	7.34
	Equal variances not assumed			1.10	99.76	.276	2.53	2.31	-2.05	7.11

Post-Hoc G*Power Analysis

Figure 12

*Post-Hoc G*Power Analysis*

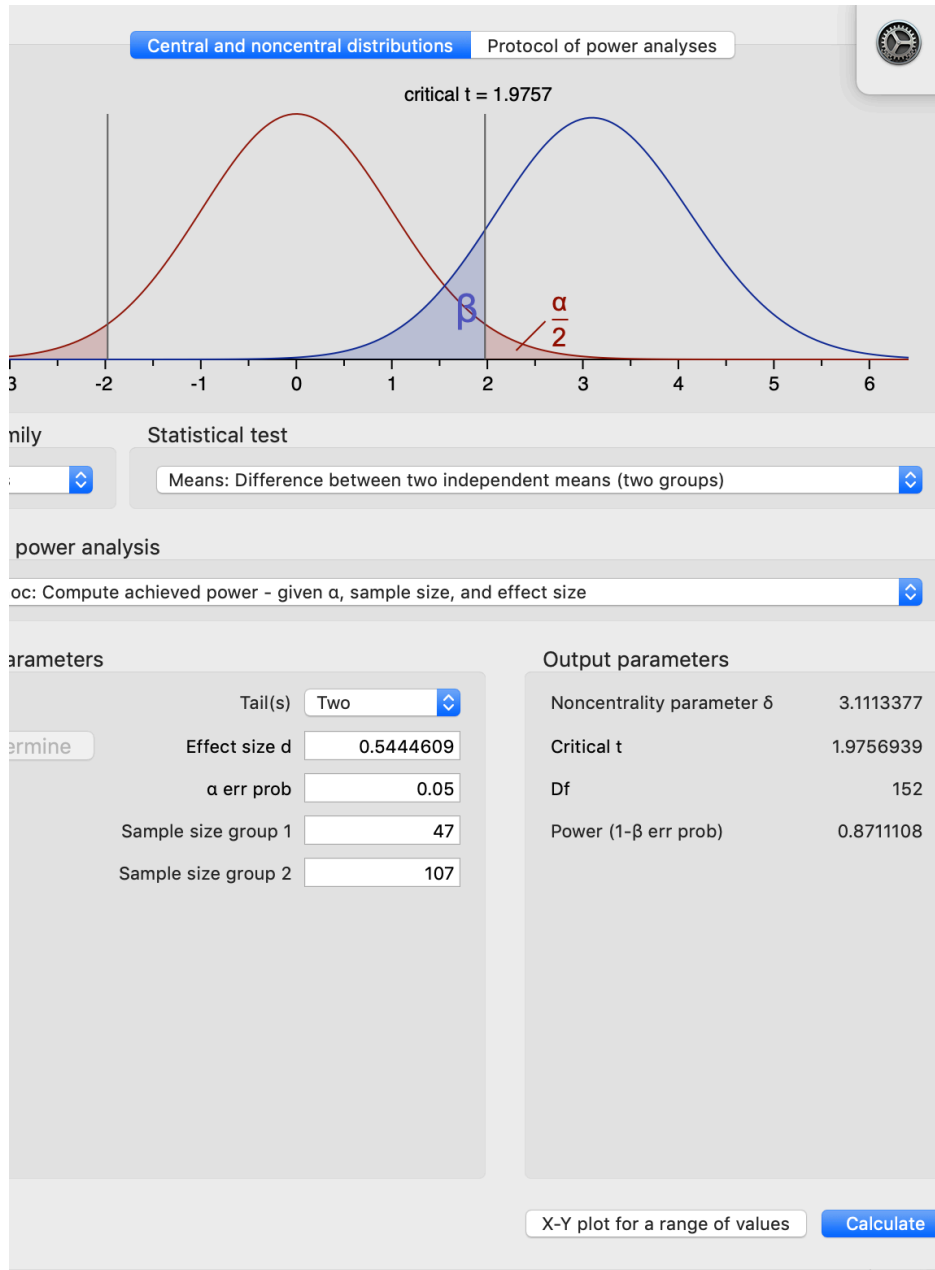


Note. The statistical power for the significant result for the physical health domain and gender.

The power resulted in .76, which is less than the recommended power of .80. Its recommended to increase sample size to reach a minimum power of .80.

Figure 13

*Post-Hoc G*Power Analysis*



Note. This figure illustrates the statistical power for the significant result of the psychological domain and gender. The power resulted in .87 which exceeds the minimum recommended power level of .80. Thus, there is a probability to reject the null hypothesis (if false) 100% of the time.

Chapter V

Discussion and Conclusion

To gain perspectives on the result of this study, the primary investigator made comparisons to the findings of other studies in the literature that attempted to assess the quality of life of medical students using the WHOQOL-BREF instrument. First, the domain mean scores were compared based on the sample for each of the four domains of the instrument to the corresponding mean domain scores obtained from other relevant studies. Second, the three subsequent subsections compare the results of each of the hypothesis tests performed by these other studies.

Mean WHOQOL-BREF Domain Scores

For each of the four domains comprising the WHOQOL-BREF instrument, the authors of the tool explain that the domain scores are such that the higher score implies a better quality of life with respect to that domain. Nevertheless, the WHO supplies no specific guidance such as cutoff points with regard to what ranges of domain scores constitute a good, acceptable, or poor quality of life (The WHOQOL Group, 1998). In this study, the mean domain scores (each expressed on a 0-100 scale) were 57.25 for the physical health domain, 53.87 for the psychological domain, 58.87 for the social relationship's domain, and 63.53 for the environmental domain. When compared to the mean domain scores from other studies in the literature that utilize the WHOQOL-BREF to measure the quality of life of medical students, the mean domain scores from this investigation tended to be lower.

It can be acknowledged that this outcome was primarily due to specific facets within each domain that had unusually low mean scores. By determining what these particular facets are, one

could gain insight into what aspects of Saudi medical students' existence have the greatest negative influence on their QOL.

For the physical health domain, the sleep and rest facet had the lowest mean score. Students often enter medical school both unaware of being emotionally unprepared to cope with its many challenges. In the literature, many authors emphasized that during the first years of medical school, students had deficit hours of sleep. A study of Brazilian medical students by Pagnin and Queiroz (2015) detected that the decrease in the physical health domain was connected to emotional exhaustion and low sleep quality, thus affecting one's energy and engagement with the academic demands. Moreover, Azad et al. (2014) emphasized that given their large academic load, medical students' deficits of sleep and rest are most acute when it is close to exam periods. Thus, Mahmoud and Fareed (2018) expressed the necessity of considering students' health and wellbeing as part of the strategies taken by the medical school to improve the quality of their education programs. This is important because medical students need to maintain good physical and mental health to be capable of handling academic challenges (Pagnin and Queiroz, 2015).

For the psychological domain, the negative feelings facet had the lowest means score. As medical students face great academic pressure, they experience high levels of stress. Mental distress becomes a major concern for students during medical school. Zhang et al. (2012) emphasized that medical schools need to pay attention to and show concern for medical students' psychological problems and give them the necessary psychological counseling. The authors further explained that a student's interest in his or her career development had an impact on their QOL. Students with an active study attitude would be more likely to pay attention to their studies and therefore would tend to have a greater enthusiasm toward their field of study. As a result,

these students would yield better academic performance and hence have a better QOL from both a physical aspect and a mental health aspect compared to students with lower levels of interest and confidence in their studies and future careers. Moreover, Naseem et al. (2016) addressed that experiencing long-term stress can induce some permanent personality changes in an individual, and consequently a student may become to be physicians with undesirable personality traits affecting both communication with the patients and the quality of care provided to patients. As such, medical schools must develop reforms in their education program to relieve the pressure from medical courses that may have a negative impact on a medical student's psychological health.

For the social relationship domain, the personal relations facet had the lowest mean score. Dyrbye et al. (2005) acknowledged that medical students with detached attitudes toward medical learning are less likely to maintain altruistic and positive attitudes toward their social responsibilities. Moreover, Zhang et al. (2012) pointed out that medical students from rural areas tend to have lower scores in the social relationship domain. The authors' explanation for this result was that these students had to leave their homes and adapt to a new life in the city, which for some resulted in experiencing a degree of culture shock that in turn could cause both lower self-esteem and challenges in dealing with social relationships.

Last, for the environmental domain, the recreation and leisure facet had the lowest mean score. Both Tempiski et al. (2012) and Bergmann et al. (2019) identified the reason for this as possibly due to restrictions on the amount of time medical students have for leisure pursuits as a result of the extensive requirements of most medical school programs. The inability to participate in recreational and leisure activities does negatively affect medical students' private lives. As a

result, opportunities for recreation and leisure must be offered to medical students to enable them to have an acceptable quality of life within the medical school learning environment.

The above discussion about the facets that scored the lowest within each domain provides insight into what factors are of greatest concern to Saudi medical students regarding their QOL. Saudi medical schools need to recognize what these factors are and make appropriate modifications to their programs and address these issues for the benefit of their students (Shareef et al., 2015). These changes to improve students' QOL would be most effective when identified and dealt with at the early phases of a student's medical education. Particularly important for the quest to improve QOL during the early phase of medical school is the implementation of strategies designed to manage stress within the learning environment (Pagnin & Queiroz, 2015). Providing medical students with a more conducive learning atmosphere along with psychological support results in physicians who are both more capable and more socially adept to their patients (Tempski et al., 2012).

Quality of Life Perceptions and Medical School Phase (Pre-Clinical and Clinical)

The current study showed that differences in the QOL perceptions in each of the four domains of the WHOQOL-BREF between the pre-clinical and clinical phases for Saudi medical students were not significant. These findings were consistent with other studies in the literature. The study by Pagnin and De Queiroz (2015) compared a sample of n=193 Brazilian medical students at the ends of the pre-clinical phase (the second year), the clinical phase (the fourth year), and the internship phase (the sixth year) of their training. The study result found that students' QOL did not differ significantly at these three points of their medical school years. The authors believed that this outcome may be the result of a learning environment within the

Brazilian medical schools in which students receive enough support and preparation to move smoothly between the various phases of their medical education.

In contrast, a study by Zhang et al. (2012) conducted on a sample of n=1,686 Chinese medical students revealed that there was significant QOL differences existed in both the psychological and the social relationship domains between the various years of study in medical school. Particularly, third-year students who just began their clinical phase of training had the lowest quality of life scores in both these domains as compared to students in other years of their medical education. The courses taken by third-year students in Chinese medical schools involve contact with real patients for the first time, and many of these students feel that they do not have enough knowledge and skills to interact with patients (Zhang et al., 2012). According to the authors, this is the primary reason for the decline in these students' quality of life scores.

It was surprising to find that there were no statistically significant differences in any of the four quality of life domains between Saudi medical students in the pre-clinical versus clinical phase of their medical education. This result could be due to the relatively small numbers of students recruited in the pre-clinical and clinical phases (n=81, and n=73, respectively) especially in comparison to the n=1,686 students utilized in the Zhang et al. (2012), study which did produce statistically significant results. Perhaps the relatively small sample size in the current study may have resulted in a false negative result and limited the ability to identify a significant effect. Moreover, as Pagnin and Queiroz (2015) suggested, the non-significant result could be due to the nature of the curriculum and the several preparations. In fact, these Saudi medical students could have been introduced to such preparations as they become well prepared to move from the pre-clinical to the clinical phase. Therefore, this study promotes further investigation to

identify other factors that may be involved such as the academic learning environment and the availability of a support system within the medical school environment.

Quality of Life Perceptions and Year of Medical School (from year 1 to year 6)

Interestingly, within all four domains there appeared no significant relationship between quality of life perception and year of study (from year 1 to year 6). These findings contrasted with those that Chazan et al. (2015) obtained, in which students being in the third or sixth year of study held a significantly negative association with all the domains. The authors explained that students in their third-year experience both the challenges of dealing with patients for the first time and the demands of a heavy academic course load. Regarding the sixth year, students experience high levels of pressure related to graduation and the responsibility to fully exercise the profession. The authors recommended a process of curriculum improvement that would prioritize a careful look at the students in the third and sixth year of study, offering activities that help them to better perceive and cope with the stress of professional training.

A possible reason for the non-significant results in the current study may be found in an explanation by Malibary et al. (2019). These authors stated that the nature of the curriculum and academic preparations that medical students encounter in their early years of medical school can be constructed to give them some exposure to the learning environments and workloads that they will see in their later years of medical school. Therefore, Saudi medical students who participated in this study, possibly encountered initiatives within their medical school experience. This may be the reason the participating students did not experience the drastic quality of life changes as they progressed from one year to the next within the medical school.

Quality of Life Perceptions and Gender (Male/Female)

This study has revealed that there were significant differences in the quality of life perceptions between male and female Saudi medical students regarding the physical health, psychological and social relationship domains. Female students achieved lower scores than males in each of these domains. These findings were consistent with other studies in the literature.

The study by Shareef et al. (2015) involved Saudi medical students in their pre-clinical phase. These authors revealed a gender effect, in which male students scored higher than females in the physical and psychological domains. The authors pointed out that the reason may be due to cultural and social aspects of being female in Saudi Arabia. Many other factors may have affected female medical students' QOL. Further, the authors referred to a study by Habib (2013) on the decrease in the physical health domain, stating that females' contributions in physical activity and exercise were significantly lower those that of their male peers. Moreover, a study by Zhang et al. (2012) found that male medical students scored significantly higher than female students in the psychological domain. The reason cited by the authors for this outcome was that women are more emotional and sensitive to pressure than men (Moffat et al., 2004).

Regarding the health concern that could affect the quality of life among female medical students, Tanmahasamut and Chawengsettakul (2012) revealed that dysmenorrhea and premenstrual dysphoric disorder both have a high prevalence rate among this population. Thus, women's health care needs to be better addressed within the medical school system to improve and maintain their QOL. However, most of the female students in this study were single, and it has been emphasized in the literature that married status among medical students boosts their quality of life perceptions. Heidari et al. (2013) found that married status among medical

students in Iran showed a better QOL. This is consistent with a research study by Alshibani and Al-Kattan (2019), which showed that married female dental students reported higher scores in QOL domains. The authors related this to social maturity, companionship, and spousal support. Therefore, several other factors that may affect the QOL among female Saudi medical students.

Educational Implications

According to Henning et al. (2010), QOL represents an essential component of medical learning and has strong links with the practice of medicine. Therefore, it is important to consider medical students' QOL as a component of strategies designed to improve medical school programs. These students often begin their medical educations unaware of and emotionally unprepared to cope with the many challenges inherent in such programs (Abdelrahman et al., 2013).

For each of the four domains measured by the WHOQOL-BREF instrument, the mean domain scores for the sample of n=154 Saudi medical students utilized in the current study were lower than the corresponding mean domain scores reported in the literature from other studies conducted on medical students. The issues raised in this discussion may provide some insights into possible ways of modifying the learning environments of Saudi medical students which would improve their QOL as they progress in becoming physicians. Further, these initiatives will help improve both the level of competency and the degree of social awareness of these future doctors who will constitute the Saudi medical profession.

Furthermore, addressing students' individual characteristics may provide valuable insights into their QOL perspectives. The current study shows that female Saudi medical students performed lower than male students regarding the physical health, psychological, and social

relationships domain; therefore, other factors that may affect female medical students' QOL that need to be addressed.

Quality of life Measurement Implication: (WHOQOL-BREF) Critique

Since the WHO provides no guidance on either what constitutes a minimum quality of life or any objective approaches for individuals to measure their own QOL, the evaluation of this concept remains subjective and individualistic. This study utilized the WHOQOL-BREF questionnaire for use with Saudi medical students. Despite the attempt by Skevington et al. (2004) to include a multitude of nationalities and cultures in their study sample, none of their samples drew from Saudi Arabia. In fact, the authors' sample included just three Muslim countries – Malaysia, Nigeria, and Turkey- and the 418 subjects from these countries combined constituted only 3.5% of the total sample. Furthermore, the study sample consisted of adult subjects spanning a continuum of ages, level of education, marital statuses, and a deliberate mix of healthy and sick participants.

By contrast, the current study focuses on Saudi medical students who are typically people in their twenties, high school graduates, predominantly single, and healthy enough to pursue a rigorous professional educational program. Given these dissimilarities between the two samples, one should not assume that the conclusions Skevington et al. (2004) drew about the appropriateness of the WHOQOL-BREF instrument to measure one's quality of life perception would apply to this study's target population (i.e., Saudi medical students).

A thorough understanding of an individual's QOL, can be acknowledged that QOL measure depends on the population, life experiences and cultural context.

Population Dependent. The critical factor in QOL measure is choosing a scale where items are appropriate for the population. The difficulty in measuring QOL depends on the fact

that studies reported in the literature are not generalizable because there is little agreement about the meaning of QOL. Although the WHOQOL-BREF has been tested in different populations but the immediate concern is if the instrument really reflects Saudi medical students' population, as these students differ in many reflected areas. Therefore, it is essential to provide evidence for the use of the respondent measure in the target population as the psychometric properties of QOL measure are population dependent. (McHorney, 1999).

Life Experience. It is essential to acknowledge that QOL is experienced differently and encompasses different values across different groups, such as young adults and older adults. As an explanation, a study by D'Abundo et al. (2011) performed on a group of n=1,773 American undergraduate college students. The authors revealed that the four domains of the WHOQOL-BREF had a poor fit. The author's explanation for this outcome was that the age range of college students (i.e., typically late teens or early twenties) makes them developmentally different compared to the general adult population. Therefore, college students have different perspectives on what constitutes a good QOL compared to their older counterparts. Thus, the importance to consider life experience regarding QOL measure. Therefore, the WHOQOL-BREF needs to be re-evaluated, especially for the young adult population as well as for this study's target population, Saudi medical students. Therefore, it can be concluded that the WHOQOL-BREF has inadequate construct validity for the higher education population sample, including the target population in this study, Saudi medical students.

Cultural Context. Krageloh et al. (2011) pointed out that what is important to one culture may completely differ for another which is an important consideration that needs to be acknowledged regarding QOL. Therefore, it is important to acknowledge that quality of life may be experienced differently across different cultural groups and populations. Additionally, this

study utilized the English version of the WHOQOL-BREF. Although the subjects had sufficient command of English to complete the survey (English proficiency is required in Saudi medical schools), the fact that it was not in the participants' native language of Arabic may have introduced a bias into their responses to some of the items. Finally, the definition of quality of life by WHO specifies that an individual's perceptions of their position in life are tightly related to the cultural context and value system of their social network. Thus, differences within the Saudi medical students' population in relation to language, cultural, and social factors could influence dimensions that affected the individuals' perception of QOL.

In conclusion, although the WHOQOL-BREF has been widely used in the past, based on this study's findings, the WHOQOL-BREF does not appear to be a good fit for assessing the QOL among Saudi medical students. Thus, this research promotes further investigation regarding the appropriate use of WHOQOL-BREF for the Saudi medical students' population and the need to modify for future use.

Barriers to Quality of Life Measurement

The following three questions should be asked before utilizing any quality of life measure:

- **Are the domains covered relevant?** The first barrier to QOL measurement is the need to clarify the QOL definition and its classified domains. One should not assume that the already existing definitions of quality of life will be applicable to any population. In fact, each population needs its own definition of quality of life because each group differs in relation to characteristics, life experiences, standards, satisfactions, and cultures. Indeed, QOL is subjective, and what matters to one individual may not matter to others. Therefore, a more specific concept of quality of life can lead to a more reliable measurement of quality of life. Thus, fundamental research is needed on the concept of

QOL and the factors influencing Saudi medical students' quality of life. Such research should seek to develop a better understanding regarding the importance of the selection of domains and items.

- **In what population and setting was it developed and tested, and are these related to those situations in which it is planned to be used?** The literature identified studies that utilized the WHOQOL-BREF, but the immediate concern is that these studies relied on already published studies for addressing the validity and reliability. This causes a barrier because there is no clear understanding of whether the instrument measures what it is supposed to measure from one population to another.
- **Is the measure valid, reliable, and appropriate?** Situational validity is required because there are no such gold standards regarding QOL measurements, in which validity, reliability, and appropriateness are only concluded from the assumptions on the individuals who are participating. Thus, each study must test the instrument for its validity and reliability for the intended target population.

WHOQOL-BREF Recommendation

Many studies cited previous literature regarding the validity of the WHOQOL-BREF, however its validity only concluded from the assumptions about individuals who are participating. Therefore, it is important to acknowledge that the use of WHOQOL-BREF in the current study with the Saudi medical student population does not appear to be a good fit, thus modification is needed for future use. Thus, there is a clear need to address the following recommendations to appropriately utilize the WHOQOL-BREF for measuring QOL among Saudi medical students in the future:

- Establishment of situational validity is required. It is important to assess the validity within the population of interest, even if there is sufficient evidence of validity in other population (Streiner & Norman, 2004)
- Establishing face and content validity is needed through the Delphi Technique (Hasson et al., 2000). Validity is the idea that an instrument is measuring what it is claimed to be measuring (Streiner & Norman, 2003). There are different ways of assessing the validity of an instrument, but the immediate concern is whether the WHOQOL-BREF exhibits face and content validity among Saudi medical students. According to Alreck and Settle (2004), face validity is a type of validity process in which researchers conclude if a test seems to measure what it is proposed to measure. Moreover, content validity is established through experts' reviewers' determination if survey statements measure the construct. To confirm the validity of the tool, at least 80% agreement on each survey item needs to be obtained through three rounds of Delphi experts panelists' review (Hasson et al., 2000). Below are the elements considered in the Delphi process:
 - Assess each variable for content validity
 - Identify unclear items
 - Identify items that may be double-barreled
 - Identify items that may lead to a biased socially desired response
- After establishing face and content validity through a panel of expertise, it's recommended to pilot test the instrument with a larger representative sample size involving medical schools from different cities in Saudi Arabia.

Streiner and Norman (2003) expressed the importance of assessing the validity within the population of interest even if there is sufficient evidence of validity in other populations. Further,

determining the soundness of the application is a matter of degree because the test is applied to different populations (Theofilou, 2013). Thus, questions arise as to whether the WHOQOL-BREF is truly student centered and to what extent they represent the quality of life of individual students. Do they simply describe a students' quality of life in terms of what health professionals or society believe constitutes quality of life for students?

In response to this matter, Cella and Tulsky (1990) identified that the initial and most important step in the development of quality of life measurement is to identify the concepts and domains of importance. When deciding on these, one must consider the intended population (i.e. adults), condition, timeframe, and research. Therefore, establishing face and content validity through the Delphi technique will provide better insights into the future use and appropriateness of using of the WHOQOL-BREF with Saudi medical students.

Limitations

In evaluating and interpreting the results of this study, one must be aware of the study's limitations. Perhaps the most prominent limitation is the use of only one Saudi medical school to obtain the study sample. Because the institution may not be representative of all medical schools in Saudi Arabia, one cannot assume that the study result can be applied to students attending other schools as well.

The sampling method employed in this study may also serve as a potential limitation. Although the SurveyMonkey link was initially emailed to a convenience sample of Saudi medical students, the primary investigator utilized a snowball sampling method in which students who were the original recipients of the survey tool were able to forward it to other Saudi students including those attending other medical schools.

Another limitation of the study was its relatively small sample size of $n=154$. A smaller sample size increases the chance for a type II error, which occurs when a non-significant result is obtained even though an effect exists (Field, 2013). Thus, the non-significant differences were obtained in regard to the first research question and the second research question, indeed because of the result of the small number of participants within the study.

Addressing the WHOQOL-BREF recommendations is needed for modification for future use with the Saudi medical students' population. This limitation will prevent future research gaps regarding the use of already validated quality of life measurements.

Future Studies

This study could be expanded to include a larger sample size of students from different medical schools across Saudi Arabia rather than only one school. Including more schools would increase both the applicability and the generalization of the study results. A larger sample size would also decrease the chance of a type II error from occurring and make it more likely to obtain a significant result when an effect exists (Field, 2013).

In contrast to the current study, which was cross-sectional, a longitudinal study in which the same set of students are tracked as they move through each of the six years of medical school would eliminate the additional variability and bias caused by different groups of subjects. This would increase the statistical power of the study results (Field, 2013).

Regarding the significant differences in quality of life between male and female students in the physical health, psychological, and social relationships domains, female students had a lower quality of life scores than male students. As the literature suggested, this result might be due to cultural and social barriers that women experience in Saudi Arabia. To better understand

the reason for the differences in the quality of life scores, identifying other factors that may affect the quality of life among female Saudi medical students is needed.

A more specific concept of quality of life could lead to a valid and reliable measurement of QOL. Thus, research is needed on the fundamental concept of quality of life and factors influencing Saudi medical students' quality of life in order to develop a better understanding of the choice of relevant domains and items. QOL consists of a broad of different factors and what is important to one culture may be different for another culture.

A mixed-methods approach would involve the students completing both a quantitative instrument and answering a series of open-ended questions through participation in a one-on-one interview. The open-ended question portion of the mixed methods model will be focused on thoughts and feelings and will produce a result that takes into account the students' individual assessment of what constitutes a good quality of life.

Summary

This study aimed to explore the quality of life perceptions among Saudi medical students regarding the medical school phases, medical school years, and gender. The study provides insights into the quality of life perceptions among Saudi medical students and acts as a starting point for Saudi medical schools to consider other factors that may influence their QOL.

Regarding the significant difference among quality of life and gender, female students illustrated lower scores in the physical health, psychological, and social relationships domains. Therefore, it is important to address Saudi female medical students' health care and needs which may be due to social and cultural barriers.

Furthermore, this study highlights important insights regarding the future use of the WHOQOL-BREF and its needed modification to be applicable for use with the Saudi medical

students' populations. The study's implications on the WHOQOL-BREF instrument will help to prevent the misunderstanding the use of previous, valid quality of life measurements, which could create a barrier for research use. Lastly, Saudi medical students will take care of future generations; therefore, their quality of life goes beyond an individual. It stands as an integral component of a good health care system. In the long term, exploring Saudi medical students' quality of life will benefit patients, the public, and the profession.

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Appendices

Appendix A

Letter of Permission to Utilize the WHOQOL-BREF Instrument

Tel. direct: +41 22 791 3202
Fax direct: +41 22 791 3202
E-mail :

In reply please
refer to:

Your reference: Sibel Volkan

Olfat Gushgari
PhD candidate
Seton Hall University

24 April 2018

Dear Olfat Gushgari,

Please note that we are granting you permission to use the U.S. version of the WHOQOL-BREF as per the User Agreement form which you submitted to us.

Best regards,



Dr Somnath Chatterji
Health Statistics and Informatics
The World Health Organization
20 Avenue Appia
CH-1211 Geneva 27
Switzerland

Appendix B

WHOQOL-BREF Survey Instrument [first two pages]

Part 1 of 2 : WHOQOL-BREF

Please read each question, assess your feelings, and circle the number on the scale for each questions

* 1. How would you rate your quality of life?

Very Poor	Poor	Neither poor nor good	Good	Very Good
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 2. How satisfied are you with your health?

Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following questions ask about how much you have experienced certain things in the last two weeks

* 3. To What extent do you feel that physical pain prevents you from doing what you need to do?

Not at all	A little	A moderate amount	Very much	An extreme amount
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 4. How much do you need any medical treatment to function in your daily life?

Not at all	A little	A moderate amount	Very much	An extreme amount
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 5. How much do you enjoy life?

Not at all	A little	A moderate amount	Very much	An extreme amount
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 6. To what extent do you feel your life to be meaningful?

Not at all	A little	A moderate amount	Very much	An extreme amount
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 7. How well are you able to concentrate?

Not at all	Slightly	A moderate amount	Very much	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 8. How safe do you feel in your daily life?

Not at all	Slightly	A moderate amount	Very much	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 9. How healthy is your physical environment?

Not at all	Slightly	A moderate amount	Very much	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following questions ask about how completely you experience or were able to do certain things in the last two weeks

* 10. Do you have enough energy for everyday life?

Not at all	A little	Moderately	Mostly	Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 11. Are you able to accept your bodily appearance?

Not at all	A little	Moderately	Mostly	Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 12. Have you enough money to meet your needs?

Not at all	A little	Moderately	Mostly	Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 13. How available to you is the information that you need in your day-to-day life?

Not at all	A little	Moderately	Mostly	Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 14. To what extent do you have the opportunity for leisure activities?

Not at all	A little	Moderately	Mostly	Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 15. How well are you able to get around?

Very poor	Poor	Neither poor nor well	Well	Very well
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following questions ask you to say how good or satisfied you have felt about various aspects of your life over the last two weeks

3

Appendix C

Research Study Cite Approval letter

Kingdom of Saudi Arabia
Ibn Sina National College
C.R. 4030144057
P.O.Box 31906 Jeddah 21418
Date:
Encl:
No. :



المملكة العربية السعودية
كلية ابن سينا الأهلية للعلوم الطبية بجدة
س.ت ٤٠٣٠١٤٤٠٥٧
ص.ب ٣١٩٠٦ جدة ٢١٤١٨
التاريخ:
المرفقات:
الرقم:

05/09/2018

ISNC Protocol Identification Number: 001ER06082018

Title of Study: "Exploring Quality of Life Perceptions among Pre-clinical and Clinical Phases Saudi Medical Students."

Principal Investigator: Ms. Olfat Gushgari

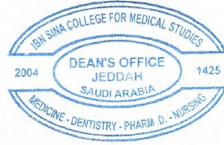
Sponsor or Funding Agency: External

To Ms. Olfat Gushgari,

I am aware of the research protocol as mentioned above. I am willing to give permission to collect the research data at Ibn Sina National College (ISNC), Jeddah, Saudi Arabia after submission of a formal ethical committee approval from your parent university and to establish contact with Prof. Randa Al-haraizi at ISNC

My permission is contingent upon the approval and the aforementioned terms and conditions laid out by the Chairman of Institutional Human Ethics committee and the Director of Ibn Sina National College for Medical studies – Research Center.

Dr. Rashad Al-kashgari,
Dean of Ibn Sina National College.



R. Kashgari
Signature

Date: 6-9-2018

Tel.: 6356555 - 6355882 / Fax: 6375344 - P.O.Box 31906 Jeddah 21418

تليفون: ٦٣٥٦٥٥٥ - ٦٣٥٥٨٨٢ / فاكس: ٦٣٧٥٣٤٤ - ص.ب ٣١٩٠٦ - جدة ٢١٤١٨

Appendix D
SHU IRB Approval



December 3, 2018

Olfat Gushgari
[REDACTED]

Dear Ms. Gushgari,

The Seton Hall University Institutional Review Board has reviewed your research proposal entitled "Exploring Quality of Life Perceptions among Pre-Clinical and Clinical Phases Saudi Medical Students" and has categorized it as exempt.

Enclosed for your records is the signed Request for Approval form.

Please note that, where applicable, subjects must sign and must be given a copy of the Seton Hall University current stamped Letter of Solicitation or Consent Form before the subjects' participation. All data, as well as the investigator's copies of the signed Consent Forms, must be retained by the principal investigator for a period of at least three years following the termination of the project.

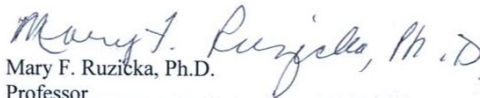
Should you wish to make changes to the IRB approved procedures, the following materials must be submitted for IRB review and be approved by the IRB prior to being instituted:

- Description of proposed revisions;
- *If applicable*, any new or revised materials, such as recruitment fliers, letters to subjects, or consent documents; and
- *If applicable*, updated letters of approval from cooperating institutions and IRBs.

At the present time, there is no need for further action on your part with the IRB.

In harmony with federal regulations, none of the investigators or research staff involved in the study took part in the final decision.

Sincerely,


Mary F. Ruzicka, Ph.D.
Professor
Director, Institutional Review Board

cc: Dr. Deborah Deluca

Office of Institutional Review Board
Presidents Hall • 400 South Orange Avenue • South Orange, NJ 07079 • Tel: 973.313.6314 • Fax: 973.275.2361 • www.shu.edu

A HOME FOR THE MIND, THE HEART AND THE SPIRIT

**REQUEST FOR APPROVAL OF RESEARCH, DEMONSTRATION OR
RELATED ACTIVITIES INVOLVING HUMAN SUBJECTS**

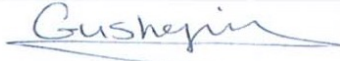
All material must be typed.

PROJECT TITLE: Exploring Quality of Life Perceptions among Pre-clinical and Clinical Phases Saudi Medical Students

H2018. 12. 4

CERTIFICATION STATEMENT:

In making **this application**, I(we) certify that I(we) have read and understand the University's policies and procedures governing research, development, and related activities involving human subjects. I (we) shall comply with the letter and spirit of those policies. I(we) further acknowledge my(our) obligation to (1) obtain written approval of significant deviations from the originally-approved protocol BEFORE making those deviations, and (2) report immediately all adverse effects of the study on the subjects to the Director of the Institutional Review Board, Seton Hall University, South Orange, NJ 07079.



RESEARCHER(S) Olfat Gushgari 11/13/2018

Please print or type out names of **all researchers below signature.
Use separate sheet of paper, if necessary.**

My signature indicates that I have reviewed the attached materials of my student advisee and consider them to meet IRB standards.

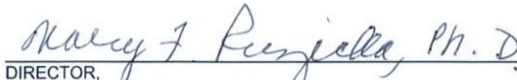


RESEARCHER'S FACULTY ADVISOR Deborah A. Deluca, MS, JD 11/13/2018

Please print or type out name below signature

The request for approval submitted by the above researcher(s) was considered by the IRB for Research Involving Human Subjects Research at the Dec 2018 meeting.

The application was approved not approved by the Committee. Special conditions were were not set by the IRB. (Any special conditions are described on the reverse side.)



DIRECTOR,
SETON HALL UNIVERSITY INSTITUTIONAL
REVIEW BOARD FOR HUMAN SUBJECTS RESEARCH

12/3/18
DATE

Seton Hall University
3/2005

Appendix E

Letter of Solicitation and Implied Consent



Letter of Solicitation and Implied Consent

Dear Participant,

I am inviting you to participate in a research project (Exploring quality of life perceptions among pre-clinical and clinical phases Saudi medical students) I am a full time doctoral student at the department of Interprofessional Health Sciences and Health Administration, school of health and Medical Sciences, Seton Hall University. I am conducting this research as partial fulfillment of my PhD degree in Health Sciences.

This research study explores quality of life among medical students in Saudi Arabia. Through the participants, I hope to obtain information that will help in assess the current situation regarding quality of life perception among pre-clinical and clinical phases Saudi medical students population and to facilitate the education for future healthcare educators about the perception of quality of life among Saudi medical students.

Your participation in this study is voluntary and anonymous, and there is no penalty if you do not participate or if you decide to stop at any time during your participation.

By completing this questionnaire, you are giving your consent to participate in this research study. Your answers are anonymous, and any reports generated will be reported in the aggregate. Your participation is voluntary, and there is no penalty if you do not participate. Please be aware while the confidentiality of your responses will be protected once the data are downloaded from the internet, there is always a possibility of hacking or other security breaches that could threaten the confidentiality of your responses. Please know that you are free to decide not to answer any question.

All data will be stored on a USB memory stick and will be kept in a locked physical location, accessed only by the principle investigator. No data will be available electronically.

Thank you in advance for your assistance in my continued research effort.

Take the questionnaire: <https://www.surveymonkey.com/r/P3PSN6W>

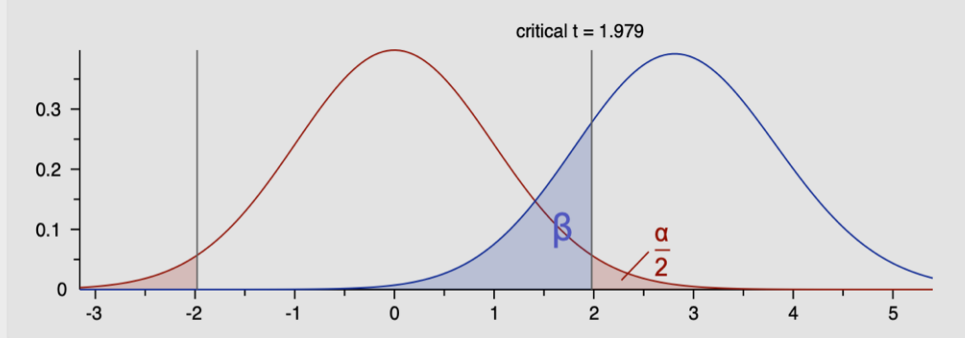
As principle investigator, I should be contacted to answer any question about this study via email Olfat.gushgari@student.shu.edu or via phone [REDACTED] or my Committee Chair Dr. Deborah Deluca, via email Deborah.deluca@shu.edu

Pertinent questions or concerns about the research, research participants' rights, and/or research-related injuries to participants should be directed to Seton Hall IRB at email irb@shu.edu or phone at (973)313-6314

School of Health and Medical Sciences
Department of Interprofessional Health Sciences & Health Administration
Tel: 973.275.2076 • Fax: 973.275.2171
400 South Orange Avenue • South Orange, New Jersey 07079 • gradmeded.shu.edu

A H O M E F O R T H E M I N D , T H E H E A R T A N D T H E S P I R I T

Appendix F
A Priori G*Power



Test family

t tests

Statistical test

Means: Difference between two independent means (two groups)

Type of power analysis

A priori: Compute required sample size - given α , power, and effect size

Input parameters

Determine

Tail(s) Two

Effect size d 0.5

α err prob 0.05

Power (1- β err prob) 0.8

Allocation ratio N2/N1 1

Output parameters

Noncentrality parameter δ	2.8284271
Critical t	1.9789706
Df	126
Sample size group 1	64
Sample size group 2	64
Total sample size	128
Actual power	0.8014596