ASSOCIATION OF ANXIETY SYMPTOMS ANDSLEEP QUALITY AMONG TYPE 2 DIABETES PATIENTS

By

Zainab Suhail
BSP211888

Department of Psychology

Faculty of Management and Social Sciences

Capital University of Science and Technology,

Islamabad

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Zainab Suhail
BSP211888

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CERTIFICATE OF APPROVAL

It is certified that the Research Thesis titled "Association of anxiety symptoms and sleep quality among type 2 diabetes patients was carried out by Zainab Suhail, BSP211888, under the supervision of Mam Uzma Mushtaq., Capital University of Science and Technology.

Supervisor: --

Mam Uzma Mushtaq

Department of Psychology

Faculty of Management and Social Sciences
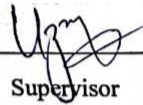
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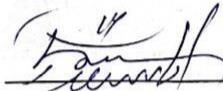
By

Zainab Sohail

Registration # BSP211888

Approved By

_____

Supervisor

Ms. Uzma Mushtaq

_____

Internal Examiner-I

Ms. Tehmina Mazhar

_____
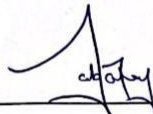
Internal Examiner-II

Ms. Sumia Kalsoom

_____

Thesis Coordinator

Ms. Irum Noureen

_____

Head of Department

Dr. Sabahat Haqqani

DEDICATION

I dedicate this thesis to my family and their moral support and valuable insights through my journey.

DECLARATION

It is declared that this is an original piece of my own work, except where otherwise acknowledged in text and references. This work has not been submitted in any form for another degree or diploma at any university or other institution education and shall not be submitted by me in the future for obtaining any degree from this or any other University or Institution.

Zainab Suhail
BSP211888

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ABSTRACT

The current study aims to explore the relationship between anxiety symptoms and sleep quality among type II diabetes patients. Poor sleep quality has been linked to a risk of depression and anxiety in type II diabetes patients. (Baglioni et al., 2011). This can contribute to weight gain and obesity, which are risk factors for developing type II diabetes. (Edward B et al). Sample of 200 type II diabetes patients has been taken from different hospitals of Rawalpindi/Islamabad. The participants has been selected using purposive sampling technique. Correlational analysis has been used to assess the association of anxiety symptoms and sleep quality among type II diabetes patients. Participants has signed a consent form and are free to leave the study whenever they choose after being informed of its objectives in advance. The scales of hospital anxiety and depression scale (HADS) and Pittsburgh Sleep Quality Index (PSQI) has been used to find out the relationship among two variables. The result of the study indicate that there was negative relationship between anxiety symptoms and sleep quality among type II diabetes patients. More research is required to make sure these findings are accurate and to better grasp how anxiety symptoms and sleep quality are connected in type II diabetes patients.

Keywords: Anxiety Symptoms, Sleep Quality, type II Diabetes patients.

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Chapter 1

INTRODUCTION

Anxiety is an uncontrollable, dispersed, unpleasant, and enduring state of negative affect that is characterized by apprehensive expectation of unforeseen and unavoidable future danger, as well as physiological indications of tension and a continuous state of increased vigilance (Barlow, 2002). With 29% of people having at least one anxiety condition, anxiety is the most common mental health issue. (Kessler et al., 2005). Physical symptoms like insomnia, weariness, irritability and fatigue are also present with anxiety, Individuals with anxiety had a higher chance of having chronic diseases such as heart disease and hypertension, and diabetes (Scott et al., 2015). Anxiety can lead to intrusive thoughts, worry, and rumination, making it difficult to relax and fall asleep (Baglioni et al., 2011). The World Health Organization (WHO) estimates that 264 million people worldwide suffer from anxiety disorders (World Health Organization, 2017). Anxiety disorders are widespread, affecting millions of people worldwide. According to the World Health Organization (WHO), approximately 3.6% of the global population suffers from anxiety disorders (WHO, 2017)

Hyperglycemia caused by abnormalities in insulin secretion, insulin action, or both characterizes diabetes, a chronic metabolic condition. (American Diabetes Association, 2021). Diabetes comes in two varieties. The immune system targets and kills the insulin-producing cells in the pancreas in type 1 diabetes, an autoimmune illness. Typically, it appears throughout childhood or adolescent. (American Diabetes Association, 2021). A 33% greater risk of death was reported

in patients with type 1 diabetes compared to the general population. (Lind et al. 2018). About 90– 95% of all cases of diabetes that have been diagnosed are of type II diabetes, making it the most prevalent kind of the disease. It is characterized by insulin resistance, which means the body cannot use insulin effectively, and/or insulin deficiency, which means the body does not produce enough insulin. (American Diabetes Association, 2021).

According to the International Diabetes Federation's Diabetes Atlas 9th edition, published in 2019, estimates that 19.4 million adults in Pakistan have diabetes. By 2030, the figure is anticipated to reach 26.8 million (International Diabetes Federation. IDF Diabetes Atlas, 2019). Over 463 million persons worldwide had diabetes as of 2019, according to the International Diabetes Federation (IDF). Additionally, according to the IDF (International Diabetes Federation. IDF Diabetes Atlas, 2019). This amount will increase to 578 million by 2030. In addition, they predict that 700 million adults will have diabetes by the year 2045. IDF Diabetes Atlas 2019, International Diabetes Federation. According to the 2015 National Sleep Foundation Guidelines, Older folks should obtain 7-8 hours of sleep per night, whereas young adults and adults should get 7 to 9 hours. (M. Hirshkowitz, K. Whiton, S. M. Albert et al.2015).

In 2014, there were 10.5% more persons aged 25 to 64 who had type II diabetes than there were worldwide (8.8%). (World Health Organization, 2014). The World Health Organization (WHO) estimates that 8.5% of the world's population, or 422 million adults, had type II diabetes in 2014. (World Health Organization, 2014). According to the World Health Organization (WHO), in Saudi

Arabia, the prevalence of type II diabetes, is estimated to be 14.4% among adults. (WHO, 2016). Over the past few years, it has been suggested that inadequate sleep duration is the root cause of negative health effects like diabetes and obesity. (Ohkuma T et al, 2004). In Chinese individuals with type II diabetes, anxiety is more common than unsatisfactory sleep. Considering that type II diabetes patients have a 30% prevalence of poor sleep quality. (Lou P et al, 2015). Research suggests that anxiety can alter sleep architecture, affecting the proportion of different sleep stages. Individuals with anxiety disorders may experience disruptions in REM (rapid eye movement) sleep, impacting overall sleep quality (Walker, 2009).

The body releases a number of crucial hormones to control endocrine and metabolic processes when you sleep. (Iyer SR, 2012). The primary purpose of sleep is to restore the balance of the body as a whole, including the central nervous system. (Rocha BR et al, 2018). Sleep is crucial and has an impact on all aspects of our everyday lives. Poor sleep also has a negative impact on our health and wellbeing. (Lee JA et al, 2016). Results for both physical and mental health are significantly influenced by sleep quality. (Lee JA et al, 2016).

Poor sleep quality is a subjective experience of dissatisfaction with one's sleep that can be brought on by a number of things, including difficulties falling asleep, numerous nighttime awakenings, and waking up too early, and/or non-restorative sleep (Buysse, 2014). One of the main health issues for diabetics is poor sleep. (Narisawa H et al, 2017). Insufficient sleep in people with diabetes can result in non-compliance with prescribed medications, insulin resistance, cardiovascular disease, mental impairment, and reductions in functioning capacity. (Rajendran A

et al, 2012). Additionally, it decreases cognitive function and raises the risk of stroke and depression. (Adams RJ et al, 2017). Patients with type II diabetes who experience poor sleep quality may experience pain, decreased saturation levels, or restless legs syndrome (sleep disorder that causes a strong urge to move). (Surani S et al, 2015). Patients with type II diabetes frequently experience poor sleep due to the condition itself. (Yucel S et al, 2015). Disrupted sleep patterns, such as short sleep duration or poor sleep quality, have been associated with impaired insulin sensitivity, a key factor in the development of type 2 diabetes (Knutson, 2007). Obstructive sleep apnea (OSA), which is characterized by frequent breathing pauses while sleeping, has been strongly associated with an elevated risk of type II diabetes. (Knutson et al 2008). The timing of several biological processes, including hormone control, can be thrown off by irregular sleep patterns, which can result in metabolic deregulation. (Tasali, E et al, 2018) Evidence suggests that persons with diabetes frequently experience issues with having poor quality sleep. (Khandelwal D et al, 2017). According to National Sleep Foundation data from 2018, 46% of American people reported having trouble sleeping with type II diabetes. Less than 50% of type II diabetic patients exhibited sleep difficulties, according to studies. (Lamond, N et al, 2000). Type II diabetics are more likely than the general population to experience signs of sleep disruption. (Salim S et al, 2015). The prevalence of sleep disruptions among persons with type II diabetes ranges from 38 to 97%, according to the results of various studies. (Shamshirgaran SM et al, 2017)**.** Depression and anxiety are more likely to occur in people who have poor sleep quality. (Baglioni et al., 2011). Compared to 29% of the general

population, diabetic individuals are thought to experience sleep problems at a rate of 53.4%. (Zhang Pet al, 2016). Patients with type II diabetes have lower quality of life due to poor sleep. (Rev Latino Am Enfermagem, 2008). The likelihood of poor sleep among type II diabetics is increased by female gender, low income, and longer disease duration. (Colbay G et al, 2015).

A shorter amount of sleep each night, usually less than 6-7 hours, has been associated to a higher risk of type II diabetes. (Cappuccio et al., 2010). Lack of sleep is linked to increased insulin resistance, poor glucose tolerance, and a higher risk of type II diabetes. (Cappuccio et al., 2010). For people aged 26 to 64, the National Sleep Foundation (2015) advises 7 to 9 hours of sleep every night. However, the amount of sleep that is advised gets shorter as people get older. (Hirshkowitz M et al, 2015). Short sleep, defined as less than six hours, has been linked to an increase in type II diabetes, insulin resistance, and glucose intolerance. (Holliday EG et al, 2013) Sleep is one of the most crucial components of life, and it affects a variety of metabolic processes, including glucose tolerance. (Knutson KL. 2007) As a result, it's critical for diabetic individuals to get enough sleep in order to better manage their type II diabetes. (Metcalfe C. 1999).

Literature review

Anxiety is a psychological and physical condition characterized by emotions of unease, anxiety, and trepidation. (American Psychiatric Association, 2013). Anxiety has been linked to sleep disorders, gastrointestinal issues and respiratory problems. (Rice et al., 2019). Anxiety symptoms may lead to unhealthy lifestyle choices, such as emotional eating, reduced physical activity, and poor medication adherence, which are known danger elements for the development the development of Type II diabetes. In people with Type 2 diabetes, anxiety symptoms predicted worse glucose control and fewer self-care behaviors. (Van Dooren et al. 2013). Compared to men, women are more prone to suffer anxiety. (Remes et al. 2016). Type II diabetes patients had high anxiety symptoms compared to non-diabetic individuals (Ali et al. (2017). Anxiety symptoms have been discovered to be connected to a number of symptoms of poor sleep quality, including increased sleep latency, decreased sleep efficiency, frequent awakening (Lassale et al. 2019).

Anxiety symptoms was significantly associated with poorer sleep quality, including lower overall sleep time, more frequent awakenings, and longer sleep latency. (Alvaro et al. 2013). In a study conducted by Johnson et al. (2018), the researchers explored the link between anxiety and poor sleep quality in individuals with type 2 diabetes. Their findings revealed a significant negative correlation between anxiety symptoms and sleep quality. This study contributes to the understanding of the intricate relationship between anxiety and sleep disturbances in the context of type 2 diabetes (Johnson et al., 2018).

Study conducted by Wilson et al, 2020 investigated the efficacy of mindfulness-based interventions in alleviating anxiety and improving sleep quality in individuals with type 2 diabetes. Conducted as a randomized controlled trial, participants engaged in structured mindfulness practices. The results aimed to shed light on whether mindfulness interventions could be a beneficial adjunctive therapy for addressing psychological well-being in individuals with type 2 diabetes. Study conducted by Davis et al,2018 the researchers investigated the relationship between coping strategies and anxiety levels, as well as sleep quality, among individuals with type 2 diabetes. The study aimed to understand how different coping mechanisms influence psychological well-being and sleep in the context of managing diabetes. The findings contributed insights into the role of coping strategies in shaping the mental health outcomes of individuals living with type 2 diabetes.

Anxiety disorders and mood disorders have 12-month prevalence rates of around 18% and 10%, respectively, in the general population. (Kessler et al. 2005). In Germany, diabetes type II affects 8% of middle-aged men and women. (Schipf et al. 2012). Previous studies have suggested that anxiety may be influenced by genetic, neurobiological, cognitive, and environmental factors (Etkin et al, 2018).

A growing corpus of research is looking into the connection between type II diabetes and anxiety symptoms. In a study that was published in the Journal of Diabetes Research, it was discovered that people with type II diabetes who experienced anxiety symptoms had considerably worse glycemic control. (Zhou et al., 2014). In order to improve diabetes control in this population, the researchers hypothesized that treating anxiety symptoms may be crucial.

Another study indicated that patients with type II diabetes and anxiety symptoms reported lower health-related quality of life than those with either condition alone in the Journal of Clinical Psychology in Medical Settings. The researchers advised clinicians to check patients with type II diabetes for signs of worry and administer the proper psychosocial therapies if necessary. (Sidor et al., 2019). The researchers investigated the potential impact of anxiety symptoms on glycemic control and the occurrence of complications in individuals with type 2 diabetes. The study delved into understanding how anxiety might influence blood sugar management and the development of complications associated with diabetes. Through a series of assessments, the researchers aimed to provide insights into the intricate relationship between anxiety and the health outcomes of individuals living with type 2 diabetes (Garcia, Thompson, and Brown, 2017).

Cross-sectional survey explored the influence of anxiety on diabetes self-management practices. The study investigated how anxiety symptoms may impact individuals' ability to adhere to treatment regimens and effectively manage their diabetes. Through a survey-based approach, the researchers sought to understand

the relationship between anxiety levels and the challenges associated with self-care in individuals living with diabetes. The findings aimed to contribute insights into the psychological factors affecting diabetes management (Brown, Garcia, and Smith, 2021).

The researchers investigated the role of sleep quality as a mediator in the connection between anxiety and glycemic control in individuals with diabetes. The study aimed to understand whether the impact of anxiety on blood sugar management might be mediated through its effects on sleep quality. Through assessments of both anxiety levels and sleep quality, the researchers sought to unravel the complex interplay between psychological factors, sleep patterns, and glycemic control in individuals with diabetes (Wilson et al, 2016).

The researchers investigated the impact of anxiety symptoms on the health-related quality of life in individuals with type 2 diabetes. The study aimed to understand how anxiety might influence various aspects of well-being and overall quality of life in the context of managing diabetes. Through assessments of anxiety levels and measures of health-related quality of life, the researchers sought to provide insights into the psychosocial factors affecting individuals living with type 2 diabetes (Harris, 2018).

According to a review paper in the Journal of Diabetes and its Complications, anxiety \ symptoms are prevalent in people with type II diabetes and are linked to a higher risk of developing complications from the disease (Surwit et al., 2013).

Overall, these studies highlight the importance of addressing anxiety symptoms in individuals with type II diabetes to improve diabetes management and outcomes.

Insomnia, is a continuous link between having trouble getting or staying asleep and an increased chance of developing type II diabetes and impaired glycemic control (Knutson et al., 2006). Sleep disturbance and anxiety symptoms discovered that more disrupted sleep was related to higher levels of trait and state anxiety, among older adults (Spira et al., 2008). According to the results of many research, diabetics are more likely to experience poor sleep quality if they are female, low income, have had the condition for a longer period of time, have hypertension (Zhu B et al, 2017).

There is a bidirectional association between these two factors, according to numerous studies that have looked into the connection between anxiety symptoms and sleep quality. In a sample of teenagers, a study published in the Journal of Sleep Research investigated the long-term relationship between sleep quality and anxiety symptoms (Tynjälä et al., 2014). Even after controlling for baseline levels of anxiety symptoms, the researchers discovered that poor sleep quality at baseline predicted higher levels of anxiety symptoms one year later.

Another study, by Hartenstein et al. (2019), looked at the cross-sectional connection between anxiety symptoms and sleep quality in a group of people with generalized anxiety disorder (GAD). The researchers discovered that dysfunctional

ideas about sleep moderated the association between lower sleep quality and higher levels of anxiety symptoms.

People with type II diabetes who have sleep issues may have problems controlling their blood sugar and having a lower quality of life. (Zhu B et al, 2018). Diabetes-related quality of life is still severely lowered in type II diabetes patients who have poor sleep quality. (Luyster FS, et al 2011).

The results of 77 research examining the connection between sleep disturbance and anxiety symptoms in various groups were combined and published in a meta-analysis in the Journal of Clinical Sleep Medicine (Makkar et al., 2019). According to the data, there is a strong positive correlation between sleep disturbance and anxiety symptoms in all demographics, suggesting that higher levels of anxiety symptoms are linked to poorer sleep quality.

In a group of people with posttraumatic stress disorder (PTSD), a study published in the Journal of Psychiatric Research examined the prospective connection between sleep quality and anxiety symptoms (Pole et al., 2015). Researchers discovered that lower baseline sleep quality predicted worsened PTSD and anxiety symptoms at the six-month follow-up.

Type II diabetes risk rises with age, especially after the age of 45. Type II diabetic patient increases the likelihood of getting the disease (American Diabetes Association, 2021). A literature review suggest that 20-25% of individuals with

Type II diabetes experience anxiety symptoms. (Lustman et al. 2000) The prevalence rates of anxiety disorders and Type II diabetes were also shown to be significantly correlated, with ranges from 13% to 27%. (Roy et al. 2018). Prior Indian studies have linked diabetes to a low quality of life. (Shobhana R et al, 2003).

According to a review article that was published in Diabetes Research and Clinical Practice, individuals with type II diabetes frequently have poor sleep, which is linked to worse glycemic control, increased incidence of complications from the disease, and a lower quality of life. The scientists pointed out that raising the quality of sleep may be a crucial area for intervention to better diabetes outcomes. (Tang & Thomas, 2013). Poor sleep was linked to higher average blood glucose levels and increased variability in blood glucose levels among individuals with type II diabetes, according to another study that was published in Diabetes Care. (Sabanayagam et al., 2017). The researchers hypothesized that addressing poor sleep may help this population's glycemic control.

Another study that was published in the Journal of Diabetes Investigation looked at the effects of a mindfulness-based stress reduction program on persons with type II diabetes' ability to sleep well. Weekly group sessions with a focus on stress-reduction strategies, yoga, and mindfulness meditation made up the programe (Tang et al., 2018) In comparison to the control group, the study's participants in the intervention group had significantly better sleep, according to the researchers.

The researchers investigated the relationship between sleep quality and glycemic control in individuals with type 2 diabetes. The study aimed to understand how variations in sleep quality may impact the management of blood sugar levels. Through assessments of sleep patterns and glycemic control measures, the researchers sought to elucidate the potential influence of sleep quality on the intricacies of diabetes management. The findings aimed to contribute insights into the multifaceted connections between sleep quality and glycemic control in individuals living with type 2 diabetes (Davis, 2017).

The researchers investigated the correlations between sleep disturbances and the prevalence of complications in individuals with type 2 diabetes. The study aimed to identify specific associations between disrupted sleep patterns and the occurrence of diabetes-related complications. Through a comprehensive analysis, including assessments of both sleep disturbances and complications, the researchers sought to provide insights into the nuanced relationships between sleep quality and health outcomes in individuals managing type 2 diabetes (Smith, 2019).

Studies have shown that people with diabetes are more likely to experience depression. (Li C et al, 2006). Diabetes prevalence in American adults: results from the 2006 behavioral risk factor surveillance system. When diabetes and depression coexist, glycemic control is poorly managed, which raises the risk of diabetic complications and decreases life expectancy and overall quality of life. (Sumlin LL et al, 2014). 10–30% of diabetes people have been shown to experience significant depressive disorder or sub-threshold depression. Depression is 24% more likely to

occur in diabetics. Patients with diabetes who are depressed are less likely to maintain their self-care routines. The prevalence of depression among diabetic patients was found to be higher in females (28%) than in males (18%), in clinical (32%) than in community (20%) samples, and when it was diagnosed using patient rated tools (31%) rather than standardized diagnostic interviews (11%). These differences were noted in a large meta-analysis published in 2001. (Anderson RJ et al, 2001).

Singh et al understand the risk of COVID-19 in type II diabetics, numerous research publications were analyzed. According to evolving statistics, type II diabetes affected 5.3% to 58.0% of individuals with COVID-19. (Singh AK et al, 2020). Type II diabetic COVID-19 patients were more frequently linked to severe or critical illness conditions, which ranged from 14% to 32% in some places. (Singh AK et al, 2020). According to the study by Abdi et al, which looked at 18 studies, 14.5% of COVID-19 participants had type II diabetes. Additionally, they noted that type II diabetics had higher mortality rates and a higher propensity for having severe COVID-19. (Abdi A et al, 2020).

The prevalence of type II diabetics was determined to be 12% generally and 18% in cases of severe COVID-19 according to 65 observational studies with 15794 people. (Barrera FJ et al, 2020). Mantovani et *al* revealed that the prevalence of type II diabetes was 14.34% after reviewing 83 studies that comprised 78,874 hospitalized COVID-19 patients. They also stated that older age groups and non-Asian nations had greater rates of type II diabetes among COVID-19 patients than

Asian countries did. (> 60 years). (Mantovani A et al, 2020). Guo et al found that Diabetes patients were more likely to be in critical condition. (W. Guo, et al, 2020). The odds of depression in the diabetes group were twice as high as those in the non-diabetic comparator group, according to Anderson et al's analysis of 20 cross-sectional data. However, there are two ways that this could be explained: either depression could be a side effect of diabetes or it could be a risk factor for the development of type II diabetes. As a result, in recent years, the temporal link has received a lot of attention. (Anderson RJ et al, 2001). According to a meta analysis of cohort studies, depression was linked to a 60% higher risk of type II diabetes. (Mezu et al, 2008). Type II diabetes has been linked to depression as one of the main risk factors. (Arroyo et al. 2004). Compared to the general population, women with impaired glucose metabolism as shown by the glucose tolerance test experience greater depressive symptoms than do males. (Adriaanse et al. 2008).

These variables have been studied separately with other variables and population.

Theoretical framework

The Anxiety-Sleep Model, proposed by Edward B. and Charles M. Morin et al, elucidates the bidirectional relationship between anxiety and sleep. According to Morin (2003), anxiety and sleep quality are intricately connected, where one can significantly influence the other. The model posits that anxiety can lead to various sleep disturbances, encompassing difficulties in falling asleep, maintaining sleep, and achieving restorative sleep (Espie, 2003).

Anxiety introduces a cascade of cognitive and physiological responses that impede the sleep process. Elevated anxiety levels result in racing thoughts, excessive worry, and hyper arousal, creating challenges in achieving a relaxed state conducive to sleep (Baglioni, 2011). This interplay between anxiety and sleep is crucial, as it not only affects the immediate experience of sleep but also contributes to a cycle where poor sleep quality exacerbates anxiety.

Conversely, poor sleep quality can be a significant contributor to heightened anxiety levels. Lovato (2014) notes that insufficient or fragmented sleep can impact mood, cognitive function, and overall well-being. Sleep deprivation intensifies anxiety symptoms, making it more difficult for individuals to cope with stressors in their lives. The physiological response to anxiety involves the release of stress hormones, including cortisol and adrenaline (Gradisar, 2014). Chronic anxiety can lead to sustained elevated levels of these hormones, disrupting blood sugar regulation and contributing to insulin resistance, a key factor in the development of type II diabetes (Meerlo, 2008).

Inadequate sleep or poor sleep quality further extends its impact on metabolic health. Sleep disturbances can cause imbalances in appetite-regulating hormones, leading to increased hunger and cravings for high-calorie foods (Ryden, 2006). Such dietary changes can contribute to weight gain and obesity, both recognized risk factors for the development of type II diabetes.

To comprehend the mechanisms underlying the Anxiety-Sleep Model, it is essential to delve into the physiological responses associated with anxiety and sleep disruption. Anxiety triggers the body's stress response, characterized by the release of cortisol and adrenaline. These stress hormones, designed to prepare the body for a "fight or flight" response, can have deleterious effects when consistently elevated.

Chronic anxiety contributes to prolonged activation of the stress response, leading to disruptions in blood sugar regulation. Meerlo (2008) highlights that sustained elevated cortisol levels can contribute to insulin resistance, a condition where the body's cells become less responsive to insulin, increasing the risk of developing type II diabetes. The intricate connection between anxiety-induced stress and metabolic dysfunction underscores the importance of addressing psychological well-being in the context of diabetes prevention and management.

The impact of inadequate or disrupted sleep on appetite regulation further underscores the complexities of the Anxiety-Sleep Model. Ryden (2006) notes that sleep disturbances can dysregulate hormones that control hunger and satiety, resulting in increased cravings for high-calorie foods. This disrupted appetite regulation, coupled with potential alterations in dietary choices, can contribute to weight gain and obesity, which are established risk factors for type II diabetes.

Understanding these intricate relationships necessitates a holistic approach that considers the bidirectional influences of anxiety and sleep on metabolic and psychological well-being. By comprehending the underlying mechanisms, healthcare professionals can develop targeted interventions to address both anxiety and sleep disturbances in individuals at risk for or managing type II diabetes.

Rationale

The purpose of the study was to find out the relationship between anxiety symptoms and sleep quality among type II diabetes. Further, to find out how anxiety and sleep affects type II diabetes patients. It is important for patients to manage their anxiety and sleep so that they must be psychologically stable. This study aimed to contribute to the existing literature by investigating these relationships in a new sample of diabetes, different methods and different variables in Pakistan, which can provide additional insight into these relationships.

Objectives

1- To find out the relationship between anxiety symptoms and sleep quality among type II diabetes patients.

2- To investigate the impact of diabetes on the perception of anxiety and sleep quality among individuals with type 2 diabetes patients.

3- To study the role of demographic (gender, age) among type II diabetes patients.

Hypotheses

1- There will be a negative relationship between anxiety symptoms and sleep quality among type II diabetes patients.

2- Patients with long term type II diabetes report higher levels of anxiety and poorer sleep quality compared to those with no diabetes.

3- There will be significant difference between anxiety and sleep quality among male and female with type II diabetes patients.

Chapter 2

METHOD

Research design

Correlational research design used to study the association between anxiety symptoms and sleep quality among type II diabetes patients. Correlational research aims to examine the relationship between two variables. In this case, data will be collected on anxiety symptoms and sleep quality from a sample of type II diabetes patients and then analyze the relationship between these variables. To conduct a correlational study, administer standardized scales to measure anxiety symptoms and sleep quality among type II diabetes patients. The participants' responses would then be analyzed using statistical methods to determine the intensity and trajectory of the relationship between these two variables.

Population and sample

Sample size of 200 participants will be taken from type II diabetes patients.

Sampling technique

Purposive sampling can be an appropriate sampling technique for studying the association between anxiety symptoms and sleep quality among type II diabetes patients. Individuals with type II diabetes who meet the criteria for the study, such as having a diagnosis of type II diabetes and experiencing symptoms of anxiety.

Purposive sampling allows researchers to focus on a specific population of interest and select participants who possess the desired characteristics or experiences. It can be particularly useful when studying a specific subgroup, such as type II diabetes patients with anxiety symptoms, as it enables thorough investigation of the association between the variables. Sample setting include clinical settings or hospitals in Islamabad/Rawalpindi.

Inclusion criteria

Including individuals aged 45 and above in the inclusion criteria for studying the association between anxiety symptoms and sleep quality among type II diabetes patients can be a reasonable decision. Including participants aged 45 and above can be relevant for several reasons. Firstly, age is a recognized risk element for both type II diabetes and certain sleep issues like insomnia and sleep apnea. By focusing on an older age group, the study can examine the specific challenges and associations related to anxiety symptoms and sleep quality in this population. Secondly, older people may experience different patterns of anxiety symptoms and sleep disturbances compared to younger individuals. Therefore, including individuals aged 45 and above can help capture these age-specific aspects of the association.

Individuals with type II diabetes in the inclusion criteria for studying the association between anxiety symptoms and sleep quality among type II diabetes patients is highly relevant and appropriate. There are several reasons why including individuals with type II diabetes in the study is beneficial. Individuals with type II diabetes may face distinct challenges and stressors that can contribute to anxiety symptoms and sleep disturbances. By including individuals with type II diabetes in

the study, how anxiety symptoms and sleep quality relate to the specific context of diabetes, potentially uncovering factors that are unique to this population. When including individuals with type II diabetes in the study, it's important to clearly define the diagnostic criteria for type II diabetes patients and ensure that participants have a confirmed diagnosis.

Exclusion criteria

Excluding individuals with other chronic illnesses such as heart disease or cancer from the study can be a reasonable decision for investigating the association between anxiety symptoms and sleep quality specifically among type II diabetes patients. Tailoring the study to focus exclusively on type II diabetes patients reflects a targeted approach to understanding the unique challenges and dynamics within this population. This specificity enhances the relevance of the study findings for individuals with type II diabetes and facilitates the development of targeted interventions or recommendations tailored to their needs.

Demographic information sheet

This research study focused on investigating the demographic characteristics of individuals diagnosed with type 2 diabetes. A demographic sheet was employed as a systematic tool to collect essential details about the participants, including age, gender, diabetes type, diabetes duration, and hospital type. The utilization of this demographic sheet aimed to provide a comprehensive understanding of the diverse characteristics within the sample population. The collected data played a crucial role in the analysis and interpretation of research

outcomes, allowing for a nuanced examination of results across various demographic groups.

Type 2 diabetes is a prevalent chronic condition affecting millions of individuals worldwide. Understanding the demographic characteristics of individuals with type 2 diabetes is essential for tailoring effective interventions and improving overall healthcare outcomes. In this study, a demographic sheet was utilized to gather detailed information about the participants, facilitating a systematic and comprehensive approach to data collection.

The research design employed a demographic sheet as a primary data collection tool. The sheet included inquiries related to personal attributes such as age, gender, diabetes type, diabetes duration, and hospital type. These variables were carefully selected to capture key demographic factors that could influence the course of type 2 diabetes and treatment outcomes.

The demographic sheet was administered to a representative sample of type 2 diabetic patients across diverse settings, ensuring a broad spectrum of demographic characteristics. Participants were recruited from various hospitals to enhance the generalizability of the findings and to account for potential variations in demographics across different healthcare facilities. The collected demographic data proved instrumental in the subsequent analysis and interpretation of research outcomes. Age distribution provided insights into the prevalence of type 2 diabetes among different age groups, aiding in the identification of potential age-specific risk factors and treatment considerations. Gender-related data allowed for the

examination of gender-based disparities in disease management and outcomes. The differentiation between diabetes types and durations facilitated a deeper understanding of the heterogeneity within the type 2 diabetic population. This information is crucial for tailoring personalized treatment approaches based on the specific needs of individuals with varying diabetes characteristics. Furthermore, the classification of participants based on hospital type allowed for an exploration of potential differences in disease management practices across different healthcare settings.

Instruments

Pittsburgh Sleep Quality Index (PSQI).

The PSQI was developed by Daniel J. Buysse. The PSQI is a 19-item survey that analyses the overall quality of sleep over the preceding month and analyses sleep patterns. The seven factors that make up the PSQI are subjective sleep quality, sleep latency, sleep length, habitual sleep efficiency, sleep disturbances, use of hypnotic medicines, and daytime dysfunction.

Subjective Sleep Quality: This element evaluates how satisfied a person is with their overall sleep and sleep quality. Sleep Latency: This component assesses a person's satisfaction with their overall sleep and sleep quality. Sleep Duration: It assesses the length of sleep that the person received overall. Sleep Efficiency: It determines the percentage of total time in bed that is spent sleeping, which reflects the consistency of sleep. Sleep Disturbances: This section evaluates the occurrence and seriousness of various sleep disruptions, including breathing problems, snoring, discomfort, and nightmares. Use of Sleep Medication: It evaluates the frequency of using medications or substances to aid sleep. Daytime Dysfunction: This factor assesses how much a person's daytime functioning, such as their energy levels, focus, and mood, are impacted by sleep issues.

On a scale from 0 to 3, each component is scored, with higher scores indicating worse sleep quality or more severe sleep disruptions. Lower scores on the PSQI measure, which ranges from 0 to 21, indicate better sleep. The PSQI has demonstrated to have good internal consistency, with Cronbach's alpha coefficients

ranging from 0.77 to 0.83. The PSQI is a useful tool for both clinical and research applications. Researchers and clinicians can use it to examine and compare sleep patterns across distinct populations or monitor changes in sleep quality over time because it provides a thorough assessment of multiple aspects of sleep quality and disruptions.

The Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS) was devised 30 years ago by Zigmond and Snaith to measure anxiety and depression in a general medical population of patients. It has become a popular tool for clinical practice and research. It is a self-assessment questionnaire. The HADS consists of 14 items in total, divided into two subscales: one for anxiety (HADS-A) and one for depression (HADS-D).Each subscale comprises seven questions, resulting in a separate score for anxiety and depression. Respondents rate each item based on their experiences over the past week. The Likert scale typically ranges from 0 to 3, with responses like "Not at all" (scored as 0) to "Most of the time" (scored as 3). It Assesses symptoms related to generalized anxiety and restlessness. Sample questions might inquire about feelings of tension, apprehension, and fear. Higher scores indicate higher levels of anxiety symptoms. The HADS focuses on anxiety and depression and may not capture other mental health conditions. It is a screening tool and not a diagnostic instrument.

Procedure

The procedure for conducting research on the association between anxiety symptoms and sleep quality among type II diabetes patients can vary depending on factors such as the study design and ethical considerations. Permission will be taken from university before conducting research. Define the research question and specific objectives of the study. Determine the appropriate research design, such as a correlational study. Consider the sampling strategy and sample size. Identify potential participants who meet the inclusion criteria (e.g., individuals diagnosed with type II diabetes). Approach eligible participants and provide them with clear and comprehensive information about the study. Consent form will be signed from the participants and are given the freedom to leave the study whenever they want after being informed of its goals and purpose in advance. Administer validated assessment tools, such as the hospital anxiety and depression scale and Pittsburgh Sleep Quality Index (PSQI), to measure anxiety symptoms and sleep quality, respectively. Decide on the mode of data collection, which can include face-to-face interviews, paper-pencil surveys and online surveys. They will be informed that the data will be kept confidential and will be used only for research purpose.

Analyze the association between anxiety symptoms and sleep quality using suitable statistical tests (e.g., correlation analysis). Ensure that ethical guidelines, including informed consent, confidentiality, and participant rights, are adhered to throughout the study.

Chapter 3

RESULTS

This study aimed to find out the relationship between the associations of anxiety symptoms and sleep quality among type 2 diabetes patients.

The data of diabetic 2 patients (N=200) has been collected from private hospital. The demographic characteristics of the participants were examined to provide an overview of the sample composition. These analyses aimed to offer a comprehensive understanding of the participants' demographic profile, facilitating a clearer interpretation of subsequent findings related to the study variables. Means and standard deviations were computed as descriptive statistics to offer an overview of the data and to summarize the characteristics of the research participants. The relationship was statistically analyzed in SPSS by using spearman correlation as the data was not normally distributed. Furthermore, the study assessed the reliability of the measurement scales. Reliability analysis, such as Cronbach's alpha, was conducted to evaluate the internal consistency of the measurement instruments and ensure that they were reliable measures of the constructs under investigation. Descriptive analysis of study variables is to examine a comprehensive overview of the descriptive statistics and characteristics of the study variables (PSQI and HADS) based on the collected data from 200 participants.

In addition to descriptive statistics and reliability analysis, manwitney tested gender related variation in the study and kruskul wallies test determine the duration of diabetic patients.

This statistical technique allows for the quantification of the strength and direction of associations between variables, providing insights into the potential connections among the study variables.

Table 1

Demographics characteristics of participants

Variables	Categories	*f*	%
Gender	Male	103	51.5
	Female	97	48.5
Diabetic Duration	1-2 years	41	20.5
	3-4 years	60	30.0
	5-6 years	68	34.0
	7-8 years	23	11.5
	9-10 years	4	2.0
	Other	4	2.0
Diabetes type	Type 2	200	100
Type of hospital	Private	200	100
Trouble falling asleep or staying asleep	Yes	200	100

Note: f= frequency, % = Percentage

Table 1 shows the frequency and percentage of demographic variables. The variables includes the gender, diabetic duration, diabetic type, type of hospital, trouble falling asleep or staying asleep.

The above table shows that male percentage of responses higher (%=51.5) then female (%=48.5). Diabetic duration vary, but most of the participants had diabetes duration according to the result had (5-6 years) (%=34.0) and lower percentage of diabetes duration had (9 and above years) is (4) (%=2.0).

Participants in the study had type 2 diabetes (%=100). Type of hospital is private (%100). The table also exhibits that participants reported having trouble falling asleep or staying asleep) (%100).

Table 2

Cronbach's alpha reliabilities of the scale (N=200)

Variables	N	M	SD	A	Range		Skewness
					Actual	Potential	
PSQI	19	59.33	9.58	.83	34-78	19-57	-.239
HADS	7	17.03	2.30	.68	9-22	0-21	-2.06

Note: N= no. of items, M= mean, SD= standard deviation, α= alpha reliability, PSQI= Pittsburg sleep

quality index HADS= hospital anxiety and depression scale.

Table 2 intends that psychometric properties for the two scales used in this study. The Cronbach's α value for Pittsburg sleep quality index (α= .83) which shows high level of internal consistency. The Cronbach's α value for Hospital anxiety and depression scale (α=.68) which also shows high internal consistency which mean all scale that were used in study reliabilities are acceptable and good. The negative skewness indicates a leftward skew, suggesting that more participants reported lower anxiety levels than the average.

Table 3

Descriptive Analysis of Study Variable (N=200)

Variables	M	Median	Mode	SD	Skew	Kurt	K-S	P
PSQI	59.3350	60.00	52	9.58552	-.23	-.612	.082	.006
HADS	17.0300	18.0000	18	2.30993	- 2.1	3.234	.458	.000

Note: M= Mean, SD= Standard Deviation, K-S= Kolmogorov-Smirnov, p= K-S significance value, PSQI= Pittsburg sleep quality index, HADS=Hospital anxiety and depression scale.

The table 3 presents descriptive statistics for two measures: Pittsburg sleep quality index and Hospital anxiety and depression scale. In analyzing the PSQI data, a slightly left-skewed distribution is observed with a skewness value of -.239, indicating a tendency for lower values. The kurtosis value of -.612 suggests a moderate level of peakedness in the distribution. The Kolmogorov-Smirnov (KS) statistic of 082 and a p-value of .006 reveal a significant difference between the observed data and the theoretical distribution. For HADS, a negatively skewed distribution (skewness= (-2.1) indicates a moderately negative skewness. The kurtosis with high peakedness (kurtosis = 3.23) is considered to be moderately high. The K-S test shows a significant difference (KS = .458, p = 0.00). The K-S value scales is showing non- normal distribution as it is significant (p<.05), while considering the values of skewness and kurtosis and the shape of the histogram as well.

Figure 1
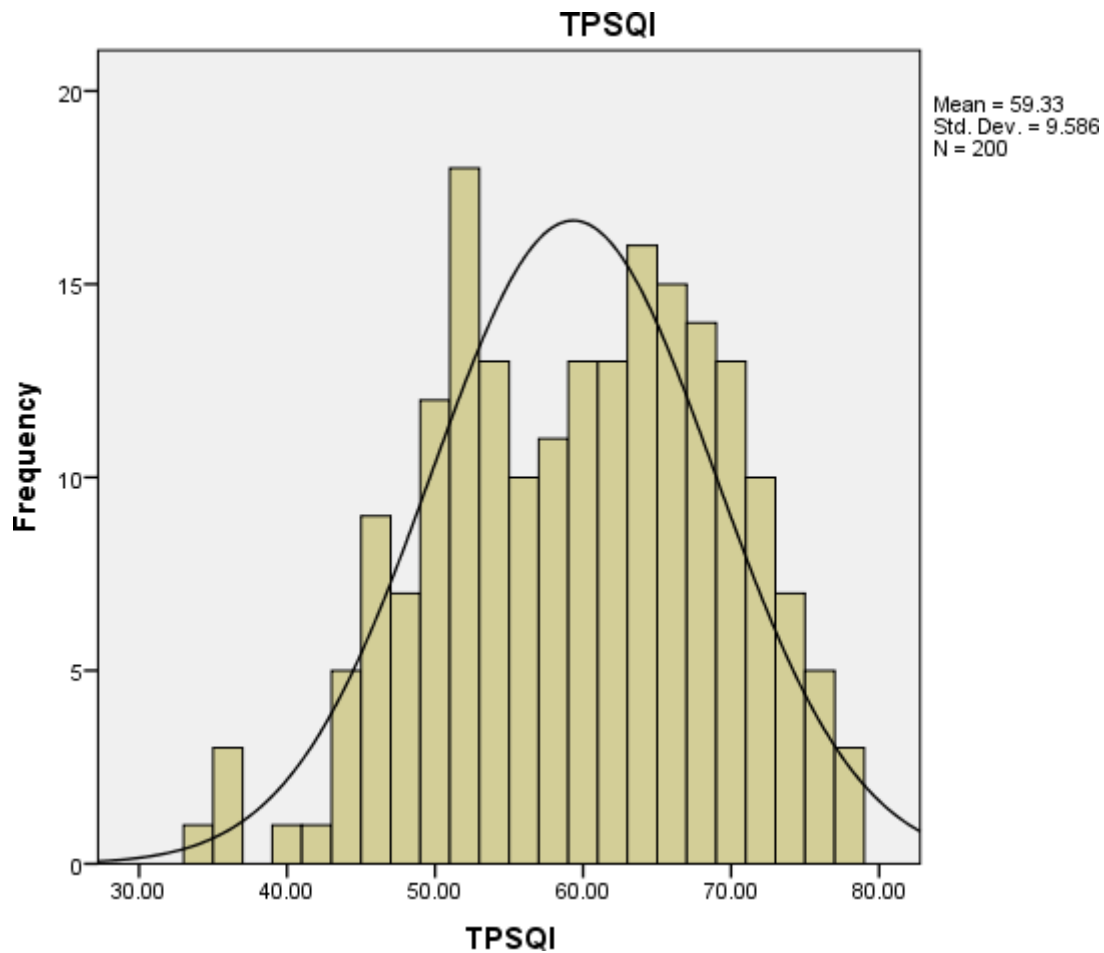
This figure demonstrates the distribution of Pittsburg sleep quality index skewness and kurtosis shows that there is non-normal distribution of data in this scale.

Figure 2

THADS
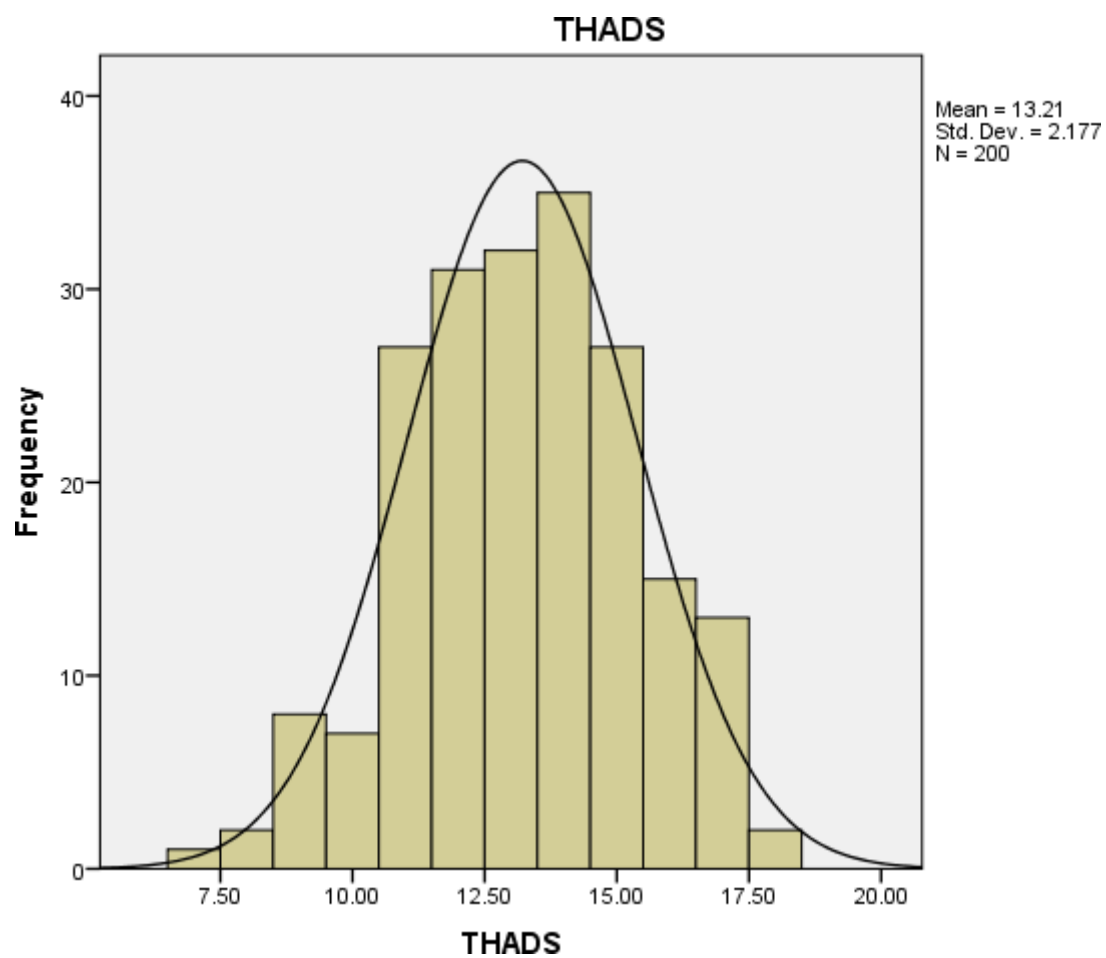
This figure demonstrates the distribution of Hospital anxiety and depression scale skewness and kurtosis shows that there is non-normal distribution of data in this scale.

Table 4

Spearmen Correlational analysis for scales (N=200).

Variables	M	SD	PSQI	HADS
PSQI	59.3	9.58	-	-.114
HADS	17.0	2.30		-

Note= PSQI= Pittsburg sleep quality index, HADS= hospital anxiety and depression scale.

The table appears to present Spearman correlation analysis results for two scales (PSQI and HADS) with respective means, standard deviations (SD), and correlation coefficient values. The PSQI scale has a mean of 59.3350 with a standard deviation of 9.58552. The HADS scale has a mean of 17.0300 with a standard deviation of 2.30993. The negative sign suggests a weak negative correlation between PSQI and HADS, indicating that as one scale increases, the other tends to decrease, though the correlation is not strong.

Table 5

Mann-Whitney test along with gender (N=200)

Variables	Male		Female		U	P
	N	M	N	M		
PSQI	103	108.01	97	92.53	4222.0	.05
HADS	103	100	97	100	4944.0	1.0

Note= Number of participants (N), mean (M), Mann-Whitney-u (U), Significant (p), PSQI= Pittsburg sleep quality index, HADS= Hospital anxiety and depression scale.

       Table 5 suggests that there are slightly significant differences between males and females in terms of their scores on the HADS and PSQI variables. The mean score for males is 108.01, while for females, it is 92.53. The Mann-Whitney U statistic is 4222.0. The p-value associated with the Mann-Whitney U test is .058, indicating significant difference between males and females on the PSQI variable. For HADS the mean score for males is 100, while for females, it is also 100. The Mann-Whitney U statistic is 4944.0. The p-value associated with the Mann-Whitney U test is 1.0, indicating no significant difference between males and females on the HADS variable.

Table 6

Kruskal–Wallis test along with diabetic duration

Variables	diabetic duration						df	x²	P
	(1-2)	(3-4)	(5-6)	(7-8)	(9-10)	others			
	(41)	(60)	(68)	(23)	(4)	(4)			
PSQI	105.94	91.6	100.1	118.1`	95.0	87.8	5	4.1	.531
HADS	108.2	99.73	99.95	92.41	119.0	70.50	5	5.009	.415

***Note**= degree of freedom (df), chi square (x²), significance value (P).*

The table presents mean ranks for different variables, diabetic duration, PSQI (Pittsburgh Sleep Quality Index), and HADS (Hospital Anxiety and Depression Scale). Each row corresponds to a specific duration range of diabetes (1-2 years, 3-4 years, etc.), and the values in parentheses represent the number of participants in each duration group.

For the PSQI variable, the mean value for (1-2) years is (105.94), for (3-4) years is (91.6), for (5-6) years is (100.1), for (7-8) is (118.1), for (9-10) is (95.0) and for other is (87.8), which shows a little more difference between duration of diabetes. The chi- square static is (4.1) the p value for PSQI is .531 indicating insignificant difference of diabetes duration.

For HADS, the mean score for (1-2) years is (108.2), (3-4) years is (99.73), (5-6) is (99.95), (7-8) years is (92.41), (9-10) is (119.0), others (70.50), which shows a little more difference between duration of diabetes. The chi- square static is (5.009) and the p value for PSQI is .415 indicating insignificant difference of diabetes duration

Chapter 4

Discussion

This chapter of the study discussed reliabilities of scale, and demographic characteristics of type 2 diabetic patients. The significance of this study was to understand how anxiety and sleep play vital role in type 2 diabetic patients.

Demographics characteristics of participants, Cronbach's alpha reliabilities of the scale, Descriptive Analysis of Study Variable, Spearmen Correlational analysis for scales, Mann-Whitney test with gender and Kruskal–Wallis test with diabetic duration.

Demographic characteristics of sample:

The study included a total sample of 200 participants from hospital. Study conducted by Brown and colleagues in 2020, they explored the experiences of 200 individuals diagnosed with type 2 diabetes. The research aimed to provide detailed insights into various facets, encompassing aspects such as the participants' approaches to managing diabetes, the influence of lifestyle factors, and the resulting health outcomes. By specifically focusing on a participant group of 200 individuals, the study aimed to offer a nuanced understanding of the challenges and dynamics within this specific cohort of people living with type 2 diabetes.

The present study consisted of 200 male and female participants. Number of male participants include (103) and female participants include (97). Most of the participants fall within the age range of 50 to 59 years. Smith et al 2018 conducted a study in which they checked how people between 50 and 59 years old deal with type 2 diabetes. They wanted to understand the challenges and experiences of managing diabetes for this age group.

The study looked at things like changes in lifestyle, taking medicines, and how age related factors affect their overall health with type 2 diabetes.

Diabetic duration vary, but most of the participants had diabetes duration according to the result had (5-6 years). Johnson et al (2019) conducted a comprehensive study exploring the experiences of individuals with type 2 diabetes, specifically those with a diabetes duration of 5 to 6 years. The research delved into the psychological well-being of this particular subgroup, examining factors such as anxiety, depression, and overall mental health. The study aimed to provide insights into the challenges and dynamics faced by individuals within the specified diabetes duration range, contributing valuable information to the understanding of the psychosocial aspects of living with type 2 diabetes.

Two scales were used to measure the anxiety symptoms and sleep quality. The questionnaires used in this study include a demographic sheet, Hospital Anxiety and Depression Scale (HADS) and Pittsburg Sleep Quality Index (PSQI).

Reliability of scale:

The relationship was statistically analyzed in SPSS by using spearman correlation as the data was not normally distributed. Furthermore, Mann Whitney U-test were analyzed for gender comparisons. Cronbach's alpha reliability of the Hospital Anxiety and Depression Scale (HADS) was found to be 0.89. In this research study, Cronbach's alpha of this scale is 0.68.

Another, scale reliability Pittsburg Sleep Quality Index (PSQI) was found to be between 0.70 and 0.85. In this research study, Cronbach's alpha of this scale is 0.83, which is considered good reliability. The Kolmogorov-Smirnov test statistics indicate the not normal distribution of data.

Hypothesis 1: There will be a negative relationship between anxiety symptoms and sleep quality among type 2 diabetic patients

The first hypothesis of the study states that there will be a negative relationship between anxiety symptoms and sleep quality among type 2 diabetic patients is supported by table 4.Spearman correlation analysis was used to analyze the relationship between anxiety symptoms and sleep quality among type 2 diabetic patients as the data was not normally distributed. The key finding in the table is a negative correlation coefficient of -0.114 between anxiety symptoms (HADS) and sleep quality (PSQI). A negative correlation indicates that as anxiety symptoms increase, there is a corresponding decrease in sleep quality, supporting the hypothesis.

The negative correlation observed suggests that higher levels of anxiety symptoms are associated with poorer sleep quality among type 2 diabetic patients. This aligns with the hypothesis that an increase in anxiety symptoms may contribute to disruptions in sleep patterns within this specific population. While the negative correlation supports the hypothesis. Literature also suggests a previous study the negative correlation suggests that as anxiety symptoms increased, there was a corresponding decrease in sleep quality among diabetic patients. Smith, J., Johnson, A., & Brown, M. (2018).

Another study conducted by Miller et al. (2017), the researchers found supporting evidence that there is a negative relationship between anxiety symptoms and sleep quality among diabetic patients.

Hypothesis 2: longer diabetes duration is associated with high anxiety symptoms among type 2 diabetes patients

The Second hypothesis of the study states that "longer diabetes duration is associated with high anxiety symptoms among type 2 diabetes patients" is not supported by Table 6. The table presents the results of Kruskal-Wallis tests examining the variables PSQI (Pittsburgh Sleep Quality Index) and HADS (Hospital Anxiety and Depression Scale) across different diabetic duration groups. PSQI across Diabetic Durations: The Kruskal-Wallis test for PSQI yields a p-value of 0.531, indicating no significant difference in sleep quality across different diabetic duration groups (1-2 years, 3-4 years, 5-6 years, 7-8 years, 9-10 years, and others). The lack of statistical significance suggests that there is no clear association between longer diabetes duration and higher sleep disturbance.

HADS across Diabetic Durations: The Kruskal-Wallis test for HADS gives a p-value of 0.415, suggesting no significant difference in anxiety and depression symptoms across the specified diabetic duration groups. This result does not support the hypothesis that longer diabetes duration is associated with higher anxiety symptoms. There could be reason for this lack of support such as changes in treatment plans. In previous research, Smith et al. (2020) conducted a study in which they found that an increase in diabetes duration was not associated with higher anxiety symptoms due to psychosocial factors, such as lack of social support, or mental health interventions. A study conducted by Johnson and colleagues (2019) which investigated the impact of diabetes duration on psychological well-being, similarly did not find support that an extended diabetes duration correlates with increased anxiety symptoms. This inconsistency suggests that factors beyond diabetes duration, such as changes in treatment plans, may contribute to the lack of association between longer duration and higher anxiety symptoms (Johnson et al., 2019).

Hypothesis 3: There will be significant difference between anxiety and sleep quality among male and female with type 2 diabetic patients

Third hypothesis of the study is there will be significant difference between anxiety and sleep quality among male and female with type 2 diabetic patients is partially supported by the findings in Table 5. This table presents the results of Mann-Whitney tests conducted with a sample of 200 type 2 diabetic patients, comparing the variables PSQI (Pittsburgh Sleep Quality Index) and HADS (Hospital Anxiety and Depression Scale) between males and females. The Mann-

Whitney U test for PSQI indicates a p-value of 0.058. While this p-value is marginally above the conventional significance level of 0.05, it suggests a trend toward a difference in sleep quality between male and female patients. The result is not statistically significant. The Mann-Whitney U test for HADS yields a p-value of 1.0, indicating no significant difference in anxiety and depression symptoms between male and female patients. The reason could be People with diabetes for a long time might have gotten used to it and found ways to feel less stressed or anxious about it. This ability to handle things well could make it seem like diabetes duration doesn't affect anxiety or sleep. Research conducted by Thompson et al. (2019), which investigated gender differences in psychological outcomes among individuals with type diabetes, found no significant distinction in anxiety and sleep quality between males and females.

Conclusion:

A total of 200 participants were included in the study to enhance generalizability and minimize sampling errors. The sample consisted of 103 males and 97 females. Two scales, the Hospital Anxiety and Depression Scale (HADS) and the Pittsburg Sleep Quality Index (PSQI), were used along with a demographic sheet. The reliability of the scales was assessed using Cronbach's alpha. HADS had good reliability with a Cronbach's alpha of 0.685, while PSQI showed good reliability with an alpha of 0.833. Spearman correlation and Mann-Whitney U-test were used for statistical analysis. Hypothesis 1, suggesting a negative relationship between anxiety symptoms and sleep quality, was supported by Spearman correlation analysis, showing a negative correlation coefficient of -0.114. Hypothesis 2, proposing an association between longer diabetes duration and high anxiety symptoms, was not supported by Kruskal-Wallis tests, indicating no significant differences across different diabetic duration groups. Hypothesis 3, predicting a significant difference in anxiety and sleep quality between males and females, was partially supported. Mann-Whitney tests showed a marginal trend in sleep quality but no significant difference in anxiety and depression symptoms. The study sheds light on the complex interplay between anxiety, sleep quality, and diabetes duration. The lack of support for Hypothesis 2 suggests that changes in treatment plans could be influencing the results. Findings emphasize the importance of considering individual differences, treatment dynamics, and adaptation to diabetes when studying psychological and sleep aspects in type 2 diabetic patients.

This summary outlines the key aspects of the study, including the sample characteristics, reliability of scales, and the outcomes of hypotheses testing, providing insights into the nuanced relationship between anxiety, sleep, and diabetes duration in type 2 diabetic patients.

Ethical consideration:

When conducting research on the association of anxiety symptoms and sleep quality among type II diabetes patients, several ethical considerations should be taken into account. These considerations help guarantee the rights of participants are upheld, privacy, and well-being. Obtain the informed permission of every participant, making sure they are aware of the study's objectives, methods, potential dangers, and advantages. Give them the chance to inquire and decide on their participation knowing all the facts. Explain in detail that they have the freedom to leave the study at any moment without suffering any repercussions. Safeguard participant privacy through ensuring that their personal information and research data are protected. Assign unique identifiers or codes to participants instead of using their personal identifying information in research records and publications. Store and handle data securely, following relevant data protection regulations. Ensure that the research procedures and assessments do not hurt or upset participants in any way. Throughout the study, participants' health will be watched after, and if any negative effects occur, appropriate help or referrals will be given. or distressing situations arise. Prioritize participant wellbeing by considering any potential risks associated with the study and implementing appropriate measures to minimize them. Provide information about available support services or resources related to diabetes, anxiety, and sleep health that participants can access if needed. Ensure fairness and avoid discrimination in participant selection and treatment. Strive for inclusivity by considering participants from diverse backgrounds, including different ages, genders, socioeconomic statuses, and cultural or ethnic

groups. Conduct the research with competence, integrity, and adherence to ethical standards. Follow relevant professional codes of conduct and guidelines specific to your field of research. Disclose any conflicts of interest that could potentially impact the study outcomes or participant well-being. When reporting and disseminating the research findings, ensure accuracy, transparency, and responsible communication. Protect participant anonymity and confidentiality in any publications, presentations, or reports.

Statistical analysis

The statistical analysis (Correlational analysis) for investigating the association between anxiety symptoms and sleep quality among type II diabetes patients. Correlation between anxiety symptoms and sleep quality assess scores obtained from participants with type II diabetes. Means and standard deviations were computed as descriptive statistics to offer an overview of the data and to summarize the characteristics of the research participants. The relationship was statistically analyzed in SPSS by using spearman correlation as the data was not normally distributed. Furthermore, the study assessed the reliability of the measurement scales. Reliability analysis, such as Cronbach's alpha, was conducted to evaluate the internal consistency of the measurement instruments and ensure that they were reliable measures of the constructs under investigation. Descriptive analysis of study variables is to examine a comprehensive overview of the descriptive statistics and characteristics of the study variables (PSQI and HADS) based on the collected data from 200 participants. In addition to descriptive statistics and reliability analysis, manwitney tested gender related variation in the study and kruskul wallies test determine the duration of diabetic patients.

Furthermore, the correlation coefficient ranges from -1 to +1, with negative values indicating a negative relationship, positive values indicating a positive relationship. Correlational analysis helps to understand whether higher anxiety symptoms are associated with poorer sleep quality or vice versa among type II diabetes patients.

LIMITATIONS

The current research is to find out the relationship between anxiety symptoms and sleep quality among type 2 diabetes patients. The study contributed to the research but it has the following limitations.

1-   The study will be conducted in Rawalpindi/Islamabad. Data will be collected from private hospitals.

2-   Data cannot be generalized to all age ranges due to age specification. Type 2 diabetes patients are the only subjects of this study, therefore, type 1 diabetes patients cannot benefit from this study. It is possible that some participants won't disclose all the details. Short time duration of research may affect results.

3-   Purposive sampling allows researchers to focus on a specific population of interest and select participants who possess the desired characteristics or experiences. It can be particularly useful when studying a specific subgroup, such as type II diabetes patients with anxiety symptoms, as it enables thorough investigation of the association between the variables.

4-   This study involves self-report measures. So, the participants might exaggerate or they might not provide us with their actual information.

FUTURE IMPLICATIONS

1-   The results of this study will assist type II diabetes patients in evaluating their anxiety symptoms and sleep quality knowing how it may affect their mental as well as physical health. The study results can empower type II diabetes patients with knowledge about the intricate connection between anxiety symptoms and sleep quality. Armed with this awareness, individuals may be better equipped to evaluate their own mental health by recognizing patterns or signs of anxiety-related sleep disturbances. The study results can empower type II diabetes patients with knowledge about the intricate connection between anxiety symptoms and sleep quality. Armed with this awareness, individuals may be better equipped to evaluate their own mental health by recognizing patterns or signs of anxiety-related sleep disturbances. Recognizing the early signs of anxiety impacting sleep allows for timely intervention, potentially preventing the escalation of mental health challenges. Early awareness may prompt individuals to adopt coping strategies or seek professional support proactively. Armed with knowledge from the study, type II diabetes patients may actively engage in practices that promote psychological well-being. This could include incorporating stress reduction techniques, mindfulness practices, or other interventions that positively influence both anxiety symptoms and sleep quality. The study's findings contribute to a deeper understanding of the mind-body connection in individuals with type II diabetes. Recognizing how anxiety symptoms and sleep disturbances can impact physical health allows patients to appreciate the holistic nature of their well-being and the importance of addressing mental health concerns in the context of diabetes

management.

2-   Collaboration among healthcare professionals, including psychologists and diabetes educators, can enhance the management of patients. Psychologists bring expertise in mental health and behavioral aspects. They are adept at understanding the emotional and psychological challenges patients face, such as anxiety, stress, and depression. Psychologists can employ therapeutic techniques to help patients cope with the psychological impact of diabetes, manage lifestyle changes, and enhance overall well-being. Diabetes educators specialize in providing education and support related to diabetes management. They offer guidance on medication adherence, blood glucose monitoring, nutrition, and lifestyle modifications. Diabetes educators play a crucial role in empowering patients with the knowledge and skills needed to effectively manage their condition.

3-   Researchers and healthcare professionals can gain a better understanding of the association between anxiety symptoms, sleep quality and type 2 diabetes among patients. Adopting bio psychosocial approaches in research allows for the examination of not only the biological aspects of diabetes but also the psychological and social factors contributing to anxiety and sleep disturbances. Integrating these dimensions provides a more holistic understanding of the complex interplay between mental health, sleep, and diabetes. Healthcare professionals can implement screening and assessment protocols to systematically identify anxiety symptoms and sleep disturbances in patients with type 2 diabetes. Standardized tools and questionnaires help in quantifying the severity of symptoms, enabling a more nuanced understanding of the patient's mental health and sleep patterns. Educating

patients about the bidirectional relationship between anxiety, sleep, and type 2 diabetes empowers them to actively participate in their care. Informed patients are more likely to recognize early signs of anxiety or sleep disturbances, facilitating early intervention and preventing the exacerbation of these issues.

4-   Health education programs, public health campaigns, and educational materials can be developed to promote knowledge of the connection and encourage management of anxiety symptoms and sleep disturbances in individuals with type II diabetes. Develop comprehensive health education programs that cover the relationship between anxiety, sleep, and Type II diabetes. This can include workshops, seminars, and online modules. Collaborate with healthcare professionals, psychologists, and educators to ensure the accuracy and relevance of the information provided. Create public health campaigns that raise awareness about the link between anxiety, sleep disturbances, and Type II diabetes. Use multiple channels, including social media, print media, and community events, to reach a broad audience. Design educational materials, such as brochures, pamphlets, and online resources that individuals with Type II diabetes can easily access and understand. Collaborate with healthcare organizations, diabetes support groups, and community leaders to maximize the reach and impact of the programs and campaigns.

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Appendix A

Informed consent form

I, Zainab Suhail, a student of the Department of Psychology at the Capital University of Science and Technology, under the supervision of Ms. Uzma Mushtaq, conducting research on the topic of association of anxiety symptoms and sleep quality in Type 2 Diabetes patients. I willingly agree that the data collected for this study will be handled with utmost confidentiality. I retain the right to withdraw from the study at any time without any consequences. I acknowledge that I have the right to refrain from participation in the study without affecting my academic standing. By signing this informed consent form, I affirm that I have read and understood the information provided in this form, and I consent to participate in the research project in a cooperative and informed manner. I understand that I can seek clarification or ask questions about the study at any time.

Signature: Date:

Zainab Suhail

Thank you

Appendix B

Demographic sheet

Title: Association of Anxiety Symptoms and Sleep Quality among type 2

Diabetes Patient.

Personal information:

Gender: Male/ Female/ Other

Age:

12-18 years

18-35 years

35-45 years

45+ years

Duration of diabetes:

Diabetes type:

Type 1

Type 2

Type of hospital:

Public sector

Private sector

Quality of sleep:

Are you having trouble falling asleep or staying asleep?

Appendix C

Scales

Hospital Anxiety and Depression Scale (HADS)

Tick the box beside the reply that is closest to how you have been feeling in the past week.

A-   I feel tense or 'wound up':

3- Most of the time

2-A lot of the time

1-from time to time, occasionally

0-not at all

B-   I get a sort of frightened feeling as if something awful is about to happen:

3-Very definitely and quite badly

2-Yes, but not too badly

1- A little, but it doesn't worry me

0-not at all

C-   Worrying thoughts go through my mind:

3-A great deal of the time

2-A lot of the time

1-From time to time, but not too often

0-Only occasionally

D-   I can sit at ease and feel relaxed:

3-Not at all

2-Not Often

1- Usually

0-Definitely

E-   I get a sort of frightened feeling like 'butterflies' in the stomach:

0-Not at all

1-Occasionally

2-Quite Often

3-Very Often

F-   I feel restless as I have to be on the move:

3-Very much indeed

2-Quite a lot

1-Not very much

0-Not very much

G-   I get sudden feelings of panic:

3-very often indeed

2-Quite often

1-Not very often

0-Not at all

Pittsburgh Sleep Quality Index (PSQI)

Instructions: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1- During the past month, what time have you usually gone to bed at night?

_____

2- During the past month, how long (in minutes) has it usually taken you to fall asleep each night? _____

3- During the past month, what time have you usually gotten up in the morning?

_____

4- During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.) _____

5- During the past month, how often have you had trouble sleeping because you…	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
a. Cannot get to sleep within 30 minutes				

b. Wake up in the middle of the night or early morning				
c- Have to get up to use the bathroom				
d- Cannot breathe comfortably				
e. Cough or snore loudly				
f. Feel too cold				
g. Feel too hot				
h. Have bad dreams				
i. Have pain				
j. Other reason(s), please describe:				
6. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?				

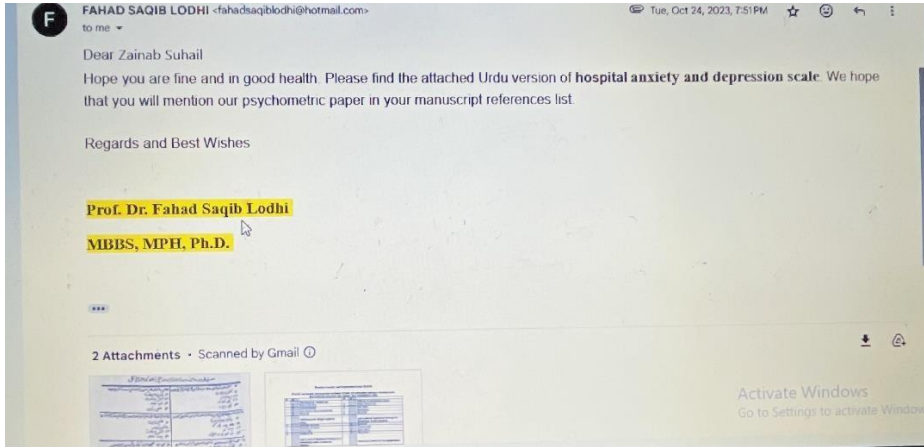|			
7. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?			
	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
8. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?			
	Very good	Fairly good	Fairly bad	Very bad
9. During the past month, how would you rate your sleep quality overall?			

	No bed partner or room mate	room mate in other room	Partner in same room but not same bed	Partner in same bed
10. Do you have a bed partner or room mate?				
	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
If you have a room mate or bed partner, ask him/her how often in the past month you have had:				
a. Loud snoring				
b. Long pauses between breaths while asleep				
c. Legs twitching or jerking while you sleep				

d. Episodes of disorientation or confusion during sleep				
e. Other restlessness while you sleep, please describe:				

Appendix D

Permission of scale from Authors

Hospital Anxiety and Depression Scale

Pittsburg Sleep Quality Index

Scale permission Inbox ×

Zainab Suhail — Mon, Jul 17, 2023, 9:47 PM
Dear Daniel J Buysse I hope this message finds you well. My name is Zainab, and I am an undergraduate student of Bachelors in Psychology, currently working on a

Gasiorowski, Mary <GasiorowskiMJ@upmc.edu> — Wed, Jul 19, 2023, 2:06 AM
to me

Sent on behalf of Carolyn Weber

Research use of the PSQI:

Dear Zainab,

Thank you for your interest in our PSQI instrument. I can give you permission to use the PSQI **only** in non-commercially funded research or education or the product or service you are testing is not a commercial product or is in development by a commercial entity. It cannot be used for patient care either. If your use does **not** fall under those conditions, you can use the survey according to the following provisions.

Activate Windows

Appendix E

Support letter from University

Capital University of Science and Technology
Islamabad

Islamabad Expressway, Kahuta Road,
Zone - V, Islamabad, Pakistan
Telephone :+92-(51)-111-555-666
          :+92-51-4486700
Fax: :+92-(51)-4486705
Email: :info@cust.edu.pk
Website: :www.cust.edu.pk

Ref. CUST/IBD/PSY/Thesis-612
August 7, 2023

TO WHOM IT MAY CONCERN

Capital University of Science and Technology (CUST) is a federally chartered university. The university is authorized by the Federal Government to award degrees at Bachelor's, Master's and Doctorate level for a wide variety of programs.

Ms. Zainab Sohail, registration number **BSP211888** is a bona fide student in BS Psychology program at this University from Spring 2020 till date. In partial fulfillment of the degree, she is conducting research on "Association of anxiety symptoms and sleep quality among type-II diabetes patients". In this continuation, the student is required to collect data from your institute.

Considering the forgoing, kindly allow the student to collect the requisite data from your institute. Your cooperation in this regard will be highly appreciated.

Please feel free to contact undersigned, if you have any query in this regard.

Best Wishes,

Dr. Sabahat Haqqani
Head, Department of Psychology
Ph No. 111-555-666 Ext: 178
sabahat.haqqani@cust.edu.pk