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Effect of sleep hygiene educational program on sleep quality among patients with depression

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Abstract
Background: Depression and sleep are much related. A majority of people with depression have sleep disturbances. The study **aimed** to examine the effect of a sleep hygiene educational program on sleep quality among patients with depression. **Setting:** conduction of the study was at inpatient of Neuropsychiatric Department in Tanta University Hospital. **Research design:** This study used a quasi-experimental design with a single-group pre/posttest format. **Subjects:** A convenient sample of 50 patients with depression according to DSM-5 criteria was included in the study. **Tools** that used in the study were demographic and clinical characteristics Questionnaire, Pittsburgh Sleep Quality Index (PSQI), and Beck Depression Inventory. **Results:** There was a highly statistically significant positive correlation among the sleep quality index score and total depression score among the studied patients at pre-intervention, immediately post-intervention, and 3 months post-program. The study **concluded** that sleep hygiene educational program improved sleep quality of patients with depression. **Recommendations:** utilizing sleep hygiene educational program for patients with depression should be considered as an essential part of rehabilitation plans.

Keywords: Eepressed patients, Educational program, Sleep hygiene & Sleep quality

Introduction
Depression is a growing mental health issue worldwide **(Ismail et al., 2024)** and approximately 280 million people in the world have depression **(WHO 2021, & Institute of Health Metrics and Evaluation, 2022).** It is considered as a challenge for health and economic policy makers with its great impact on total health dimensions, life satisfaction, in addition to economic burden **(Ismail et al., 2024, & Seo et al., 2018)**. Additionally, socio-economic factors have been linked with depression incidence, like being old, female sex, low educational levels, being single or alone, suffering from physical illness, and weak cognitive functions **(Vaccaro et al., 2017)**. Females especially in their old age, are at increased risk to be diagnosed with depression because they lost their routine role in their house due to existence of functional disabilities **(Pilania et al., 2017)**.

Depression is a widespread psychiatric disorder, in which patients feel persistent sorrow and pessimism. Patients with depression are presented with a downcast and low mood, absence of concern in formerly interesting hobbies, weight fluctuations, reduced physical activity, reduced attentiveness level, tiredness, feeling of valueless, feeling of guiltiness, and suicidal ideas **(Ma, 2022)**. Depression can greatly influence concentricity levels, quality of falling asleep, functional capacity, further, it can impair individual personal and social life **(Psychiatry 2020 & Zakeri et al., 2022)**.

For achieving human growth and development sleep is needed. It could be considered as a necessary process to attain a good quality of life, preserve physical and mental processes **(Lee, et al., 2015 & Gilad & Shapiro, 2020)**. Sleep is a basal aspect in people life. Without sleep, human body cannot perform its functions well and sleeping the enough amount helps to maintain the ability for doing daily tasks. During sleep, the body could repair itself, heighten learning, memories and upgrade its chemical harmony **(Watson & Cherney, 2020 & Jara-Díaz & Rosales-Salas, 2020).**

Sleep changes are identified as one of the markers for easily diagnosing depression and can appear in the form of insomnia, laziness, sluggishness, bad dreams and sleep-wake cycle disturbances **(Yan et al., 2021)**. The liaison which exists amongst sleep and depressive illness is much complex-depression may result in sleep problems and this may lead to onset of depression. In depression, insomnia is very common and it is a predisposing agent for its incidence or recurrence among youth, middle-age and older people. People with insomnia have a ten-fold risk for developing depression in comparison to those who sleep well **(Fang et al., 2019 & Al Balushi et al., 2022)**.

In spite of factors affecting depression prominence are assorted and comprise social and economic conditions **(Kang et al., 2015 & Kim et al., 2021)** and co-existing diseases **(Jang et al., 2020; Jeong et**

al., 2021; Kwon et al., 2021). Incidence of low sleep quality is one of the most prevalent and preceding symptom manifesting in depression **(Anderson & Bradley, 2013; Kim et al., 2021)**.

Sleep quality can be seen as the person's self-contentment towards whole sides of the sleeping experience. Quality of sleep possesses 4 features (continuation of sleep, latency of sleep, sufficiency of sleep, and subsequent wakefulness following starting sleep. Good quality of sleep result in favorable outcomes like sensation of comfort, natural body responses, and favorable social interactions. Two fundamental indicators for achieving good quality of sleep embrace having a latency of sleep of less than or equal to fifteen minutes with night time sleeping characterized by little wakenings of less than or equal to five minutes **(Ohayon, 2002 & Chaput et al., 2018).**

Poor quality of sleep contributes in a lessening of mental functions, with hardness in evading automatic unfavorable ideas, irritability, day time dysfunction and triggering rumination **(Zhao et al., 2021 & Wang et al., 2023)**.

Worsening of sleep hygiene practices may increase the risk to psychiatric illnesses like depression **(Gupta et al., 2019 & Scott et al., 2021)**. "Sleep hygiene" indicates to those manners that are thought to improve quantity and quality of sleep **(Stepanski & Wyatt 2003)**. Sleep hygiene is a non-pharmacological tactic commonly utilized to enhance sleep quality **(Saeedi, et al., (2014): & Alanazi et al., 2023)**. Sleep hygiene tactics points to behavioral interventions where patients are given instructions about healthy sleep habits to improve their quality of sleep at the prerequisite sleeping times **(Booker et al., 2020& Thibault et al., 2024)**. Sleep hygiene recommend a group of healthy habits that boost good sleep as maintaining daily exercising, intake of a healthy diet, ensuring a convenient sleep environment through bedding, light, minimization of noise and establishing relaxation at bedtime **(Colt & Reilly 2019 & Markwald et al., 2018)**. In addition to avoidance of stimulants in the late afternoon or evening such as drinking of caffeine or nicotine, limiting consumption of alcohol and minimizing fluids around bedtime **(Veale et al., 2020 & Spadola et al., 2019)**.

Previous researches have elucidated that having bad sleep hygiene habits largely affect sleep quality and its continuation. Sleeplessness and bad sleep habits are harmful to humans' wellbeing, and are associated with many mental and physical disorders **(Brick et al., 2010 & Medic et al., 2017)**. There is an association in between bad sleep hygiene, sleep difficulties, sleeping during daytime, and depression. Having inappropriate sleep hygiene is one of the various agents responsible for inadequate sleep and sleeplessness **(Alanazi et al., 2023 & George et al., 2023)**.

Therefore, in light of increasing sleep quality among patients with depression, sleep hygiene educational program could be developed to help patients learn a group of behavioral and environmental strategies that aid in acquiring healthy sleep habits **(Alanazi et al., 2023 & Seaver et al., 2024).** This strategy encompasses gaining the proper information regarding sleep and the needed sleep-related strategies, in order to enhance sleep.Sleep upgrading which involved short-term napping and evening exercising (Sleep health course) was efficacious **(Ramar et al., 2021 & Seaver et al., 2024)**.

The benefits of sleep hygiene educational program for patients with depression are numerous and appeared in many studies. Sleep troubles and depression symptoms decreased over time **(Rahimi et al., 2016 & Başar et al., 2024)**. As well, it was efficacious for enhancing the ability to fall asleep quickly, achieving contentment, temper improvement, and the willingness to sleep during daytime (**Bani et al., 2023& Urbanová et al., 2024)**. So, educating in combination with usage of sleep hygiene policies may prohibit, in somewhat conditions, depressive illness occurrence **(Dinis et al., 2019 & Alanazi et al., 2024).**

Significance of the study:

Commonly, sleep issues co-occur in patients with major depression and according to this, they deserve a special attention **(Rahimi et al., 2016)**. Poor sleep quality may lead to depressive symptoms **(Joo et al., 2022)**.

To better sleep quality among patients with depression and to decrease the severity of depression, there is a pressing necessity to find safe and influential - non-pharmacological interventions. This shed light on the different of designing educational programs intending to master sleep hygiene in addition to improving quality of sleeping amongst patients with depression. This will undoubtfully improve physical along with mental wellness and the degree of whole life satisfaction **(Alanazi et al., 2023 & Sun et al., 2023)**.

From this standpoint, educating patients with depression on sleep hygiene by psychiatric nurses is considered their cornerstone role in order to ameliorate poor sleep hygiene of those patients. So making changes concerning sleep hygiene is sometimes recommended as the first road of interventions for remedying sleep problems by encouraging patients to create regular daily schedule for sleep and wake up times, sleeping seven hours at night, canceling strenuous activities prior bedtime, exposure for sunlight during the day, and

inhibit day time napping. At bedtime, restricting caffeine and tobacco consumption, showering by warm water, using the bed only for sleep and avoiding fatty and heavy foods **(AGS, 2017)**.

Aim of the study

The study aim was;

examine the effect of sleep hygiene educational program on sleep quality among patients with depression.

Hypotheses

The sleep quality of patients with depression will be significantly improved after program implementation.

Materials and Method

Research design

This study used a quasi-experimental study design, which consists of a single-group pre/posttest.

Setting:

The study was conducted with inpatients in the Neuropsychiatric Department of Tanta University Hospital, which is affiliated to the Ministry of Higher Education. The Neuropsychiatric Department has a capacity of 31 beds, divided into two wards for male patients (17 beds) and two wards for female patients (14 beds).

Subjects:

A convenient sample of 50 patients diagnosed with depression according to the DSM-5 was selected from the previously mentioned setting sample size. This was determined using the Epi-Info software statistical package. The criteria for sample size calculation included a 95% confidence level, an expected outcome of 70%, and a margin of error of 5%. Based on these criteria, the required sample size was calculated to be N > 92.

Inclusion criteria of the study subjects

- Adult patients (18 years and older).
- Patients with the ability to participate in the study and communicate in a logical manner.

Exclusion criteria:

Co-morbid with other psychiatric disorders.

Data collection tools:

Three tools was used for collection of the data from the study subjects:

Tool I: Demographic and clinical characteristics questionnaire

"This section was developed by the researcher based on reviewing the literature. It includes demographic characteristics (as age, sex, marital status, and level of education) as well as clinical characteristics of the studied patients, as the duration of the disease and the number of hospital admissions."

Tool II: Pittsburgh Sleep Quality Index (PSQI)

The Pittsburgh Sleep Quality Index (PSQI) was developed by Daniel J. Buysse and collaborators in 1989 to measure sleep quality and disturbances over a one-month period. The PSQI consists of 19 self-rated questions, along with 5 additional questions in Question 10, which should be rated by a bed partner or roommate (if available). Note that Question 10 is not scored, but it still needs to be answered.

The 19 self-rated items are composed of seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Each component is scored on a scale from 0 to 3, where a score of '0' indicates no difficulty and a score of '3' indicates severe difficulty. The seven component scores are then summed to yield a single 'global' score, which ranges from 0 to 21 points. A score of '0' indicates no difficulty, while a score of '21' indicates severe difficulties across all areas.

Total score as follows :

0–4 indicating "good" sleep
5–21 indicating "poor" sleep

Tool III: Beck Depression Inventory (BDI)

The Beck Depression Inventory (BDI, BDI-II), created by Dr. **Aaron T. Beck** in **1996**, is designed to measure the severity of depression and to serve as a screening tool for depression. It consists of a 21-question multiple-choice self-report inventory, with a 4-point scale ranging from no impairment (0) to severe impairment (3). The maximum possible score is 63.

After scoring the test, a value of 0 to 3 is assigned to each answer, and the total score is then compared to a key to determine the severity of depression.

Total scoring as the following:

0–9: minimal depression
10–18: mild depression
19–29: moderate depression
30–63: severe depression.

Higher total scores indicate more severe symptoms of depression.

Method

An official permission:

To carry out the study was obtained from Faculty of Nursing Dean and was sent to the study setting manager, after explaining aim of study.

Ethical considerations:

Ethical approval was obtained from the Ethical Committee of the Faculty of Nursing, Tanta University (Code No. 566-12-2024). Oral consent for voluntary participation was obtained from all patients involved in the study. The patients were informed about study aim and reassured about maintaining their confidentiality and privacy, with ensuring that any obtained information used solely for the purpose of the study. The right of the patients to refuse

participation or withdraw from the study at any stage was emphasized. It was also clarified that the nature of the study posed no harm to the participants.

Developing tools

- To assess the clarity and applicability of the study methods, a pilot study was conducted on a sample of 10% of the patients to identify any potential obstacles during data collection. The pilot subjects were later excluded from the study sample.
- Tools II and III of the study were translated into Arabic by the researchers and then back-translated. They were tested for content validity by a panel of five experts in the field of psychiatric nursing to ensure the appropriateness of the items in measuring what they are intended to measure. Both tools were found to be valid.
- Cronbach's alpha was used to assess the reliability of the Arabic version of the tool."

Tools Reliability:

- The internal consistency of the study tools were tested by using Cronbach's Alpha.

Cronbach's Alpha value	Tools
0.879	**Pittsburgh Sleep Quality Index (PSQI)**
0.856	**Beck Depression Inventory (BDI)**

The actual study:

The actual study was conduct within four phases:

Phase one: Assessment phase (pretest).

The data was collected using the formerly mentioned tools, through individual interviews and filling the questionnaire. The process was conducted in a simple and understandable manner, tailored to the patients. Filling of the questionnaire typically took between 30 to 35 minutes."

This phase involved collecting the baseline data to assess the needs of the subjects prior to the intervention."

Phase two: (Educational program development).

- The educational program was developed by the researcher based on a review of recent related literature and the results from phase one.
- The **general objective of the program** was to improve the quality of sleep in patients with depression."

Implementation phase (Educational program implementation).

- The educational program content was delivered across 6 sessions. The patients were divided into 8 subgroups, with each subgroup consisting of 5-6 patients. The patients attended 2 sessions per week for 3 weeks. The duration of each session ranged from 40 to 50 minutes.
- The teaching materials used included PowerPoint presentations, videos, posters, and role play. A handout was provided to all studied patients and their caregivers, supplemented with photos and illustrations to help the patients better understand the content in a simple way."
- The researcher acted as the initiator, provider, and facilitator, encouraging the studied patients during the main part of the session.
- After the session content was explained or after participating in activities related to the sleep hygiene educational program (e.g., relaxation techniques, imagery, etc.), the studied patients discussed the session topic.
- At the end of each session, the researcher provided a summary and informed the patients about the time of the next session.
- Group discussions were used to increase interest and encourage active participation among the patients.

The program was implemented through the following sessions:-

Sessions related to sleep physiology

Session (1) (Introduction session)

This session focused on helping the group members to become acquainted with each other and with the researchers, as well as explaining the purpose of the program, its schedule, and an outline of the program content."

Session (2): This session focused on providing the studied patients with information about:

1. The definition of sleep.
2. Normal rate of sleep.
3. Factors that affect sleep.
4. Characteristics of healthy and unhealthy sleep.
5. Sleep disorders types.

Sessions related to sleep quality

Session (3): This session focused on educating studied patients about

1. Sleep quality concept
2. How to calculate sleep quality
3. Sleep stages
4. Bad sleeping habits
5. General guidelines for improving sleep quality
6. The relationship between depression and sleep quality

Sessions related to sleep hygiene program

Session (4): This session focused on notifying studied patients about:

1. Sleep hygiene definition.
2. Tips to improve sleep hygiene.

Session (5): This session emphasized on informing studied patients about:

Behavioral intervention strategies and relaxation techniques such as:

1. Relaxation routine techniques.
2. Imagination.

Help the patients to explores the connection between thoughts and feelings about sleep and actual behaviors and notify the patients about relaxation routine.

Session (6): This session focused on:
Summary of all sessions.

Evaluation phase (Post-test):

This session focused on re-administering Tools II and III twice: once immediately after the program and again three months post-program implementation. At the end of the study, an educational booklet was given to the studied patients.

Statistical design

Upon completion of data collection, the collected data were organized, tabulated, and statistically analyzed using IBM SPSS version 22 on a personal computer. Data were presented using descriptive statistics, including frequencies and percentages, mean, and standard deviation. Qualitative variables were compared with the chi-square test, while quantitative variables were compared with the paired sample t-test to assess the program effectiveness. Data were also presented in the form of bar charts. A statistically significant difference was considered when the p-value was < 0.05, and a highly statistically significant difference was considered when the p-value was < 0.001.

Results

Table (1): Distribution of demographic characteristics of the studied patients (n=50).

Demographic characteristics	No.	%
Age (years)		
20- years	6	12.0
30- years	16	32.0
40- years	19	**38.0**
50 years and more	9	18.0
Mean± S.D **42.06 ± 10.05**		
Sex		
Male	18	36
Female	32	**64**
Marital status		
Single	10	20
Married	24	**48**
Divorced	10	20
Wildwood	6	12
Educational level		
Red and write	11	22
Elementary	13	26
Secondary / Diploma school	14	**28**
University education	12	24
Occupation		
Unemployed	10	20
Manual Workers	18	**36**
Employees	16	32
Retired and others	6	12
Income		
Enough	18	36
Not enough	32	**64**
Residence		
Rural	32	**64**
Urban	18	36
Living accommodation		
With family	41	**82**
Alone	9	18

Table (2): Distribution of clinical characteristics of the studied patients (n=50).

%	No.	Clinical characteristics
		Duration of the disease
20	10	<1 year
24	12	1 -5 years
46	23	5 -10 years
10	5	10 years and more
		Number of hospital admissions
30	15	No previous hospitalization
26	13	One time
38	19	Two times
6	3	Three times and more

Table (3): Comparison between total mean scores of the studied patients' regarding sleep quality and depression at pre, immediately post & post three months program phases (n=50)

Pre & Post 3 months		Pre &immediately		Post 3 months Mean± SD	Immediately Mean± SD	Pre Mean± SD	Scale
P-value	t-test	P-value	t-test				
0.000**	16.692	0.000**	11.035	5.62±1.159	7.50±1.418	10.10±1.992	**Sleep Quality**
0.000**	21.073	0.000**	19.956	8.94±2.888	15.48±2.915	29.56±4.773	**Depression**

** *Highly statistically significant at p<0.001.* *t= Paired sample t test*

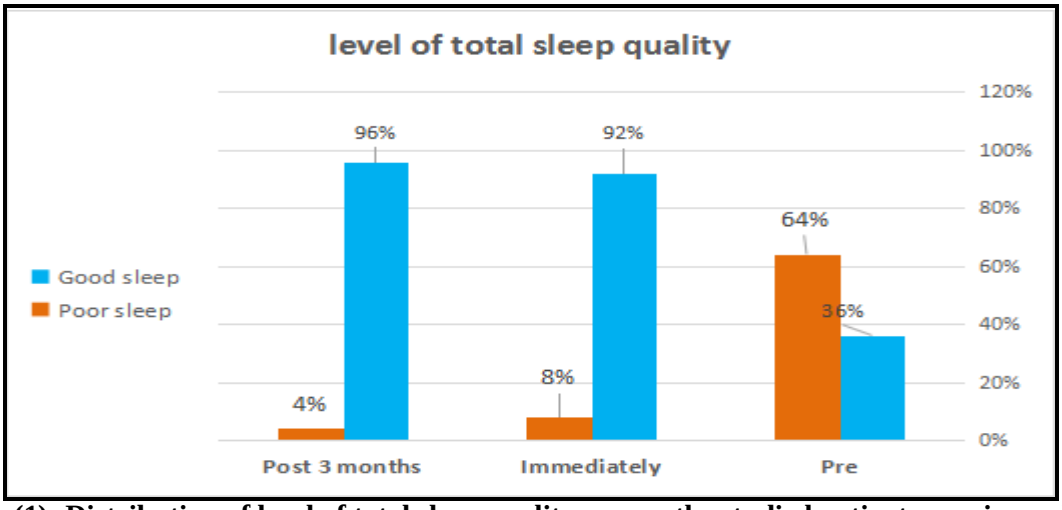

Figure (1): Distribution of level of total sleep quality among the studied patients pre, immediately post & post three months program phases (n=50).

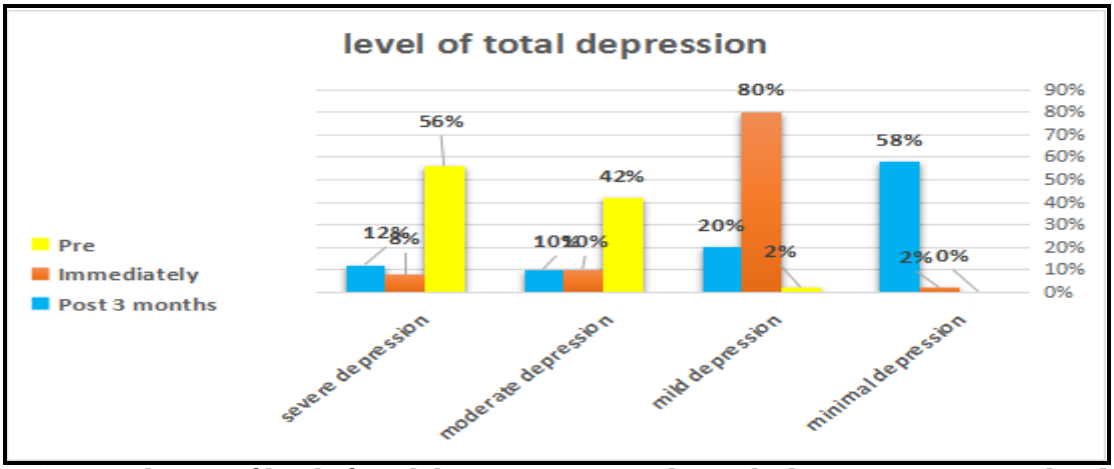

Figure (2): Distribution of level of total depression among the studied patients pre, immediately post & post three months program phases (n=50).

Table (4): The relationship between patients' demographic characteristics and their total sleep quality level post three months program application (n=50).

p-value	X2	Sleep quality total level (post 3months program)				Demographic data
		Poor sleep		Good sleep		
		%	No.	%	No.	
Age:-						
.014*	6.079	0	0	12	6	20- years
		4	2	28	14	30- years
		0	0	38	19	40- years
		0	0	18	9	50 years and more
Sex:-						
. 018*	5.613	0	0	36	18	Male
		4	2	60	30	Female
Marital status						
.106	6.112	2	1	32	16	Single
		2	1	32	16	Married
		0	0	20	10	Divorced
		0	0	12	6	Widow
Educational level:-						
.055	5.9	0	0	22	11	Red and write
		2	1	24	12	Elementary
		2	1	26	13	Secondary / Diploma school
		0	0	24	12	University education
Occupation						
.000**	12.25	0	0	20	10	Unemployed
		4	2	32	16	Manual Workers
		0	0	32	16	Employees
		0	0	12	6	Retired and others
Income						
.277	1.181	2	1	34	17	Enough
		2	1	62	31	Not enough
Residence						
.363	3.19	4	2	60	30	Rural
		0	0	36	18	Urban
Living accommodation						
.362	.829	4	2	78	39	With family
		0	0	18	9	Alone

(*) Statistically significant at p<0.05. (**) highly statistically significant at p<0.01. X^2 *=Chi square test*

Table (5):The relationship between patients' demographic characteristics and their total depression level at post 3 months program (n=50).

P-Value	X^2	Total level of depression (post 3 months program)				No	Socio-demographic characteristics
		Severe	Moderate	Mild	Minimal		
.000**	24.816	**Age (**years**)**					
		0	1	3	2	6	20- years
		2	2	2	10	16	30- years
		3	2	2	11	19	40- years
		1	0	2	6	9	50 years and more
.012*	6.4	**Sex**					
		2	2	4	10	18	Male
		4	3	6	19	32	Female
.000**	20.4	**Marital status**					
		2	2	3	10	17	Single
		3	2	5	8	17	Married
		1	0	2	7	10	Divorced
		1	1	0	4	6	Widow

P-Value	X^2	Total level of depression (post 3 months program)				No	Socio-demographic characteristics
		Severe	Moderate	Mild	Minimal		
.078		**Educational level**					
	8.38	1	1	2	7	11	Red and write
		2	2	1	8	13	Elementary
		2	2	3	7	14	Secondary/Diploma school
		1	0	4	7	12	University education
.230		**Occupation**					
	5.61	2	1	0	7	10	Unemployed
		3	3	6	6	18	Manual Workers
		0	0	4	12	16	Employees
		1	1	0	4	6	Retired and others
.363		**Income**					
	3.19	1	2	6	9	18	Not enough
		5	3	4	20	32	Enough
.592		**Residence**					
	1.05	4	4	6	18	32	Urban
		2	1	4	11	18	Rural
.03*		**Living accommodation**					
	22.1	5	5	8	23	41	With family
		1	0	2	6	9	Alone

(*) Statistically significant at p<0.05. (**) highly statistically significant at p<0.01. X^2 =Chi square test

Table (6): Correlation between total sleep quality and total depression scores among the studied patients at pre, immediately & post 3 months program (n=50).

Depression Inventory		Sleep quality index		Study variables	
p	R	P	R		
.000**	.554	-	-	**Sleep quality**	**Pre program**
-	-	.000**	.554	**Depression**	
.000**	.757	-	-	**Sleep quality**	**Immediately post program**
-	-	.000**	.757	**Depression**	
.000**	.634	-	-	**Sleep quality**	**3 months post program**
-	-	.000**	.634	**Depression**	

(**) Highly statistically significant correlation at P-value <0.01

Table (1): Clarifies that 38% of studied patients' age ranged from 40 to less than 50 years old with Mean ± SD (42.06 ± 10.05), 64 % of them are female, 48% are married. Also, 28% of the studied patients have Secondary / Diploma. Regarding their occupation 36% of them have manual workers. Meanwhile, 64% of the studied patient have not enough income and live in rural areas and 82% of them are living with their family.

Table (2): Illustrates that the duration of diseases 46% of the studied patients have 5-10 years. Also, 38% of them have 2 times of hospital admission.

Table (3): Reveals that, there is a highly statistically significant difference between the studied patients sleep quality score between pre and immediately post program and between Pre & Post 3 months program at (p<0.001). Which scores of the studied patients was 10.10±1.992 at pre and improved to be 7.50±1.418, 5.62±1.159 at immediately post and post 3 months, respectively.

Also, there is highly statistically significant difference between the studied patient's depression score between pre and immediately post program; Pre & Post 3 months program and at (p<0.001). Which scores of the studied patients was 29.56±4.773 at pre and improved to be 15.48±2.915, 8.94±2.888 at immediately post and post 3 months, respectively.

Figure (1): Describe that 36% of the studied patients has good sleep preprogram while improved to 92% and 96% of the studied patients immediately post & post three months of the program respectively.

Figure (2): Presents that 56% of the studied patients has severe depression preprogram while improved to only 8% and 12% of the studied patients immediately post & post three months of the program respectively.

Table (4): Illustrates that, there was a highly statistically significant relation between total quality of sleep level among the studied patients and their occupation. Also, there was a statistically significant relation between total sleep quality level among the studied patients and their age and sex.

Table (5): Shows that, there was a highly statistically significant relation between total depression level among the studied patients and their age and marital status. Also, there was a statistically significant relation between total depression level among the studied patients and their sex and living accommodation.

Table (6): Found that, there is a highly statistically significant positive correlation between sleep quality index score and total depression among the studied patients at pre, immediately post & post 3 months program at P-value =<0.001.

Discussion

Depression and sleep are much related. A majority of people with depression have sleep disturbances. Depression and sleep disturbances have a bidirectional connection. This refers to that poor sleep can lead to the onset of depression and having depression increases the person possibility to suffer from sleep disturbances. The occurrence rates of depression are growing year by year. Sleep disorder is one of the prime symptoms of depression and is often the first complication. This complication may raise depression severity and drive to poor prognostic criteria among patients **(Li et al., 2022).** So, addressing these sleep disturbances is a hopeful public health attitude. Thus, this study intended to examine the effect of sleep hygiene educational program on sleep quality among patients with depression.

The study findings also exhibited a highly statistically significant difference in between studied patient's depression score between pre and immediately post program and between pre & post three months program, which patients' scores improved at before, immediately after and post 3 months, respectively. In the current study, sleep hygiene education program brought significant improvement of sleep quality and this in turn improved patients' depression. That is in conformity with **Scott et al., (2021)**, which declared that improving sleep quality reduced depression, together with greater enhancements in sleep quality led to super improvements of depression mean scores, and this was evident after sleep hygiene education program.Additionally, The findings of **Rusch et al., (2015)** suggested that approaches, which successfully improved quality of sleep, were efficacious methods to reduce the symptoms of depression.

According with the present study, more than a third of the studied patients with good sleep pre- program while improved to almost all of the studied patients immediately after & after three months of the program respectively. That shows that the program educational material was specified and inclusive using a different training techniques along with utilizing fascinating photos and videos and also giving booklets to the patients. Also, it may be due to the behaviors exhibited during the sleep hygiene practices; as creating regular schedule for sleep is one of the simplest behaviors to be changed as reported by the patients.

For this, they were capable to attain better sleep which is a chief agent in deciding their attained level of sleep satisfaction by achieving the normal equilibrium of the sleep-wake cycle. The program improved their sleep knowledge and prompted sleep-related behavior changes. By the program, they realized the significance of healthy sleep influence on their own physical, intellectual and emotional health status, thus, they acknowledged fruitful benefits derived from sleep hygiene intervention and became more enthusiastic and committed.

The findings presented that more than half from the studied patients, it had severe depression preprogram while minimal of the studied patients improved immediately post & post three months after the program respectively. This may be due to getting enough sleep, regular physical activity that helped in reducing anxiety and depression. From the other hand, the interval from program, accomplishment to the last evaluation was long in the current study; as the study lengthens, the symptoms and severity of depression become less.

Concerning the relation amongst patients' social and demographic data and their overall level of sleep quality at post three months program, a highly statistically significant relation was determined in between overall sleep quality level and patients' occupation. Likewise, a statistically significant relationship was detected in between overall sleep quality level among patients with their age and sex. In relation to the age, this could be explained by that older people predominantly plain from difficulty of beginning sleep, that it was greatly attributed to a decrease in whole time of sleep and they also often complain from frequent waking up during sleep, and are always in light sleep. This outcome were coinciding with the results of **Kim et al., (2021),** which discussed that quality of sleep resorts to decline with increasing age. Many factors, enclosing physiological alterations, existent physical diseases, and psychosocial factors, may give a share in a decrease of sleep quality with age.

In relation to sex, **Wang et al., (2020),** declared that female sex was a significant predictor quality of sleep. While. **Um et al., (2023)** stated that getting poor quality of sleep was related to a rising risk for depression in both males and females. On the opposite side, **Razali et al., (2016)** found that sex was not correlated to sleep quality.

In relation to occupation, **Mao et al., (2023)** findings consistently demonstrated a negative liaison between occupational stress and quality of sleep, and **Skarpsno et al., (2018)**, identified that sleep problems are more common among working people. In addition to, working conditions impact quality of sleep **(Patel et al., 2018, Kecklund, & Axelsson, 2016)**.

Concerning the connection between patients' social and demographic data and their total depression level at post three months program, a highly statistically significant relation was found between total depression level among the studied patients and their age and marital status. That goes at the same line together with **Arias de la Torre et al., (2021)** study, which concluded that a higher prevalence of depression was detected in those whose age was 45 to 59 years old compared to those whose age was 16 to 29 years. This is congruent with **Zhai et al., (2024)**, whom suggested that being unmarried made people at greater risk of depression, and **Bulloch et al., (2017)** explained that marital status is associated with major depression prevalence. Marital state was influential to the prevalence of psychiatric illnesses. Particularly, high incidence of depression has been widely marked in separated, divorced, or widowed individuals. Similarly, **Pan et al., (2022)** referred that those lonely, divorced, widowed, not married middle-aged and elderly persons were the high risk population to experience depression symptoms and **Li & Ma, 2017,** reported that the peak age of onset is 50–60 years old.

Also, there was a statistically significant relationship in between overall depression level amongst the studied patients with sex and living accommodation. In relation to sex, this was in harmony with **Wu et al., 2021**, which stated that being a female sex increased the risk to suffer from depression rather than male sex.

While concerning to living accommodation, this may be due to that people living alone are more likely to be poor and economically vulnerable, which also increases their risk of depression and living with the family could promote feelings of love, belonging, care and social cohesion and these factors are also associated with good mental health, so living alone increases the risk of depression. Those results are harmonious with **Peerenboom et al., (2015)** who recorded that living lonely rises the likelihood for social isolation. Living lonely may be hurtful to one's mental health, particularly among olders. Anterior research has concluded that lonely individuals had poorer mental health and a, reduced quality of life than those who live in togetherness with others. Also, being alone can lead to depression and the study of **Wu et al., (2022)**, explained that people living alone are at risk to depression in contrast to those who live with others.

In relation to the correlation of total sleep quality with overall depression scores of patients at before, immediately & after 3 months of the program, a highly statistically significant positive correlation appeared among sleep quality index score and overall depression at pre, immediately after & after 3 months of the program. Conceptually, Poor quality of sleep is associated with unfavorable impact on intellectual abilities, temper, remembrance, regulating body weight, diminished immunity, and depression. In the same direction, **De Paula Rebouças et al., (2021)** who found out a straightforward link between sleep quality and depression, also, **Zhao et al., (2021)** study had appeared that poor quality of sleep could have a contributing role in decreasing in intellectual tasks, with difficulties in evading repeated negatory ideas and this results in rising the predisposition to depression. This is in the same direction with **Gupta et al., (2019)** study which concluded that, quality of sleep was considerably connected to the severity of depression. The study of **Sandoval-Rincón et al., (2022)**, detected that those with major depression showed a significantly worse sleep hygiene practices. These results matched with **Um et al., (2023)**, who stated that sleeping for a short time and poor quality of sleep were independently related to the risk of depressive symptoms among young adults, proposing that sleeping inadequately and poor sleep quality had a part in depression risk.

Conclusion

According to the study findings, it was concluded that sleep hygiene educational program improved sleep quality of patients with depression.

Recommendations

1. Incorporating sleep hygiene educational program into more comprehensive primary prevention plans for psychiatric disorders, especially depression.
2. Using sleep hygiene educational program for patients with depression and considering it as an essential part of rehabilitation plans.
3. Recommending a prospective cohort and intervention studies to investigate the possible contributing role of poor sleep hygiene in the development of depression.
4. Applying a training and educational program for psychiatric nurses to promote sleep hygiene for patients.

A conflict of interest

The authors states that they not present any limitation during data collection.

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References

- **Alanazi, E., Alanazi A., Albuhairy, A., & Alanazi, A. (2023):** Sleep Hygiene Practices and Its Impact on Mental Health and Functional Performance among Adults in Tabuk City: A Cross-Sectional Study. Cureus , Vol.(15), No.(3), Pp. e36221.
- **Al Balushi, M, Al Balushi, S, Javaid, S, Leinberger-Jabari, A, Al-Maskari, F, Al-Houqani, M, Al Dhaheri, A, Al Nuaimi, A, Al Junaibi, A, Oumeziane, N, Kazim, M, Al Hamiz, A, Haji, M, Al Hosani, A, Abdel Wareth, L, AlMahmeed, W, Alsafar, H, AlAnouti, F, Al Zaabi, E, K Inman C, Shahawy OE, Weitzman M, Schmidt AM, Sherman S, Abdulle, A, Ahmad A, & Ali, R. (2022):** Association between depression, happiness, and sleep duration: data from the UAE healthy future pilot study. BMC Psychol, Vol.(10),), No.(1), Pp. 235.
- **American Geriatrics Society (AGS). (2019):** Sleep problems. In Healthin Aging.org. Retrieved, from https://www.healthinaging.org/a-z-topic/sleep-problems
- **Anderson, K., & Bradley, A. (2013) :** Sleep disturbance in mental health problems and neurodegenerative disease. Nature and Science of Sleep, Vol.(5), Pp. 61-75.
- **Arias de la Torre, J., Vilagut, G., Ronaldson, A., Dregan, A., Ricci-Cabello, I., Hatch, S., Serrano-Blanco, A., Valderas, M., Hotopf, M., & Alonso, J. (2021):** Prevalence and age patterns of depression in the United Kingdom. A population-based study. Journal of Affective Disorders, Vol.(279), Pp. 164-172.
- **Bani Issa, W., Hijazi, H., Radwan, H., Saqan, R., Al-Sharman, A., Samsudin, A., Fakhry, R., Al-Yateem, N., Rossiter, R., Ibrahim, A., Moustafa, I., Naja, F., Alameddine, M., Abbas, N., Abdelrahim, N., Al-Shujairi, A, & Awad, M. (2023):** Evaluation of the effectiveness of sleep hygiene education and FITBIT devices on quality of sleep and psychological worry: a pilot quasi-experimental study among first-year college students. Front Public Health, Vol.(11), Pp. 1182758.
- **Başar Okul, E., & Kars Fertelli, T. (2024):** The Effects of Sleep Hygiene Education on Sleep Quality, Pain, and Depression in Individuals With Fibromyalgia. Pain Management Nursing, Vol.(S1524-9042),), No.(24), Pp. 1182758.
- **Booker, L., Barnes, M., Alvaro, P., Collins, A., Chai-Coetzer, C., McMahon, M., Lockley, S., Rajaratnam, S., Howard, M., & Sletten, T. (2020):** The role of sleep hygiene in the risk of Shift Work Disorder in nurses. Sleep, Vol.(43),), No. (2), Pp. zsz228.
- **Brick, C., Seely, D., & Palermo, T. (2010):** Association between sleep hygiene and sleep quality in medical students. Behavioral Sleep Medicine, Vol.(8), Pp. 113–121.
- **Bulloch, A., Williams, J., Lavorato, D., & Patten, S. (2017):** The depression and marital status relationship is modified by both age and gender. Journal of Affective Disorders, Vol.(223), Pp. 65-68.
- **Colt, A., & Reilly, J. (2019):** An Educational Intervention to Improve the Sleep Behavior and Well-Being of High School Students, Vol.(3), Pp. 21.
- **De Paula Rebouças, C., Ribeiro, M., Zangilorami-Raimundo, J., de Lima Bezerra, P., Das Chagas de Souza Júnior, A., Da Silva Souza, N, Pereira, J., Soares Júnior, J., De Paula Rebouças da Costa, L., De Abreu, L. & , Raimundo, R. (2021):** Association between sleep quality and depression among institutionalized and community older people - Brazilian Western Amazonia. BMC Psychiatry, Vol.(21), No.(1), Pp. 367.
- **Dinis, J., & Bragança, M. (2018):** Quality of sleep and depression in college students: a systematic review. Sleep Science, Vol.(11), Pp. 290–301.
- **Fang, H., Tu, S., Sheng, J., & Shao, A. (2019):** Depression in sleep disturbance: A review on a bidirectional relationship, mechanisms and treatment. Journal of Cellular and Molecular Medicine, Vol.(23), No.(4), Pp. 2324-2332.
- **George, N., Earnesteen, L., George, M., Dharmaraj, B., Mohandas, N., Anand, V., Muniyapillai, T., Chacko, A., & Kulothungan, K. (2024):** Sleep Quality, Daytime Sleepiness and Sleep Hygiene Among Youth in a Rural District in South India: A Cross-Sectional Study. Cureus, Vol.(16), No.(9), Pp. e69551.
- **Gilad, R. & Shapiro, C. (2020):** Sleep and Development. Health, Vol. (12), Pp. 653-670.
- **Gupta, P., Sagar, R., & Mehta, M. (2019):** Subjective sleep problems and sleep hygiene among adolescents having depression: a case-control study. Asian Journal of Psychiatry, Vol. (44), Pp. 150–55.
- **IHME I of HM. (2022):** Global Health Data Exchange (GHDx). Institute of Health Metrics and Evaluation. 2021. Available at: http://ghdx.healthdata.org/gbd-results-tool?params=gbd-api-2019-permalink/d780dffbe8a381b25e1416884959e88b.

- **Ismail, S., Elsheikh, N., Khater, M., & Tawfik, H. (2024):** Prevalence of depression among Egyptian male older adults with subjective cognitive decline. Egyptian Journal of Geriatrics & Gerontology, Vol.(11), No.(1), Pp. 167–179.
- **Jang, B., Lee, H., Joo, J., Park, E., & Jang S. (2020):** Association between health behaviors and depression: findings from a national cross-sectional study in South Korea. BMC Psychiatry, Vol.(20), No.(1), Pp. 238.
- **Jeong, W., Kim H., Joo J., Jang I., & Park E. (2021):** Association between depression and risk of Parkinson's disease in South Korean adults. Journal of Affective Disorders, Vol.(292), Pp. 75-80.
- **Joo, H., Kwon, K., Shin, J., Park, S., & Jang, S. (2022):** Association between sleep quality and depressive symptoms. Journal of Affective Disorders, Vol.(310), Pp. 258-65.
- **Kang, Y., Ko, Y., Kim Y., Sung, K., Kim, H., Choi, H., Sung, C., & Jeong, E. (2015):** Korea Community Health Survey Data Profiles. Osong Public Health and Research Perspectives, Vol.(6), No.(3), Pp. 211-7.
- **Kecklund, G., & Axelsson, J. (2016):** Health consequences of shift work and insufficient sleep. BMJ, Vol.(355), Pp. i5210.
- **Kim, S., Kim, H., Joo, H., Jeong, S., Park, E., & Jang, S. (2021):** Impact of changes in housing tenure and affordability status on depressive symptoms: Evidence from a longitudinal study. Journal of Affective Disorders, Vol.(295), Pp. 40-49.
- **Kwon, J., Lee, H., Joo, J., & Park, E. (2021):** Urinary incontinence status changes and depressive symptoms among middle-aged and older women: Using data from a survey of the Korean Longitudinal Study of Aging. Journal of Affective Disorders, Vol.(279), Pp. 549-53..
- **Lee, S., Paek, J., & Han, S. (2015):** Sleep hygiene and its association with daytime sleepiness, depressive symptoms, and quality of life in patients with mild obstructive sleep apnea. Journal of the Neurological Sciences, Vol.(359), No.(1-2), Pp. 445-9.
- **Li , J., & Ma, W. (2017):** Analysis of depression symptoms and influencing factors in middle-aged and older people in China. Chin. Journal of Public Health, Vol.(2), Pp. 177–181.
- **Li, M, Cui, J., Xu, B., Wei, Y., Fu, C., Lv , X., Xiong, L., & Qin, D. (2022):** Sleep Disturbances and Depression Are Co-morbid Conditions: Insights From Animal Models, Especially Non-human Primate Model. Frontiers in Psychiatry, Vol.(12), Pp. 827541.
- **Ma F. (2022):** Diagnostic and statistical manual of mental disorders-5 (DSM-5). In Encyclopedia of Gerontology and Population Aging, Cham: Springer International Publishing. Pp.1414–25.
- **Mao, Y., Raju, G., & Zabidi, M. (2023):** Association Between Occupational Stress and Sleep Quality: A Systematic Review. Nature and Science of Sleep, Vol.(15), Pp. 931-47.
- **Markwald, R., Iftikhar, I., & Youngstedt, S. (2018):** Behavioral Strategies, Including Exercise, for Addressing Insomnia. ACSMs Health Fit J, Vol.(22), No.(2), Pp. 23-29.
- **Medic, G., Wille , M., & Hemels , M. (2017):** Short- and long-term health consequences of sleep disruption. Nature and Science of Sleep, Vol.(9), Pp. 151-161.
- **Ngante, C. (2016):** The Evaluation of the Effectiveness of Sleep Hygiene Protocol for Insomnia. Brandman University Irvine, California. Published doctoral Dissertation University. ProQuest Dissertations Publishing.
- **Ohayon, M. (2002):** Epidemiology of insomnia: what we know and what we still need to learn. Sleep Medicine Reviews, Vol.(6), No.(2), Pp. 97–111.
- **Pan, L., Li, L., Peng, H., Fan, L., Liao, J., Wang, M., Tan, A., & Zhang, Y. (2022):** Association of depressive symptoms with marital status among the middle-aged and elderly in Rural China-Serial mediating effects of sleep time, pain and life satisfaction. Journal of Affective Disorders, Vol.(303), Pp. 52-7.
- **Patel, D., Steinberg, J., & Patel, P. (2018):** Insomnia in the Elderly: A Review. Journal of Clinical Sleep Medicine, Vol.(14), No.(6), Pp. 1017-24.
- **Peerenboom, L., Collard, R., Naarding, P., & Comijs, H. (2015):** The association between depression and emotional and social loneliness in older persons and the influence of social support, cognitive functioning and personality: a cross-sectional study. Journal of Affective Disorders, Vol.(182), Pp. 26–31.
- **Pilania, M., Bairwa, M., Khurana, H., & Kumar, N. (2017):** Prevalence and predictors of depression in community-dwelling elderly in rural Haryana, India. Indian Journal of Community Medicine, Vol.(42), Pp. 13–18.
- **Psychiatry L. (2020):** Isolation and inclusion. Lancet Psychiatry, Vol.(7), No.(5), Pp. 371.
- **Rahimi, A., Ahmadpanah, M., Shamsaei, F., Cheraghi, F., Sadeghi Bahmani, D., Holsboer-Trachsler, E., & Brand, S. (2016):** Effect of adjuvant sleep hygiene psychoeducation and lorazepam on depression and sleep quality in patients with major depressive disorders: results from a randomized three-arm intervention.

Neuropsychiatric Disease and Treatment, Vol.(12), Pp. 1507-15.

- **Ramar, K., Malhotra, R., Carden, K., Martin, J., Abbasi-Feinberg, F., Aurora, R., Kapur, V., Olson, E., Rosen, L., Rowley, J., Shelgikar, A., & Trotti, L. (2021):** Sleep is essential to health: an American Academy of Sleep Medicine position statement. J Clin Sleep Med, Vol.(17), No.(10), Pp. 2115-2119.
- **Razali, R., Ariffin , J., & Aziz , A. (2016):** Sleep quality and psychosocial correlates among elderly attendees of an urban primary care centre in Malaysia. Neurology Asia, Vol.(21), No.(3), Pp. 265-73.
- **Rusch, H., Guardado, P., Baxter, T., Mysliwiec , V., and Gill , M. (2015):** Improved Sleep Quality is Associated with Reductions in Depression and PTSD Arousal Symptoms and Increases in IGF-1 Concentrations. Journal of Clinical Sleep Medicine, Vol.(11), No.(6), Pp. 615-23.
- **Saeedi, M., Shamsikhani, S., Farahani, P., & Haghverdi, F. (2014):** Sleep hygiene training program for patients on hemodialysis. Iranian Journal of Kidney Diseases, Vol.(8), No.(1), Pp. 65–69.
- **Sandoval-Rincón, M., Sánchez-Ferrer, J., Muñoz-Delgado, J., Saldívar-Hernández, R., & Jiménez-Genchi, A. (2022):** Sleep hygiene practices in patients with major depression with comorbid insomnia, primary insomnia, and good sleepers. Salud mental, Vol.(45), No.(3), Pp. 97-103.
- **Scott, A., Webb, T., Martyn-St James M., Rowse, G., & Weich, S. (2021):** Improving sleep quality leads to better mental health: A meta-analysis of randomised controlled trials. Sleep Medicine Reviews, Vol.(60), Pp. 101556.
- **Seaver, C., Bowers, C., Betide, D., Holt, L., Ramakrishnan, S. (2024):** A game-based learning approach to sleep hygiene education: a pilot investigation. Front Digit Health. , Vol.(12), No.(6), Pp. 1334840.
- **Seo, E., Kim, S., Kim, S., Kim, J., Park, J., Yoon, H. (2018):** Life satisfaction and happiness associated with depressive symptoms among university students: a cross-sectional study in Korea. Ann Gen Psychiatry, Vol.(18), No.(17), Pp. 52.
- **Skarpsno, E., Mork, P., Nilsen, T, Jørgensen, M., & Holterman, A. (2018):** Objectively measured occupational and leisure-time physical activity: cross-sectional associations with sleep problems. Scand. Journal of Work, Environment & Health, Vol.(44), Pp. 202–11.
- **Spadola, C., Guo, N., Johnson, D., Sofer, T., Bertisch, S., Jackson, C., Rueschman, M., Mittleman, M., Wilson, J., & Redline, S. (2019):** Evening intake of alcohol, caffeine, and nicotine: night-to-night associations with sleep duration and continuity among African Americans in the Jackson Heart Sleep Study. Sleep, Vol.(42), No.(11), Pp. zsz136.
- **Stepanski, E., & Wyatt, J. (2003):** Use of sleep hygiene in the treatment of insomnia. Sleep Medicine Reviews, Vol. (7), No.(3), Pp. 215–25.
- **Sun, A., & Wu, X. (2023):** Efficacy of non-pharmacological interventions on improving sleep quality in depressed patients: A systematic review and network meta-analysis. Journal of Psychosomatic Research, Vol. (172), Pp. 111435.
- **Thibault, D., Derouin, A., Cain, L., Thibault, N., & Roberts, J. (2024):** Sleep Hygiene Education as a Treatment for Depression in Adolescents The Journal for Nurse Practitioners, Vol.(20), No.(8), Pp. 105114.
- **Um, Y., Kim, Y., Chang, Y., Jung, H., Cho, I, Jeon, S., & Ryu, S. (2023):** Association of changes in sleep duration and quality with incidence of depression: A cohort study. Journal of Affective Disorders, Vol.(328), Pp. 64-71.
- **Urbanová, L., Vaníček, O., Červená, K., Bartoš, A., & Evansová, K. (2024):** The impact of sleep education, light intervention and relaxation on sleep and mood in the elderly. Chronobiology International, Vol.(41) No.(4), Pp. 567-576.
- **Vaccaro, R., Borrelli, P., Abbondanza, S., Davin, A., Polito, L., Colombo M, Francesca Vitali, S, Villani, S, & Guaita, A. (2017):** Subthreshold Depression and Clinically Significant Depression in an Italian Population of 70-74-Year-Olds: Prevalence and Association with Perceptions of Self. BioMed Research International. 3592359.
- **Veale, D., Ali, S., Papageorgiou, A., & Gournay, K. (2020):** The psychiatric ward environment and nursing observations at night: A qualitative study. Journal of Psychiatric and Mental Health Nursing, Vol.(27) No.(4), Pp. 342–351.
- **Wang, W., Zhu, Y., Yu, H., Wu, C., Li, T., Ji, C., Jiang, Y., & Ding, D. (2024):** The impact of sleep quality on emotion regulation difficulties in adolescents: a chained mediation model involving daytime dysfunction, social exclusion, and self-control. BMC Public Health.;24(1):1862.
- **Wang, X., Chen, H., Liu, L., Liu, Y., Zhang, N., Sun, Z., Lou, Q., Ge, W., Hu, B., & Li , M. (2020):** Anxiety and sleep problems of college students during the outbreak of COVID-19. Frontiers in Psychiatry, Vol.(11), Pp. 588693.

- **Watson, S., & Cherney, K. (2017):** (2020). The Effects of Sleep Deprivation on Your Body. Healthline. 15.5.2020. +http://www.healthline.com/health/sleep-deprivation/effects-on-body
- **WHO. (2017):** Depression. 2021. Available at: https://www.who.int/news-room/fact-sheets/detail/depression.Citado February 26, 2022.
- **Wu, D., Liu, F., & Huang, S. (2022):** Assessment of the relationship between living alone and the risk of depression based on longitudinal studies: A systematic review and meta-analysis. Frontiers in Psychiatry, Vol. (13), Pp. 954857.
- **Wu, N., Yang, F., Xia, J., Ma, T., Yu, C., & Li, N. (2021):** [Analysis of the Status of Depression and the Influencing Factors in Middle-Aged and Older Adults in China]. Sichuan University. Medical Sciences, Vol. (52), No.(5), Pp. 767-771.
- **Yan, T., Qiu, Y., Yu, X., & Yang, L. (2021):** Glymphatic Dysfunction: A Bridge between Sleep Disturbance and Mood Disorders. Frontiers in Psychiatry, Vol. (12), Pp. 658340.
- **Zakeri, M., Dakkalirad, A., Saedi, F., Shahnavazi, A., Kordi, M., Ahmadipour, M., & Dehghan, M. (2022):** Depression and self-efficacy among Iranian children during the prevalence of COVID-19 disease. Frontiers in Pediatrics, Vol. (10), No. (3), Pp. 993.
- **Zhai, X., Tong, H., Lam, C., Xing, A., Sha, Y., Luo, G., Meng, W., Li, J., Zhou, M., Huang, Y., Wong, L., Wang, C., & Li, K. (2024):** Association and causal mediation between marital status and depression in seven countries. Nature Human Behavior, Vol.(8), No.(12), Pp. 2392-2405.
- **Zhao, J., Liu, H., Wu, Z., Wang, Y., Cao, T., Lyu, D., Huang, Q., Zhu, Y., Wu, X., Chen, J., Su, Y., Zhang, C., Peng, D., Li, Z., Rong, H., Liu, T., Xia, Y., Hong, W., & Fang, Y. (2021):** Clinical features of the patients with major depressive disorder co-occurring insomnia and hypersomnia symptoms: a report of NSSD study. Sleep Medicine, Vol.(81), Pp. 375–381.