

The relationship between psychological distress and sleep quality among community dwelling older adults during the Covid-19 pandemic

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Abstract

Background: Covid-19 pandemic is considered one of the worst pandemics that affected older adults. With ageing, the higher possibility of living alone and lower psychological resilience become worse due to the state of lockdown and the infection control precautions imposed by international and national authorities to prevent the spread of infection. All these circumstances may lead to psychological distress, anxiety and depression, which have negative effects on sleep quality among older adults. **Aim:** To identify the relationship between psychological distress and sleep quality among community dwelling older adults during covid-19 pandemic. **Settings:** Four Alexandria post offices which are affiliated with Egypt's Ministry of Communications and Information Technology were included. **Subjects:** Convenient samples of 230 older adults were recruited. **Tools:** Five tools were used for data collection as follows: Tool I: Older adult's socio-demographic and health profile structured interview schedule, Tool II: Kessler psychological distress scale (k10), Tool III: Pittsburgh Sleep Quality Index (PSQI), Tool IV: Coronavirus Anxiety Scale (CAS), and Tool V: Geriatric Depression Scale shortened form (GDS-SF). **Results:** While, 40.9% of the study subjects reported well psychological status, 59.1% suffered from different degrees of psychological distress, either mild 30.4%, moderate 16.5%, or severe 12.2% during the COVID-19 pandemic. Also, 78.7% of the study subjects were bad sleepers, while 21.3% were good sleepers, with a mean percent score of 38.90 ± 19.94 . In relation to COVID-19 related anxiety, the highest percentage 92.2% of the study subjects reported low dysfunctional coronavirus-related anxiety, with total mean percent score of 18.91 ± 16.51 . With regard to levels of depression among the study subjects, 64.8% of them reported, either mild depression 29.1%, moderate depression 20.9% or severe depression 14.8%, with a mean percent score of 45.16 ± 26.23 . **Conclusion:** Higher levels of psychological distress, COVID-19 related anxiety and depression were significantly associated with higher sleep problems among community-dwelling older adults during COVID19 pandemic. **Recommendations:** Gerontological nurses should use valid tools to assess psychological distress, anxiety, and depression among older adults in order to identify those who are at higher risk of developing psychological disorders. Sleep patterns should be monitored continuously by gerontological nurses to determine those who are bad sleepers and implement measures to enhance sleep quality among older adults especially among those who have psychological distress.

Keywords: Psychological distress, Sleep quality, Community dwelling older adults, COVID-19.

Introduction

COVID-19 pandemic had a substantial impact on older adults, both globally and in the African region. The WHO reported that older adults are significantly at greater risk of COVID-19 complications, and their mortality rates increase significantly with aging (Organization, 2020). Likewise, Mueller et al

(2020) revealed that in older adults above 65 years, COVID-19 infection has a higher possibility of progressing to lung consolidation, pneumonia, cytokine release syndrome, and endothelins. It also predisposes to coagulopathy, which eventually leads to multiple organ failure and death (Mueller et al., 2020). This could be

attributed to lower immune function and the greater history of pre-existing chronic diseases with ageing, besides the higher level of dependence on other people to care for them due to frailty and disability (Bajaj et al., 2021) (Smorenberg et al., 2021). According to the WHO Regional Director for Africa 2020, more than 17,000 older adults aged above 60 years have lost their lives as a result of the COVID-19 pandemic, which represents over 50% of the COVID-19 deaths in the African region (WHO, 2020). May 2021, 1.6 million cases and 54,825 COVID-19 deaths were reported among older adults in South Africa (Organization, 2021) which necessitates strong precautions to be applied. The massive lockdowns were associated with home confinement, as well social distancing was imposed to promote the physical distance and a reduction in social activities to prevent virus transmission. Although these safety precautions were effective in protecting the older adults from infection, they caused negative psychological distress (Richter & Heidinger, 2021) (Khalaf et al., 2022).

Psychological distress is broadly defined as common mental health disorders characterized by symptoms of depression (i.e., sadness, hopelessness, lost interest) and anxiety (i.e., feeling tense, restlessness), often linked with somatic symptoms (i.e., headaches, insomnia) as a result of exposure to a stressful life events. In the present study, psychological distress is operationally defined as high scores of emotional suffering characterized by anxious and depressive symptoms which will be measured by Kessler Psychological Distress scale, Coronavirus Anxiety Scale and Geriatric Depression Scale shortened form (GDS-SF) respectively. Castellano revealed that several factors predispose to psychological distress in older adults during the COVID-19 pandemic (Castellano-Tejedor et al., 2022). The constant and mandatory isolation might have negative effects on older adults' psychological well-being and mental health in terms of anxiety and depression, besides worsening their feelings of loneliness (Krendl & Perry, 2021) (Gorenko et al., 2021). Also, fear and anxiety from getting infection, limiting access to

health care utilization, fear of death, overload of negative information about the COVID-19 pandemic, economic stress, and being detached from family members and caregivers aggravate psychological distress among older adults (Pothisiri & Vicerra, 2021) (Castellano-Tejedor et al., 2022). Moreover, grief over the loss of loved ones due to COVID-19 can result in the progression or exacerbation of an existing psychiatric condition like depression among older adults (Haowei Wang et al., 2021) (WHO, 2021). As a result, sleep quality among older adults during the COVID-19 pandemic may be affected (Cipriani et al., 2021).

Psychological distress and negative emotions due to the COVID-19 pandemic might increase the sleep latency of older adults, making them to have difficulties initiating sleep, increase night-time and early awakenings, and increase bad dreams. Indeed, sleep patterns change gradually as a part of the normal ageing process, which makes older adults more vulnerable to experiencing poor sleep quality during the COVID-19 pandemic (AlRasheed et al., 2021). On the other hand, Cipriani et al. shown that sleep disturbances among older adults during the COVID-19 pandemic might lead to mood disorders in terms of anxiety and depression due to hypothalamic-pituitary-adrenal (HPA) axis dysfunction and excessive stimulation of the sympathetic nervous system (Cipriani et al., 2021). While several studies have addressed the physiological consequences of COVID-19 on older adults' health, limited research has focused on the psychological suffering caused by the COVID-19 pandemic. At the same time, special attention is given to young adults and children instead of older adults during the COVID-19 pandemic. So, the purpose of this study is to identify the relationship between psychological distress and sleep quality among community-dwelling older adults during the COVID-19 pandemic. Valid tools should be used by the gerontological nurse to assess both sleep quality and psychological distress among older adults and investigate the association between them. This will help to control this association

and to develop strategies to enhance psychological wellbeing and sleep quality which will improve the older adult's quality of life and decrease the burden on the health care system.

Aim of the Study

The present study aimed to identify the relationship between psychological distress and sleep quality among community dwelling older adults during covid-19 pandemic.

Research question

What is the relationship between psychological distress and sleep quality among community dwelling older adults during the covid-19 pandemic?

Materials and Method

Materials

Design: Descriptive correlational research design was followed in the present study.

Settings: This study was conducted at four Alexandria post offices namely, El-Mandara El-Mansheya, Muharram Beck, and Toson, which are affiliated with Egypt's Ministry of Communications and Information technology

Subjects: A convenient sample of 230 older adults were included in the present study, who aged 60 years or above, able to communicate effectively, accepted to participate in the study, and those who were available in the post offices at the time of the data collection. The number of study subjects was 58 from each of El-Mandara, Muharram Beck post offices, and 57 from each of El-Mansheya and Toson post offices. The study sample size was estimated using the G*Power Windows 3.1.9.7 program with the following parameters: effect size =0.5, α err prob=0.05, power (1- β err prob) =0.95. The programme revealed a minimum sample size of 220 older adults.

Tools: Five tools were used in the current study for data collection:

Tool I: Older adults' Socio-demographic and Health Profile Structured Interview Schedule. The researcher developed this tool which consists of two parts as follows;

Part I: Socio-demographic characteristics of the study subjects such as; age, sex, marital status, level of education, occupation prior to retirement, and monthly income.

Part II: Health profile of the study subjects such as; previous hospitalization, type of consumed medications and present physical and psychological complaints.

Tool II: Kessler Psychological Distress Scale (k10)

K10 is a self-report scale that developed by Kessler et al. (2002) to measure psychological distress. It includes 10 questions on a five-point Likert scale (5 = all of the time, 4 = most of the time, 3 = some of the time, 2 = little of the time, and 1 = none of the time). The total score ranges from 10 to 50 which are classified into: score of 10-19 indicates to be well, score of 20- 24 indicates mild psychological distress, score of 25-29 indicates moderate psychological distress and score of 30-50 indicates severe psychological distress (Kessler et al., 2003).

Tool III: Pittsburgh Sleep Quality Index (PSQI)

The Pittsburgh Sleep Quality Index (PSQI) was developed by Buysse et al. (1989) to assess sleep quality and disorders within the past month. It consists of 19 self-rated questions answered by older adults and five other questions were answered by the older adults' roommate (if available) but only the 19 self-rated questions were included in the total score. The scale evaluates seven components of sleep which include subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each of which has a range from 0 to 3; a score of 0 indicates no difficulty, and a score of 3 indicates severe difficulty. The global PSQI score is calculated by adding the total scores of the seven components for providing an overall score ranges from 0 to 21. A global score of PSQI > 5 indicates poor sleep quality and indicates that the subjects have severe difficulties in at least 2 areas or moderate difficulties in more than 3 areas. Lower scores denote good sleep quality. The Arabic version of this tool was used in the present study and approved to be valid and reliable (The Cronbach's alpha coefficient for the Arabic PSQI was 0.77 (Al Maqbali et al., 2020; Suleiman et al., 2009).

Tool IV: Coronavirus Anxiety Scale (CAS)

CAS is a 5- item scale that was developed by Sherman to assess dysfunctional anxiety associated with the coronavirus crisis based on experiences over the past two weeks (Lee, 2020). Each item of the CAS is rated on a 5- point scale from 0 to 4 (0 = not at all, 1 = rare or less than a day or two, 2 = several days, 3 = more than 7 days, and 4 = nearly every day over the last two weeks). The CAS maximum score is 20, and the minimum score is 0. A total score of ≥ 9 indicates probable dysfunctional coronavirus-related anxiety. The Arabic version of this tool used in the present study (El Sayed et al., 2020) and approved to be valid and reliable (the Cronbach's α of the total scale was 0.92).

Tool V: Geriatric Depression Scale shortened form (GDS-SF)

This scale was developed by Yesavage et al. (1983). It consists of 15 statements to assess the presence of depression, acceptance of life, feelings of happiness, and boredom among older adults. The total score ranges from 0 to 15 and classified as follows: no depression (0-4), mild depression (5-8), moderate depression (9-11), and severe depression (12-15). The Arabic version of this tool used in the present study (Elhusseini, 2013; Fahmei et al., 2014) and approved to be valid and reliable ($r = 0.70$)

Method

The official permission of the Ethics Committee of the Faculty of Nursing, Alexandria University, the Director of the General Administration of Alexandria Postal District, and the directors of the selected post offices were obtained to conduct the study after explaining its purpose. The study tools were tested for content validity by 5 experts in the fields of gerontological and psychiatric and mental health nursing and the necessary modifications were done accordingly. Tool I, Socio-demographic and health profile structured interview schedule was developed by the researcher to assess socio-demographic and clinical data of the study subjects.

Tool II, The Kessler psychological distress scale (K10), was translated into Arabic by the researcher and tested for reliability using the

Cronbach's Coefficient Alpha test, which yielded $r = 0.83$. Although Kessler psychological distress scale includes several items of psychological distress, it did not cover all aspects related to anxiety and depression. So, researcher used another two specific tools to assess depression and anxiety. The Arabic versions of Tool III (Pittsburgh Sleep Quality Index), Tool IV (Coronavirus Anxiety Scale) and Tool V (Geriatric Depression Scale shortened form) were used in this study to assess sleep quality, dysfunctional anxiety associated with the coronavirus crisis, and depression respectively.

A pilot study was carried out on 10% of the study sample to assess clarity and applicability of the study tools and they were not included in the study sample. The researcher used to go to the four post offices from 9 a.m. to 3 p.m., from the first to tenth day of each month (due to higher attendance rates based on pension days) according to post office working days. The study subjects who fulfilled the inclusion criteria were interviewed individually in the waiting area of the post office either before or after receiving their pension. An informed consent was obtained from the study subjects. The researcher started the interview by introducing herself, explaining the purpose of the study, ensuring that older adults physically and psychologically willing to participate in the study, as well encourage them to wear face mask during communication. The time of data collection started from the first of April 2022 to mid of August 2022.

Ethical considerations:

Informed consent was obtained from each study subject included in the study after explanation of the study purpose. Their participation was on a voluntary base and confidentiality of the collected data was assured. The study subjects' right to discontinue participation in the study at any time was respected.

Statistical Analysis

The collected data were coded, tabulated and statically analyzed using the statistical package for social studies (SPSS) Version 20.0. The normality of distribution was

verified using The Kolmogorov-Smirnov test. Quantitative data were described using range (minimum and maximum), mean, standard deviation, median and interquartile range. These tests were used: Mann Whitney test, Kruskal Wallis and Spearman coefficient. P-values of 0.05 or less were considered statistically significant.

Results

Table 1: illustrates the socio-demographic characteristics of the study subjects. The table indicates that the age of the study subjects ranges from 60 up to 83 years, with a mean age of 68.32 ± 6.08 years. Study subjects who aged from 60 to 70 years constitute 80% of the study sample. Males constitute 53% of the study sample, 54.8% are married, 38.7% are widows, 4.3% are divorced, and 2.2% are single. About 27.4% of the study subjects are illiterate, while 5.7% able to read and write. Regarding occupation prior to retirement, study subjects who were employees represented by 37.0% of the study sample, followed by housewives 26.1%, unskilled workers 20.4% and skilled workers 16.5%. Concerning current work status, 84.3% of the study subjects did not have current work and 63.5% had inadequate income. With reference to the place of residence, 87.0% of the study subjects live in their own homes and 13.0% in relatives' homes. As for living condition, 82.2% of the study subjects live with their families or relatives, while 17.8% live alone.

Table 2: illustrates the distribution of the study subjects according to their psychological distress levels. The table reveals that, despite 40.9% of the study older adults reported well psychological status, 59.1% suffered from different degrees of psychological distress, either mild 30.4%, moderate 16.5%, or severe 12.2% during the COVID-19 pandemic. The mean total score of psychological distress is 21.67 ± 21.67 among the study subjects, with a mean percent of 29.18 ± 15.40 .

Table 3: illustrates the distribution of the study subjects according to their sleep quality during COVID-19. The table shows that 78.7% of the study subjects were bad sleepers and 21.3% were good sleepers with mean percent score of 38.90 ± 19.94 . Concerning

sleep quality domains, the table notes that the most affected sleep domains among the study subjects is related to the daytime dysfunction. For illustration, the highest mean percent score of sleep problems is related to the daytime dysfunction 58.12 ± 29.87 , while the least affected sleep domain is the use of sleeping medication domain with mean percent score of 4.35 ± 13.95 . The table also reveals that the highest percent are observed among the study subjects who reported fairly good sleep quality 44.8%, shortest sleep latency 34.3%, sleep duration ranges from 5 to less than 6 hours 36.1%, sleep efficiency that more than 85% that represented by 34.8% and minimal sleep disturbance 72.2%.

Table 4: illustrates the distribution of the study subjects according to their level of COVID-19 related anxiety. Low levels of dysfunctional coronavirus-related anxiety reported by 92.2% of the study subjects, while high levels of dysfunctional coronavirus-related anxiety reported by 7.8%, with total mean percent score of 18.91 ± 16.51 .

Table 5: illustrates the distribution of the study subjects according to their level of depression. The table indicates that 35.2% of the study subjects reported no depression, while 64.8% reported different levels, either mild 29.1%, moderate 20.9% or severe depression 14.8%. The mean total score of depression is 6.77 ± 3.94 , with a mean percent of 45.16 ± 26.23 .

Table 6: illustrates the correlations between sleep quality of the study subjects and psychological distress, COVID-related anxiety, and depression. The table reveals highly significant positive correlations between overall sleep problems and its subdomains among study subjects and psychological distress, COVID-related anxiety and depression. For illustration, the higher the levels of psychological distress, COVID-related anxiety, and depression among the study subjects, the higher the levels of sleep problems $P < 0.001$.

Discussion

The COVID-19 pandemic remains a significant threat to all individuals, especially older adults. Unfortunately, psychological

distress and poor sleep quality due to COVID-19 pandemic can hinder successful aging, which increases the risk of morbidities and burdens on the healthcare system (Jemal et al., 2021) (Ray, 2021) (Cocuzzo et al., 2022). The main findings of the present study revealed that around two-fifths of the study subjects reported well psychological status while more than one-half suffered from different degrees of psychological distress, either mild, moderate, or severe during the COVID-19 pandemic (Table 2). The higher prevalence of psychological distress among the study subjects may be justified by that the majority of them had previous history of chronic diseases which make them overwhelmed by their health conditions and facing more threats related to fear of being infected or transmission of infection to one of their family members or relatives, fear of hospitalization, fear of future due to the COVID-19 pandemic. Also, precautionary measures implemented by the government to stop the transmission of the COVID-19 virus caused social isolation and loneliness with limited access to health care services. The current study result is supported those studies done by Yi Wang et al. (2021), Fujita et al. (2021), Li et al. (2022) which revealed that psychological distress become more prevalent community dwelling among older adults during COVID-19 pandemic compared to prior COVID-19 pandemic. As well comorbidities and persistent frailty were linked to a greater degree of psychological distress.

According to the present study, the majority of the study subjects are bad sleepers during the COVID-19 pandemic (Table 3). This may be justified by the older adults' fear of the transmission of infection to their family or relatives, inadequate income, and limitations in social visits. These factors could exaggerate over thinking and poor sleep quality during the COVID-19 pandemic. This result is in consistence with the review 2021 who revealed that during the COVID-19 pandemic, social isolation, confinement at home, worry, fear of infection, stress, and economic concerns have a direct impact on sleep, causing circadian disturbance of sleep cycle and perpetuators to

insomnia among older adults (Pires et al., 2021). Moreover, this result is consistent with a review conducted by Bafail (2022) who found that older adults are more likely to experience sleep disturbance and COVID-19-related mental health problems, such as anxiety and depression.

Regarding COVID-19-related anxiety, the majority of the study subjects had low dysfunctional-related anxiety, and less than one-tenth had high dysfunctional-related anxiety. This may be explained by that more than one-half of the study subjects were males, who may have better coping skills in dealing with dysfunctional-related anxiety compared to females (Table 4). This result is in consistence with study done in united states 2023 which concluded that female's older adults have greater risk of dysfunctional coronavirus related anxiety compared to males (Curtis et al., 2023).

In relation to depression, more than one-third of study subjects reported no depression, while around two-thirds reported various degrees of depression, either mild, moderate, or severe during the COVID-19 pandemic. This may be due to the strict measures imposed by governments due to the COVID-19 pandemic, such as limitations on public gatherings, tracking of physical contact, travel constraints, quarantine, home confinement, lockdown, and cancellation of public events. All these measures make older adults more vulnerable to experiencing higher levels of depression during the pandemic. This finding is supported by study conducted in Indonesia 2022, which showed that strict measures imposed by the government during the COVID-19 pandemic were strongly associated with higher levels of depression among older adults (Kurniawidjaja et al., 2022).

The present study revealed significant relationships between overall sleep problems, its subdomains, and psychological distress, COVID-19-related anxiety, and depression among the study subjects. The higher level of overall sleep problem indicates higher levels of psychological distress; COVID-19 related anxiety and depression (Table 6). This may be due to psychological disorders that accelerate

intellectual hyper-vigilance and cause individuals to become preoccupied with fears about the future, which further exacerbated more sleep problems in older adults by increasing sleep latency, lowering depth of sleep, and reducing duration and continuity of sleep. At the same time, sleep disturbances among the older adults caused by the COVID-19 pandemic might lead to mood disorders in terms of anxiety and depression due to hypothalamic-pituitary-adrenal (HPA) axis dysfunction and excessive stimulation of the sympathetic nervous system. The present study result is in line with the review done by Cipriani et al. (2021), who suggested a bidirectional relationship between psychological distress and sleep pattern during the COVID-19 pandemic. Also, Zhang et al. (2022) added that poor sleep quality was significantly caused by severe psychological distress, this could be intensified under threatening circumstances caused by the COVID-19 pandemic.

Conclusion

Based on the results of the present study, it can be concluded that a statistically significant relationships were found between psychological distress, COVID-related anxiety, depression and sleep quality among community dwelling older adults during Covid-19 pandemic. For illustration, the higher the levels of psychological distress, COVID-related anxiety, and depression among community-dwelling older adults during the COVID-19 pandemic, the higher the levels of sleep problems. Also, personal factors like gender, marital status, level of education, and occupation prior to retirement were found to be significant predictors of psychological distress and poor sleep quality during the period of the COVID-19 pandemic.

Recommendations

Given the present results, the following recommendations are suggested:

- Gerontological nurses should use valid tools to assess psychological distress, anxiety, and depression among older adults in order to identify those who are at higher risk of developing psychological disorders.
- Sleep patterns should be monitored continuously

by gerontological nurses to determine those who are bad sleepers and implement measures to enhance sleep quality among older adults.

- Educational programs should be established by gerontological nurses to educate older adults and their care givers about psychological disorders and how to manage psychological distress that may occur during pandemics.

– In service training programs should be done by health care providers for older adults and their family members about the most common age-related sleep changes, how it can be affected by older adults’ psychological status and how to manage them.

Table (1): Distribution of the study subjects according to their socio-demographic characteristics (n = 230)

Socio-demographic data	No.	%
Age (years)		
60-75	184	80.0
75-85	46	20.0
Min. – Max.	60.0 – 83.0	
Mean ± SD.	68.32 ± 6.08	
Gender		
Male	122	53.0
Female	108	47.0
Marital status		
Married	126	54.8
Widower/ widow	89	38.7
Divorced	10	4.3
Single	5	2.2
Level of education		
Illiterate	63	27.4
Read and write	13	5.7
Primary	51	22.2
Secondary	52	22.6
University	51	22.2
Occupation prior to retirement		
Employee	85	37.0
Housewife	60	26.1
Unskilled worker	47	20.4
Skilled worker	38	16.5
Current work status		
No	194	84.3
Yes	36	15.7
Income		
Inadequate	146	63.5
Adequate	84	36.5
Place of residence		
One’s own home	200	87.0
Relative’s home	30	13.0
Living condition		
With family or relatives	189	82.2
Alone	41	17.8

SD: standard deviation

Table (2): Distribution of the study subjects according to their level of psychological distress (n = 230)

Psychological distress levels	No.	%
1-Well	94	40.9
2-Mild psychological distress	70	30.4
3-Moderate psychological distress	38	16.5
4-Severe psychological distress	28	12.2
Mean (Total Score)	(10 – 50)	
Min. – Max.	10.0 – 44.0	
Mean ± SD.	21.67 ± 6.16	
Median	20.0	
Mean percent		
Min. – Max.	0.0 – 85.0	
Mean ± SD.	29.18 ± 15.40	
Median	25.0	

SD: standard deviation

Table 4: Distribution of the study subjects according to their COVID-19 related anxiety (n = 230)

COVID-19 related anxiety	No.	%
1- Low dysfunctional coronavirus-related anxiety (<9)	212	92.2
2- High dysfunctional coronavirus-related anxiety (≥9)	18	7.8
Mean (Total Score)		
Min. – Max.	0.0 – 12.0	
Mean ± SD.	3.78 ± 3.30	
Median	3.50	
Mean percent		
Min. – Max.	0.0 – 60.0	
Mean ± SD.	18.91 ± 16.51	
Median	17.50	

SD: standard deviation

Table (5): Distribution of the study subjects according to their level of depression (n = 230)

Depression	No.	%
1- No depression	81	35.2
2- Mild depression	67	29.1
3- Moderate depression	48	20.9
4- Severe depression	34	14.8
Mean (Total Score)		
Min. – Max.	0.0 – 15.0	
Mean ± SD.	6.77 ± 3.94	
Median	6.50	
Mean percent		
Min. – Max.	0.0 – 100.0	
Mean ± SD.	45.16 ± 26.23	
Median	43.33	

SD: standard deviation

Table (3): Distribution of the study subjects according to their sleep quality during COVID-19 (n = 230)

Component of Sleep quality	No.	%
Sleep quality		
Very good	34	14.8
Fairly good	103	44.8
Fairly bad	67	29.1
Very bad	26	11.3
Mean percent %	45.65 ± 29.02	
Sleep latency in minutes		
Score of Zero	79	34.3
Score of 1	56	24.3
Score of 2	38	16.5
Score of 3	57	24.8
Mean percent %	43.91 ± 39.52	
Sleep duration in hours		
Less than < 5 hours	18	7.8
5 to less than 6 hours	83	36.1
6 to less than 7 hours	72	31.3
More than ≥ 7 hours	57	24.8
Mean percent %	42.32 ± 30.78	
Habitual sleep efficiency		
Less than < 65%	21	9.1
65-74%	53	23.0
75-84%	76	33.0
More than 85%	80	34.8
Mean percent %	35.51 ± 32.37	
Sleep disturbances		
Score of Zero	2	0.9
Score of 1	166	72.2
Score of 2	59	25.7
Score of 3	3	1.3
Mean percent %	42.46 ± 16.45	
Use of sleeping medication		
Not during the past month	207	90.0
Less than once a week	16	7.0
Once or twice a week	7	3.0
Mean percent %	4.35 ± 13.95	
Daytime dysfunction		
Score of Zero	24	10.4
Score of 1	57	24.8
Score of 2	103	44.8
Score of 3	46	20.0
Mean percent %	58.12 ± 29.87	
Total sleep quality		
-Bad sleeper (≥5)	181	78.7
-Good sleeper (<5)	49	21.3
Mean percent %		
Mean ± SD	38.90±19.94	

SD: standard deviation

For specification, for each sleep component score range from 0-3 (score of zero indicates no difficulty and score of 3 indicates severe difficulty).

Table (6): Correlation between sleep quality of the study subjects and psychological distress, COVID-related anxiety and depression (n = 230)

Sleep quality	Psychological distress		COVID related anxiety		Depression	
	r_s	P	r_s	p	r_s	p
1- Sleep quality	0.607*	<0.001*	0.480*	<0.001*	0.640*	<0.001*
2- Sleep latency in minutes	0.362*	<0.001*	0.234*	<0.001*	0.295*	<0.001*
3- Sleep duration in hours	0.297*	<0.001*	0.206*	0.002*	0.289*	<0.001*
4- Habitual sleep efficiency	0.441*	<0.001*	0.369*	<0.001*	0.400*	<0.001*
5- Sleep disturbances	0.424*	<0.001*	0.454*	<0.001*	0.423*	<0.001*
6- Use of sleeping medication	0.253*	<0.001*	0.251*	<0.001*	0.293*	<0.001*
7- Daytime dysfunction	0.505*	<0.001*	0.509*	<0.001*	0.539*	<0.001*
Overall sleep quality	0.586*	<0.001*	0.477*	<0.001*	0.567*	<0.001*

r_s : Spearman coefficient

*: Statistically significant at $p \leq 0.05$

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