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Original Article

Relationship Among Depression, Psychological Distress, and Sleep Disturbances Among Older Persons with Chronic Illness

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ABSTRACT

Background/Purpose: Sleep is considered a vital and significant function to maintain physical, emotional and mental wellbeing. The purpose of this study was to examine the relationship between depression, psychological distress and sleep disturbances among older persons with chronic illnesses.

Methods: Cross-sectional, descriptive-correlational design was used to recruit 820 older persons diagnosed with chronic illness. Structured format of data collection was used. Data was collected using depression, psychological distress and sleep disturbances scales.

Results: The analysis showed that older persons have slight to mild level of depression, moderate level of sleep disturbances, and about half of them are likely to have a moderate severe disorder due to psychological distress. The two-steps multiple hierarchical regression showed that working status (β =-0.084, p=0.005) depression (β=-8.35, 0.004) and psychological distress (β =18.42, <0.001) were significant predictors of sleep disturbances (R^2=0.442, $F_{6,820}$=22.5, p <0.001). The analysis showed that there were significant differences between males and females in depression and psychological distress , and sleep disturbances (p <0.05).

Conclusion: Depression, psychological distress, age, and working status are the main predictors of sleep disturbances of older persons.

1. INTRODUCTION

Physical degeneration of older persons has several mental and social consequences. With increasing number of older persons, those at age of 60 years or above whom reaching two billion by the year 2050,[1] healthcare facilities should be prepared to accommodate to increasingly expected healthcare needs of older persons. Studies showed that prevalence of moderate and severe impairment among older persons is about three times higher than those aged 15-59 years.[2] Such impairments interfere with quality of life among older persons and restrict their self-care and involvement activities.[3] One of

the significant health-related concerns among older persons is quality of sleep. Sleep is considered a vital and significant function to maintain physical, emotional and mental wellbeing.[4] It has been found that sleep is an essential factor that contributed to cognitive function and emotional stability among people.[5] Sleep disturbances, both insomnia and excessive sleepiness are considered significant risk factors to mental and physical dysfunction and illnesses.[5] Sleep disturbances have also been reported to associate with further significant problems such as fatigue, exhaustion and extra bedtime need.[6] Moreover, sleep is considered a vital physiologic process with important restorative functions. Changes in the quality and quantity of sleep and several sleep-related disorders occur with increasing frequency among elderly people.[7] Sleep disorders not only interfere with the quality of life but may trigger or worsen a number of conditions that are determinants to health. Several factors can also initiate and maintain sleep disturbance including the psychological disturbances such as depression and psychological distress.[8]

Although a strong association between sleep disturbances and aging has been established, the argument is still whether sleep disturbances are associated with aging process or due to it is due to comorbidity with other physical and mental health problems.[2,9] Studies showed an association between sleep disturbance and increased prevalence of various chronic disease and conditions including obesity, diabetes, and cardiovascular diseases and higher mortality rates among older adults.[10] It is also a common symptom in neurodegenerative disorders such as cognitive impairment and memory loss.[11] Multiple social, psychological, and biological factors determine the level of mental health of persons. Older people are more likely to experience negative life events such as bereavement, a drop in socioeconomic status with retirement, disability, isolation, loss of independence, and loneliness.[12] Such factors might contribute to psychological deteriorations of older persons causing depression and psychological stress. Mental health of older persons has an impact on physical health and vice versa. For example, older persons with depression and stress may suffer multiple physical problems deteriorating their physical stability and limiting their independence and self-care and quality of life.[3] The literature is sufficiently discussing psychological status of older persons; however, the impact of depression and distress on older persons' quality of sleep and its connection to sleep disturbances have not been adequately addressed. Depressive symptoms are almost the same signs and symptoms of the Major Depressive Disorder (MDD) as indicated by the DSM-5 but do not meet all the criteria. On the other hand, psychological distress refers to mental and physical symptoms that are affecting the mood stability of individuals[13-16]. These factors are known to influence human functions including psychological and physical ones. The reciprocal relationship between sleep disturbances and stress and depression alarm healthcare providers caring of older persons to physical and mental deteriorations and way of interpretation its connection. Such situation would increase cost of healthcare and burden if left untreated and less prioritized. This study is emphasizing the impact of depression and psychological distress on sleep disturbances among older persons with chronic illness, and the role of selected sociodemographic factors in sleep disturbances. The purpose of this study was to examine the relationship between depression, psychological distress, and sleep disturbances among older persons with chronic illnesses. The specific aims were:

- To identify the prediction power of depression and psychological distress on sleep disturbances among older persons with chronic illnesses.
- To examine difference in sleep disturbances related to selected socio-demographic factors among older persons with chronic illnesses.

2. METHODS

2.1. Design

Cross-sectional, descriptive-correlational design was used to survey a nationally representative sample of non-institutionalized older adults (aged ≥ 60 years) in Jordan. Data was collected using structured interview format.

2.2 Sample and Setting

All Jordanian persons aged 60 years or above represented the population of this study. The sample size was calculated using the Gpower 3.0.10 at low effect sized of 0.10, power of 0.80, and alpha at 0.05 level of significance for prediction of special R2 change, the least sample size required was 787. Quota sample has been used to recruit the older persons and the 24 centers were selected based on the distribution across the three districts and governorates. According to DOS (2012), older persons who are at age of 60 years or above represent 5.2% of the total population count. Older persons who are at age of 60 years or above are distributing as follows: Amman (42.0%), Irbid (17.6%), Zarqa (14.0%), Balqa 6.8%, and all other governances have less than 5% with lowest in Tafeilah with 1.2%. To ensure adequacy of the sample, a total sample of 1100 older persons approached and 950 agreed and participated in the study, of the 86.3% (n=820) were eligible as they are diagnosed with at least one chronic medical illness. Convenience sampling technique was used to recruit the sample from 24 outpatient and inpatient healthcare centers in Jordan from the three main districts in Jordan; north, center and south. Those with

a least one chronic medical problem for 6 months was considered eligible for the study confirmed by either primary care giver or/and medical record. Exclusion criteria were persons who are physically and mentally incompetent to comprehend and answer the survey confirmed by medical records and primary care givers.

2.3. Data Collection Procedure

After ensuring ethical approval from the IRB of XYZ University and targeted institutions, Face-to-face interviews were conducted at the healthcare centers by interviewers who were trained and certified to data collection. The research team approached the healthcare professional responsible for the healthcare facility to assist in recruitment through inviting older persons above the age of 60 to participate in the study. Those expressed interest to participate in the study were screened for eligibility using inclusion and exclusion criteria. Then, the researcher assistants explained the study and provided them with all details and answered all their questions ensuring confidentiality, privacy, and voluntary participation. Then the participant was asked to sign the consent form having one family member, if available, or primary healthcare provider as witness. Then, the package that included the questionnaires and the demographic profile was introduced. The whole package was presented in Arabic simple language.

2.4. Ethical Implications

Ethical approval was obtained from IRB at XYZ University and the targeted institutions, prior to data collection. Consent forms were also signed and obtained from participants with witness. Participants' right to confidentiality, privacy, voluntary participation, and safety are securely protected throughout the project. Permission to use the instrument was obtained prior to data collection. The purpose of the study and its significance was explained to those who accepted to participate in the study. All questions were answered. All data were kept in a closed cabinet at the researchers' offices and personal password-secured computers.

2.5. Instruments

The Arabic version of the instrument have been used.

1. Depression was measured using the DSM-5 severity measure of depression.[13] This scale has been developed by the American Psychiatric Association and PROMISE group to measure severity of depression.[13] The original scale is available on the p[ublic domain for free use. In this study we have used the Arabic version of the scale that has been used and tested for validity and reliability in previous study among the same population.[2] The scale is formed of nine items and asks the individual to rate his depressive feeling on a rank scale ranging from not at all (0) to nearly every day (3). A score of 0-4 (none), 5-9 (mild depression), 10-14 (moderate depression), 15-19 (moderately to severe depression), and 20-27 (severe depression). The scale takes 5 minutes to be filled out. The scale has very good internal consistency with Cronbach's alpha of 0.81.[2] In our study, the scale also showed very good internal consistency with Cronbach's alpha of 0.86

2. Psychological distress was measured using the brief form of Psychological Distress Measure.[14] The Arabic version of the scale was used in this study.[2] The scale is formed of 10 items asking respondents to make their answer on the best degree to which each statement has applied to him/her recently ranging. Each item is scored from one 'none of the time' to five 'all of the time' with total score ranging from 10 to 50. Low scores indicate low levels of psychological distress and high scores indicate high levels of psychological distress. K10 Score: Likelihood of having a mental disorder (psychological distress); 10-19 Likely to be well, 20-24 likely to have a mild disorder, 25-29 likely to have a moderate disorder, and 30-50 likely to have a severe disorder. The Arabic version of the scale has good internal consistency with Cronbach's Alpha of 0.88. In this study Cronbach's alpha, internal consistency, range was .84. In our study, the scale also showed very good reliability (internal consistency) with Cronbach's alpha of 0.89.

Sleep disturbances were measured using DSM-5 Level 2—Sleep Disturbance- the Adult measure, the 8-item PROMIS Sleep Disturbance Short Form. This scale is used to measure the domain of sleep disturbance in individuals aged 18 and older.[15] This scale has been developed by the American Psychiatric Association PROMISE group to measure sleep disturbances and define severity of sleep problem.[15] The Arabic version of the scale was used in this study.[2] Adult measure is the 8-item PROMIS Sleep Disturbance Short Form that assesses the pure domain of sleep disturbance in individuals age 18 and older. Each item asks the patient (or informant) to rate the severity of his/her sleep disturbance during the past 7 days. Each item on the measure is rated on a 5-point scale (1=never; 2=rarely; 3=sometimes; 4=often; and 5=always) with a range in score from 8 to 40 with higher scores indicating greater severity of sleep disturbance. Less than 55=None to slight, 55.0—59.9 =Mild, 60.0—69.9=Moderate , and 70 and over=Severe sleep disturbances. The Arabic version of the scale has a Cronbach's Alpha of 0.85. In this study Cronbach's alpha range was 0.83.

Sociodemographic information including gender, age, marital status, type of disease, duration of disease, smoking status, education level and work status were investigated using a tool developed by the researcher.

2.6. Data Analysis Plan

Data were analyzed using the statistical package for social sciences (IBM-SPSS 25). Sleep disturbances, depression, psychological distress, socio-demographic, and health-related variables were described using the central tendency measures and dispersion measures. Differences and comparisons were examined using t-test, and correlation was tested using the Pearson r. To examine whether psychological distress and depressive symptoms are significant predictors of sleep disturbances controlling for the demographic and personal characteristics, two- steps multiple hierarchical regression analysis was performed. Alpha was set to 0.05.

3. RESULTS

3.1. Descriptive Characteristics

A total number 820 completed the questionnaires. The analysis (see Table 1) of demographic information showed that the age of older persons ranged from 60 years to 100 years with a mean of 68.0 (*SD*=7.4). Of the sample, 51.5% (n=422) were males and 48.5% (n =398) were females. The majority of the participants 66.1% (n=542) were married, 56.7% (n=465) of them were not currently working, and 26.8% (n=220) are retired. Of the sample, 61.0% (n=500) had high school or less. In relation to the smoking status, 14.9% (n=122) are currently smoking tobacco, 27.9% (n=229) have comorbid diagnoses of medical diagnosis, 9.5% (n=78) have a diagnosis of diabetes mellitus, 10.1% (n=83) have hypertension, 2.6 (n=21) have cancer. In addition, the analysis showed that the duration of the medical diagnosis ranged from one year to 50 years, with a mean of 8.1 (*SD*=6.6).

3.2. Variables of the Study

Sleep disturbances: the analysis showed that the scores of sleep disturbance symptoms ranged 5-24 with a mean of 17.5 (*SD*=2.7). 66.5% of the patients have none to slight sleep disturbance symptoms, 17.5% of them have mild sleep disturbance symptoms, 12.5% of them have moderate sleep disturbance symptoms, and only 4.5% of them has severe sleep disturbance symptoms. In general, the result indicates moderate level of sleep-related disturbances. See Table 2.

Depression: Regarding the depressive symptoms, the analysis showed that the depressive symptoms ranged from 0 to 27 with a mean of 5.2 (*SD*=6.4). 77.6 % of the patients has none to slight depressive symptoms, 12% of them have mild depressive symptoms, 5.6% of them have moderate depressive symptoms, and only 4.8% of them have severe depressive symptoms. In general, the result indicates slight to mild level of depression. See Table 2.

Psychological distress: In regards of patient's psychological distress level, the analysis showed that patients had a mean score of 23.4 (*SD*=6.7) with scores ranging from 10 to 48. In general, patients' psychological distress scores were at the mild to moderate level given that possible range of scores is 10-50, and a median of 24, and the results indicate moderate level of stress. The analysis also indicated that 26.8% were likely to be well, 22.9 likely to have a mild disorder, 25.9 likely to have a moderate disorder, and 19.9 likely to have a severe disorder. See Table 2.

3.3 Differences Related to Socio-Demographic Characteristics

An independent sample t-test was conducted to examine differences among older person related to their gender. The analysis showed that there was a significant difference between males and females in depression (t=-3.7, *p*=0.001) and psychological distress (t=-3.1, *p*=0.002). Mean of depression of males (M=4.5, *SD*=6.2) lower than the females (M= 6.0, *SD*=6.6), and mean of psychological distress for

Table 1. Demographic characteristics of older person (N=820)

Variable		n	%	M	*SD*	Min	Max
Age				68.0	7.4	60	100
Period of diagnosis				8.1	6.6	1	50
Gender	Male	422	51.5				
	Female	398	48.5				
Marital status	Single	18	2.2				
	Married	542	66.1				
	Divorce	29	3.5				
	Widow	231	28.2				
Working status	Don't work	465	56.7				
	Full time	80	9.8				
	Part time	55	6.7				
	Retired	220	26.8				
Education level	>high school	280	34.1				
	High school	220	26.8				
	Diploma	196	23.9				
	Bachelor	93	11.3				
	Graduate	31	3.8				
Medical diagnoses	DM	78	9.5				
	HT	83	10.1				
	SVD	32	3.9				
	Lung disease	34	4.2				
	Cancer	21	2.6				
	Rheumatoid	29	3.5				
	Neurological disorder	30	3.7				
	Other	284	34.6				
	Comorbid	229	27.9				
Smoking	Yes	122	14.9				
	No	698	85.1				

males (M=22.7, *SD*=6.8) was lower than the females (M=24.1, *SD*=6.5). Also, there was a significant difference in the sleep disturbance scores between males and females (t=-4.2, *p*=0.001) with mean of males (M=16.8, SD=3.6) was lower than the females (M=18.2, *SD*=3.4). In general, female patients have higher depression, stress level, and sleep disturbance scores than male patients. The analysis also showed age is significantly correlated between depression (r=0.21, *p* <0.001), while no significant correlation was found with sleep disturbances and period of psychological distress. Period of diagnosis diagnosis not to correlate significantly with depression, psychological distress and sleep disturbances (*p* >0.05).

3.4. Predictors of Sleep Disturbances

To examine whether psychological distress and depressive symptoms are significant predictors of sleep disturbances controlling for the demographic and personal characteristics (age, gender, working status, marital status, medical diagnosis, smoking status, and period of diagnosis), two- steps multiple hierarchical regression analysis was performed. The results (see Table 3) showed that model 1 that contained demographics and personal characteristics explained 7.2% (R^2=0.072) of the variance in depressive symptoms. Although the R^2 was very small, the model was significant ($F_{4,420}$=3.74, *p* <0.001). In this model, working status and age were the significant predictors of depressive symptom. After entry of psychological distress and depression at step 2, the total variance explained by the model as a whole was 44.2% (R^2=0.442) and was significant ($F_{6,820}$=22.5, *p* <0.001). The variables in step 2 explained an additional 37% of variance in sleep disturbances. In Model 2, working status remained significant predictors. In addition, depression (β=-8.35, 0.004) and psychological distress (β=18.42, <0.001) were significant predictors of sleep disturbances. The analysis showed that depression is negatively associated with sleep disturbances indicating that those with higher score of depression are more likely to have lower scores of sleep disturbances, while psychological distress was associated positively indicating that those with higher score of psychological distress are more likely to have higher scores in sleep disturbances. This is under the positive effect of age where older persons have higher levels of sleep disturbances, and non-working older persons are also suffering higher levels of sleep disturbances.

Table 2. Descriptive statistics of psychological; and social variables (N=820)

Variables	M	SD	Min	Max	P_{50}
Sleep disturbance	17.5	2.7	5	24	18
Depression	5.2	6.4	0	24	16
Psychological distress	23.4	6.7	10	48	24

Table 3. Two steps Multiple Hierarchal Regressing sleep disturbances on psychological distress and depression controlling for demographic and personal characteristics among older person in Jordan (N=820)

Variables	Model 1		Model 2	
	β	*P*-value	β	*P*-value
Age	0.995	0.004	1.010	0.002
Gender	0.044	0.235	0.015	0.619
Marital status	0.095	0.145	0.071	0.214
Working status	-0.083	0.022	-0.084	0.005
Education level	-0.030	0.388	0.000	1.000
Medical diagnoses	-0.141	<0.001	-0.041	0.160
Depression			-8.35	<0.001
Psychological distress			18.42	<0.001
Model	R^2	Adj R^2	Δ R^2	F	*P*-value
1	0.072	0.068	0.072	3.74	<0.001
2	0.442	0.415	0.37	22.50	<0.001

4. DISCUSSION

Health of older persons is a debated issue due to controversial reports regarding their needs and abilities to use and access healthcare services. What seems to be normal and expected is another critical issue that affects negatively older persons. For example, assuming that older persons have high rates of depression should not be taken for granted. This means that depression cannot be always responsible physical and further medical problems among older persons. In this study, we found that depression and psychological distress were significant predictors of sleep disturbances. Notably, we found that older person with higher levels of depression are more likely to have lower sleep disturbances than those with high levels of depression. On the other hand, older persons with higher levels of psychological distress have higher levels of sleep disturbances. Such findings can be interpreted in various forms. For instance, depression and depressive feelings do interfere with individual's physical wellbeing, and the DSM-5 criteria of major depressive disorder (MDD) states that individuals with MDD do suffer insomnia and hypersomnia.[16] In our study, we found that such connection is not an absolute when it comes to discuss association between depressive symptoms and sleep disturbances among older persons. In other words, older persons do have higher levels of sleep disturbances when they suffer lower levels of depression. As asserted by Haugeberg et al.,[6] sleep disturbances were linked to fatigue, exhaustion and extra bedtime need among older persons. Furthermore, sleep is considered a core element in cognitive functioning and emotional stability among older person.[5,17] This might explain why older persons with lower levels of depression suffer more of sleep disturbances.

The literature asserted that older persons are suffering multiple physical problems that interfere with their independence, self-care, and quality of life.[3,18-19] In our study, we add that psychological factors such as psychological distress which was found to be moderate to high have also deteriorated physical health of older persons through disturbing their sleep that might contribute to further feeling of fatigue and neurogenerative problems.[20-21] The results of this study is supporting the argument that sleep disturbances might not be solely associated with ageing process, and rather, with psychological comorbidity. In a previous study, physical and general psychological functions were associated with comorbidity of chronic illness.[2] Here, we add that psychological disturbances are other factors that need to be emphasized while discussing the effect of chronic illnesses on the functionability of older persons. We suggest a reciprocal relationship between the three main sides of the triangle; ageing process, physical wellbeing and psychological wellbeing. While Liew and Aung 5 considered sleep disturbances as risk factors to mental and physical dysfunction and illnesses, we found that psychological factors are the risk factors to sleep disturbances suggesting the reciprocal relationship and confirming the intercorrelation between sleep and psychological factors.

A significant finding of this study is related to the minimal contribution of the sociodemographic characteristics of older persons on sleep disturbances. While being retired and part-time worker found to associate with sleep disturbances, age was only associated with sleep disturbances under the joint-influence of depression and psychological distress. This indicates that quality of sleep among older person is more connected to daily life-schedule and their psychological status rather than being physically fatigued or suffering chronic illness. This has been confirmed also with the non-significant association between medical problems (having chronic illness) and sleep disturbances; violating the assumption that connects medical disorder with sleep problems.

One limitation of this study is related to using self-report format of data collection, while assessing quality of sleep and sleep disturbances might be better if assessed or measured through qualitative diary using longitudinal design.

5. CONCLUSION

Lower level of depression, and higher level of psychological distress were found to predict sleep disturbances among older persons. Sociodemographic and being medically diagnosed with chronic illness were not found to predict sleep disturbances except working status and age under influence of depression and psychological distress. The results have implications to nurses and healthcare professionals caring of older persons. Nurses and healthcare professionals need to be aware that sleep disturbances have not to be linked, for granted, to medical problems or neurological problems. Nurses and healthcare professionals need also to recognize real connection between sleep disturbances, depression, and psychological distress. Therefore, depressive feelings and quality ofsleep haveto be assessed periodically, and medication and treatment protocols have to consider interrupting the cycle between depression, psychological distress and sleep disturbances. Further studies needed using observation longitudinal approach to address reciprocal relationship between depression, psychological distress, physiological factors, and quality of sleep among older persons.

CONFLICTS OF INTEREST

The authors declare no conflict of interest related to publication of this manuscript.

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AUTHOR CONTRIBUTIONS

Study design: AHM, HA, INT, SH
Data collection: RHM, HA
Data analysis: RHM, AHM, SH, INT
Manuscript writing: AHM, MBH, HA

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