

Factors Associated with Sleep Disturbance Among Community Dwelling Older Adults

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Abstract

Back ground: Sleep disturbance is associated with adverse health impacts and poor quality of life in older adults. Increased prevalence of sleep troubles among older adults creates the need to investigate factors associated with its occurrence. Control the effect of these factors can help in development of proper interventions for better sleeping patterns in old age.

The aim of the study: to determine factors associated with sleep disturbance among community dwelling older adults.

Subjects & method: Research design: A descriptive correlational research design was followed.

Setting: Somoha health insurance outpatient clinics, Alexandria Governorate, Egypt.

Subjects: 170 older adults were recruited.

Tools: Four tools were used for data collection: 1) Socio-demographic and clinical data structured interview schedule of community dwelling older adults, 2) Factors associated with sleep disturbance assessment structured interview schedule of community dwelling older adults, 3) Life satisfaction Index- Z, and 4) the General Sleep Disturbance Scale (GSDS).

Results: More than three quarters of the study subjects suffer from significant levels of overall sleep disturbance.

Conclusion: Sleep disturbance among the study subjects is significantly associated with different personal characteristics, health status, life style behaviors, sleep environment and psychological status of them.

Recommendations: Evaluation of sleep patterns among older adults should be done periodically by the gerontological nurse to discover sleep disturbance and factors associated with it. Then, the nurse can intervene to control the influence of these factors on the older adults' sleeping pattern through suitable nursing interventions.

Keywords: Sleep disturbance; factors; older adults; gerontological nurse.

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I . Introduction

Having comfortable sleeping during night is greatly significant to all people. Sleep helps the older adults' body to relax and to reestablish its power and vitality. In the absence of calm and easy sleep, the older adults may become easily distracted and irritable. Also they might be confused and more liable to injuries. Like air and water, satisfactory sleep is crucial to better health and wellbeing⁽¹⁾. Sleep disturbance in old age is a continuous state of older adults' suffering from inability to get enough satisfying sleep. Older adults' amount of sleep does not decline with age but their ability to sleep is decreased. There are common and normal changes arise in sleep patterns among older adults. In Comparison to others in younger age, older adults sleep little numbers of hours although they spend extra hours in their beds, frequently have mid sleep awakening, get up earlier in the morning, have greater frequent nap, and have longer sleep latency⁽²⁾. A meta-analysis that done on 3500 older adults indicated that sleep quality decreased with further increase in the age⁽³⁾. Persistent suffering from sleep disturbance may be unsatisfying and unbearable experience. Poor night's sleep may cause the older adults to feel weak and tired throughout the day and loss all of his power rapidly. Sleep disturbance has serious impacts on older adults' mood, abilities, competences, and skills to handle stress. Neglecting older adults' suffering from sleep disturbance can harm their health. It may induce weight gain, safety problems, physical dependency, and difficult memorization, and put a strain on the older adults' relationships with others. Prolonged sleep disturbance reduce life satisfaction in older people and linked with early death^(2,4).

Sleep disturbance is common in old age. This might be due to the physiological aging changes in sleep phases. Usual sleep is arranged into diverse stages that cycle during the night. Polysomnographic researches have categorized the sleep stages into rapid-eye-movement REM sleep and non-REM sleep. The REM sleep where the muscles start to relax obviously is retained until advanced age, with some reduction on it. Non-REM

sleep is composed of 4 stages. Stages 1 and 2 are considered light sleep, while, stages 3 and stage 4 are named deep sleep. In old age, duration of stage 1 and the number of shifts into this stage increased. Stages 3 and stage 4 are severely decline with age and may disappear completely after 90 years old and more^(1,5).

In advanced age, there are numerous other factors which may predispose sleep problems. For example, physical illnesses and complains such as chronic pain disorders, left heart failure that associated with orthopnea and paroxysmal nocturnal dyspnea, urinary system problems including benign prostatic hypertrophy, and consumption of more than five drugs per day which associated with adverse side effects. Nicotine also acts as stimulant and impairs sleep like consumption of caffeinated drinks. Other factors may include deviations in the older adults' level of activity or social life, and loss of a spouse or loved one⁽⁶⁾. To avoid the potential dangers associated with sleep disturbance in old age, factors highly correlated with disturbed sleep patterns should be examined. Recently in epidemiology, major concern has been focused on how the adverse patterns are induced during usual sleep patterns. Although given that sleep in older adults seem to be the outcome of multipart interactions between social, cultural, and personal factors, there is still requisite for more researches investigating the impacts of different variables and contexts on sleep disturbance. Determining of factors associated with sleep disturbance may provide valuable indicators for the gerontological nurses to comprehend various unknown features of sleep patterns in old age⁽⁷⁾.

Older adults with sleep disturbance ought to be evaluated by the gerontological nurses through a detailed sleep history and overnight sleep records when indicated. Nursing strategies should concentrate on the underlying sleep disturbance and its correlates, and should take into account some of the unique and special issues found in older adults. A higher sleep quality can be achieved in old age with some persistence and proper nursing interventions. This can result in obvious improvements in the older adults' life satisfaction and level of functioning⁽⁸⁾.

II. Aim of The Study

The present study aimed to determine factors associated with sleep disturbance among community dwelling older adults.

Research question:

What are the factors associated with sleep disturbance among community dwelling older adults?

III. Materials And Method

Materials:

Design: The study followed a descriptive correlational research design.

Setting: The study was carried out at Somoha health insurance outpatient clinics, Alexandria Governorate, Egypt. These clinics consist of several specialties such as medical, urology, neurology, and ophthalmology. It works for 6 days per week from Saturday to Thursday from 9 am to 12 pm.

Subjects: The study included 170 older adults aged 60 years and more, able to communicate effectively, accept to share in the study, and available at the selected setting during the period of data collection. The sample size was estimated using the EPI info 7.0 program based on these parameters; population size: 300, possible error 5 %, confidence coefficient 95%, and sample size 168.

Tools: Four tools were used in the study to collect the necessary data as follows;

Tool I: Sociodemographic and clinical data structured interview schedule of community dwelling older adults:

This tool was developed by the researchers based on review of related literature to assess the sociodemographic and clinical data of the study subjects as follows;

- Sociodemographic data such as sex, age, marital status, and level of education.
- Clinical data such as self-rating health, health problems and treatment regimen.

Tool II: Factors associated with sleep disturbance assessment structured interview schedule of community dwelling older adults:

This tool was developed by the researchers based on review of related literature to assess the factors associated with sleep disturbance among the older adults as follows;

- Living conditions such as place of residence, and living style.
- Sleep environment such as ventilation, presence of noise, and bed mattress condition.
- Life style behaviors such as eating habits, smoking, and performance of physical exercises.
- Psychological status such as feeling of anxiety or emotional distress

Tool III: Life Satisfaction Index- Z (LSI- Z):

The LSI- Z is a 13-items scale which adopted in this study to assess life satisfaction among older adults. This tool developed by Wood et al 1969⁽⁹⁾. Elders indicated the agreement or disagreement with each statement on a 2-point scale, scoring from disagree (0), to agree (1). The total score ranges from 0-13. Negative items reversed, thus, higher scores indicate greater life satisfaction.

Tool IV: The General Sleep Disturbance Scale (GSDS)

The GSDS consists of 21 items which developed by Lee 1992⁽¹⁰⁾ to assess the sleep quality within the past week. Each item was ranked on a 0 (never) to 7 (every day) numeric rating scale. The GSDS total score is the summation of the 7 subscale scores; sleep quality, sleep quantity, midsleep awakenings, sleep onset latency, early awakenings, excessive daytime sleepiness, and medications for sleep. The GSDS total score ranges from zero (no disturbance) to 147 (extreme sleep disturbance). Every subscale's mean score ranges from 0 to 7. Greater total and subscale scores revealed higher levels of sleep disturbance. Subscales scores of ≥ 3 and a GSDS total score of ≥ 43 reveal a significant level of sleep disturbance.

III. Method

1. Permission to carry out the study from the responsible authorities from the Faculty of Nursing, Alexandria University was obtained.
2. Permission to collect the required data from the head of the study setting was obtained, after being informed about the purpose of the study, the data and time of data collection.
3. Tool I and II were developed by the researchers based on review of related literature to assess the sociodemographic and clinical data of the study subjects and factors associated with sleep disturbance among them respectively.
4. Tool III and IV were translated into Arabic versions to assess the study subjects' life satisfaction and sleep disturbance respectively.
5. Tool II and the Arabic versions of tool III and IV were tested for their content validity by three experts in the related field of the study and the required modifications were completed accordingly.
6. Tool II and the Arabic versions of tool III and IV were tested for reliability. The Cronbach's Coefficient alpha was 0.86 for tool II, 0.76 for tool III, and 0.85 for tool IV.
7. A pilot study was done on 20 older adults who selected from the study setting and were not involved in the study sample. The pilot study was done to assess the tools for their applicability and clarity and essential modifications were done accordingly.
8. Older adults who fulfill the inclusion criteria were interviewed individually by the researchers in the waiting area in the outpatient clinic to collect the necessary data after clarification of the study purpose.

Ethical Consideration:

Informed witness consent was obtained from each study subject included in this study after clarification of the study purpose. Anonymity and privacy of the study subjects, confidentiality of the collected data and the subject's right to withdraw at any time were assured.

IV. Statistical Analysis

Data collected were analyzed by computer using the Statistical Package for Social Sciences (SPSS) software version 20. Reliability of the tools was determined by Cronbach Coefficient alpha. Data were presented by descriptive statistics in the form of frequencies and percentages for qualitative variables, and arithmetic mean and standard deviation for quantitative variables. Comparison of means was done by Student's t test and One Way Analysis of Variance (ANOVA). Pearson's Correlation Coefficient was used for testing relationship between variables. Significant difference was considered if $p \leq 0.05$.

V. Results

Table (1): Shows that 64.1% of the study subjects are males, 70% aged from 60 to less than 70 years with a mean age of 66.47 ± 5.74 , and 71.8% are married. Illiteracy is represented by only 25.3% of the study subjects, 42.4% were employee prior to retirement, 23.5% are current workers, and 68.8% of them reported inadequate monthly income.

Table (2): Indicates that 61.2% of the study subjects live in urban area and 88.8% live with their families. 13.5% of the study subjects reported that they were care givers for a dependent family member within the last month and they added that they live with the care recipients at the same home 100.0%.

Table (3): Illustrates that 48.8%, 10.0% of the study subjects rate their health either good or very good respectively. Having diabetes mellitus and hypertension was reported by 64.7% and 54.1% of the study subjects respectively followed by other chronic illnesses. 54.7%, 27.1% of study the subjects reported nocturnal pain either all time or sometimes respectively. Among those who consume prescribed medications, 65.2%, 56.7% take prescribed drugs for treatment of diabetes mellitus, and hypertension respectively followed by other medications.

Table (4): Indicates that 51.2% of the study subjects never consume multivitamins for either nutritional or health improvements and 58.2% consume irregular meals per day.

Study subjects used to have regular schedule of sleep either all of times 28.8% or sometimes 21.8% and 35.3% reported that they used to avoid day naps more than one hour per day. Also, consumption of caffeinated beverages before sleep time reported by 42.4%, 21.2% of the study subjects either all of times or sometimes respectively. Having one hour space between dinner and bedtime or less was reported by 44.1% of the study subjects. Sleep quantity in 42.9% of the study subjects ranges from 5 to 7 hours/day. Moreover, 73.5% of the study subjects are nonsmokers and 17.6% perform regular physical exercises.

Table (5): Shows that 34.1%, 24.1% of the study subjects always or sometimes suffer from noise in their sleep environment respectively. While, only 3.5%, 2.4% of them reported poor ventilation and inadequate sunrays and light in their sleep environment respectively. Furthermore, 64.7% of the sample reported that they did not change their bed matters for 10 years and more.

Table (6): Illustrates that 62.4% of the study subjects reported that they always feel with anxiety and distress. Also, 44.1%, 39.4% of them always or sometimes feel with sadness and depression respectively. The mean score of life satisfaction of the study subjects is 7.09 ± 3.79 .

Table (7): Shows that 75.3% of the study subjects suffer from sleep disturbance. Moreover, the main features of sleep disturbance among the study subjects include frequent mid sleep awakening 87.1%, sleep onset latency 80.0%, poor sleep quality 71.2%, increased day time fatigue 68.8%, and awakening up too early 60.6%.

Table (8): Indicates that females study subjects reported greater levels of overall sleep disturbance 66.11 ± 17.32 , with several sleep related problems more than males. Also, older age, 80 years and more, is associated with lower sleep quantity 9.80 ± 4.09 . Moreover, widows experience greater overall sleep disturbance 67.31 ± 18.66 , and several sleep related complains more than married study subjects. Furthermore, higher educational levels, university education, and better occupational status, employee, are associated with lower mean scores of overall sleep disturbance 20.65 ± 3.54 , 49.68 ± 22.42 respectively, and less sleep related problems. Study subjects who are current workers reported better overall sleeping status 49.45 ± 23.41 with better sleep quality without interruptions or sleep initiation problems. All the previous differences are statistically significant $p \leq 0.05$.

Table (9): Illustrates that living in rural area is associated with greater levels of overall sleep disturbance 66.85 ± 20.41 , poorer sleep quality, reduced sleep quantity, greater day time fatigue, and greater usages of substances or medications to induce sleep. The differences are statistically significant $p \leq 0.05$. Also, higher quality of sleep among the study subjects is associated with living with one's own family 14.88 ± 8.01 and the difference is statistically significant $T = 2.55$, $p = 0.011$.

Table (10): indicates that the study subjects who rate their health as poor reported the poorest general sleep condition 67.50 ± 21.14 , with frequent suffering from several features of sleep disturbance. Indeed, study subjects that always complain of nocturnal pain reported greater overall sleep disturbance 65.25 ± 20.83 , with frequent sleep related problems. In addition, study subjects who consume medications even prescribed suffer from frequent mid sleep awakening. All the previous differences are statistically significant $p \leq 0.05$.

Table (11): Indicates that reduced sleep quantity is associated with consumptions of multivitamins for nutritional and health improvements 7.50 ± 4.03 and having day naps more than one hour 9.34 ± 3.22 . Moreover, smoking, intake of irregular meals, and unscheduled sleep time are related to poor overall sleeping status 65.22 ± 23.99 , 63.36 ± 21.18 , 65.88 ± 19.11 respectively and associated with other different sleep related problems. Also, consumption of caffeinated beverages before sleep time, inadequate space between dinner and bed time ≤ 1 hour, lack of exercises, and sleeping less than five hours per day among the study subjects are associated significantly with higher levels of overall sleep disturbance 67.76 ± 18.45 , 66.41 ± 20.93 , 66.76 ± 18.39 , 72.64 ± 19.66 respectively and associated with various forms of sleep disturbance. All the previous differences are statistically significant $p \leq 0.05$.

Table (12): Indicates that quiet and well ventilated sleep environment with adequate sun light and rays are associated significantly with lower levels of overall sleep disturbance 48.61 ± 23.98 , 53.85 ± 21.57 , 53.80 ± 21.04 respectively and associated with lower mean scores of other sleep related problems. The differences are statistically significant $p \leq 0.05$. Also, study subjects who reported that they changed their bed mattress after a period of time less than 10 years reported better general sleep status 46.93 ± 23.18 , with little sleep related problems. The differences are statistically significant $p \leq 0.05$.

Table (13): Illustrates that there is a significant negative relation between life satisfaction and overall sleep disturbance and its subdomains which means that lower levels of life satisfaction among the study subjects are significantly associated with higher level of overall sleep disturbance as well as different features of it. While, a significant but positive relation was found between overall sleep disturbance and its subdomains and negative feelings such as sadness, depression, anxiety, or distress. The correlations are statistically significant $p \leq 0.05$.

VI. Discussion

Sleep problems are prevalent in old age and have multiple health and economic consequences⁽¹¹⁾. The reasons and outcomes of impaired sleep quality have received greater concern recently with researchers starting to explore social and environmental factors which related to sleeping patterns among older adults^(12, 13). So, this study aimed to determine factors associated with sleep disturbance among community dwelling older adults. The present study result reveals that more than three quarters of the study subjects suffer from sleep disturbance (table 7). This may be related to the characteristics of the study subjects. For instance, the higher percentages of them have lower levels of education, have no current work or adequate monthly income, suffer from chronic illnesses such as diabetes mellitus, hypertension, or cardiovascular diseases, suffer from nocturnal pain, consume irregular meals, and practice no physical exercises. In the present study, these factors are found to be significantly related to sleep disturbance. This result supports those of Schuber et al, 2002 who reported that 80% of the study participants have sleep disturbance, 76% of them have lower level of education, and one third of them had multiple chronic illnesses such as osteoarthritis⁽¹⁴⁾.

The present study result reveals that female study subjects show greater levels of sleep disturbance and different features of sleep problems than males such as sleep onset latency, frequent awakening up during sleep, poor sleep quality and higher level of day time fatigue (table 8). This can be interpreted by that females in any community have many responsibilities and duties related to themselves, their husbands, children, and sometimes their grandchildren in older age. These responsibilities and duties may negatively affect their schedule of sleep, eating patterns, feeling of physical comfort, or satisfaction about their achievements. Indeed, they may feel with anxiety, sadness, which may cause different levels of sleep disturbance. Moreover, another interpretation of this result is that females usually have more chronic diseases in old age such as osteoarthritis causing nocturnal pain and cardiovascular diseases with shortness of breath during night. This result is supported by study done in Sweden 2012, which reported that more than half of study subjects who suffered from pain and sleep disturbance were females⁽¹⁵⁾.

Concerning the relation between age and sleep disturbance, the present study result reveals that as the age increased, the sleep quantity is decreased (table 8). This may be due to the ageing related changes in the older adults' level of physical activity that usually decreased. As a result, lower level of activities may decrease the older adults' need for rest or more sleeping hours. This result is supported by Zdanys 2015⁽¹⁶⁾. Widows reported greater levels of overall sleep disturbance, lower sleep quality, and higher day time fatigue levels more than married study subjects according to the present study finding (table 8). This can be clarified by that widows may suffer from the feeling of loss of their partners who provide them with support and help them to face daily life challenges. As a result, the absence of emotional and physical support may induce different levels of fatigue and poor general quality of life inducing poor quality of sleep. Study done at 2013 on older adults who lose their husbands indicated that they suffered from more sleep disturbances and had high level of depressive manifestations⁽¹⁷⁾.

The current study result reveals that higher educational levels and better occupational status prior to retirement are associated with lower levels of overall sleep disturbance, and infrequent suffering of other forms of it (table 8). This might be due to two reasons. The first one is that study subjects who were employee prior to retirement used to have regular schedule for their daily activities such as having fixed time to go to their work, their eating pattern and sleeping time. This routine will become a habit and a part of their life after retirement. So, this will help in sleep-awakening cycle regulation and limiting sleep related disturbance. The second reason is that, the study subjects with higher educational levels may have enough knowledge about healthy life style activities and their impacts on their general health. So, they may become more motivated to engage in these activities to maintain higher levels of wellness and enjoying better sleeping quality. Study done by Ohayon et al 2001 revealed that being active and having better educational and social status are important factors to avoid sleep disorders⁽¹⁸⁾.

The study subjects who are current workers in the present study reported lower levels of overall sleep disturbance and better sleeping patterns (table 8). This might be justified by that, the study subjects who are current workers make more daily effort and have higher level of activities which increase the elders need to sleep and so facilitate falling asleep early. At the same time, most of them are generally independent and may view themselves as productive and able to achieve more of their goals. This will enhance their self-esteem and psychological status which will positively enhance their sleep conditions. This result is congruent with study done 2010 by Phelan et al, who found that greater emotional well-being, sense of personal and environmental control, fewer diseases, and no or mild depression predicted lower levels of sleep disturbance⁽¹⁹⁾. In the present study, enough monthly income is associated with better sleep quality and lower levels of overall sleep disturbance (table 8). This might be due to the fact that enough income enables the individual to have suitable housing conditions that free from noise, have adequate ventilation and sun light and where a comfortable bed for sleep is available. In addition, enough income helps the older adults' attainment of health care facilities to

maintain better health conditions with minimal sleep related problems. This result supports those of another study which revealed that poor economic condition impacts significantly sleep quality⁽²⁰⁾.

The present study result shows that living in rural area is associated with greater levels of sleep disturbance (table 9). This can be justified by that older adults who live in rural area always live with their extended families and with their grandchildren who may represent a source of noise for them. Also, children in the extended families and grandchildren may select to sleep on late hours of night which is not suitable for the elders which may cause frequent sleep interruption and problems in sleep initiation for the study subjects. Moreover, the older adults' homes in the rural area always consist of 2 or 3 floors of living which are nearby the street and the sound of road traffics. This result contradicts another study results that done in 2013 and reported that impaired sleep quality is more common among elderly Chinese who live in urban Shanghai⁽²¹⁾. Quality of sleep is altered among the study subjects who live alone more than those who live with their families (table 9). This might be due to the negative feelings and thoughts which may be associated with living alone. For example, preoccupying with personal health problems, feeling of loneliness, lack of social and emotional support, fear of crimes and to be attacked from others, and fear from death alone. Moreover, decreased day time interactions and activities do not stimulate the need of sleep. The current study result is supported by another research finding⁽²²⁾.

Concerning the relationship between self-rating health and sleep disturbance, study subjects who rate their health as poor, suffer from more several features of sleep disturbance than others (table 10). This can be clarified by that the older adults' subjective evaluation of their health is much more depend on their current abilities, performance, problems, and sometimes their psychological and economical status. So, poor self-rating health may indicate actual poor health status which will negatively affect the study subjects' sleep patterns. The current study result is in accordance with another study finding⁽²³⁾. Nocturnal pain is found to be associated with several features of sleep disturbances among the study subjects (table 10). This can be justified by that, pain is an important source of discomfort for older adults who may be associated with physical and psychological negative outcomes. It may be the first reason to search for medical help among general population. Nocturnal pain may indicate the need for more medications either to induce sleep or to relieve pain and induce more difficult sleep initiation, awakening up during sleep, and greater level of day time fatigue. This is within the same line with the results of another study which noted that poor health conditions such as pain, dyspnea, cough, and frequency that may remain throughout the night are correlated with more sleep disturbance (Bilgili et al, 2012)⁽²⁴⁾.

Regarding the relation between consumption of prescribed medications and sleep disturbances, the present study result shows that consumption of the prescribed medications is associated frequent awakening up during sleep (table 10). This could be due to that, the main consumed medications by the study subjects are for the treatment of diabetes mellitus and hypertension. For illustration, older adults with DM may suffer from nocturnal urination which interrupts their sleep due to the disease pathology. Furthermore, anti-hypertensive drugs such as diuretics may also induce nocturnal urination several times due to the medication side effect. These will result in mid sleep awakening. This result is supported by Martin 2000⁽²⁵⁾. Consumption of multivitamins for nutritional and health improvements is significantly associated with the study subjects' dissatisfaction with their sleep quantity (table 11). This may be related to the side effects of vitamins on gastrointestinal system and bone strength. Vitamin B-12 was found to shorten the length of the sleep-wake rhythm and affects the circadian aspect of sleep propensity in another study⁽²⁶⁾. In contrast, further study has identified vitamin B complex as a helpful management of night-time leg cramps⁽²⁷⁾.

The present study finding reveals that smoking is significantly associated with different forms of sleep disturbances (table 11). This may be justified that consumption of large amount of nicotine may negatively impacts the central nervous system which in turn will affect the stages of sleep among the study subjects. Also, smoking considered an irritant for both respiratory system inducing frequent cough, and urinary system inducing nocturnal urination and frequency. As a result, smokers will not have calm continuous sleeping hours. This is in accordance with Watter et al, 2015 who reported that sleep disturbance may be more common among smokers due to the stimulant effects of nicotine⁽²⁸⁾. With reference to the eating patterns, consumption of irregular meals by the study subjects is significantly associated with more sleep related complains (table 11). This can be justified by that study subjects who consume irregular meals couldn't take the necessary nutritional requirements needed for their body functions. Also, irregular meals may affect the function of the gastrointestinal system causing more digestion related problems such as feeling of heart burn which affect their sleep quality. This is supported by another research that indicated that short duration of sleep is related to high fat and low protein diet, limited vegetables and fruits intake, and diet of poor quality⁽²⁹⁾.

Concerning day time naps, the present study result reveals that study subjects who have day time naps more than one hour experience significant impairment in their sleep quantity (table 11). This might be justified by that naps more than 1 hour per day may decrease the older adults' need to sleep again during night and alter

the sleep-awakening cycle. The present study finding is supported by another study which reported a significant relation between frequent napping and sleep disturbances⁽³⁰⁾.

Moreover, the present study result reveals that consumption of caffeinated beverages before sleep time is significantly associated with several sleep related problems (table 11). This might be justified by the fact that caffeinated drinks act as central nervous system stimulants which increase alertness of the study subjects and affect the levels of the sleep hormones which responsible for sleep initiation. Indeed, they may increase the need for frequent urination during night. The result of another study done at 2013 found that a moderate dose of caffeine 3 hours before bedtime induce sleep disturbance⁽³¹⁾. Less than 1 hour space between dinner and sleep time is significantly associated with several forms of sleep disturbance among the study subjects (table 11). It can be justified by that, going to sleep directly after food intake without enough space of time will affect the process of food digestion and may cause elevation of some gastric content into the esophagus in the flat position due to weak lower esophageal sphincter in old age. So, the older adults may experience discomforts such as heart burn, aspiration, and feeling of food remaining in the esophagus. Sleep disturbances are profound in this situation. The current study result supported by another study finding⁽³²⁾. According to the current study result, practice of physical exercises is significantly associated with lower levels of sleep disturbances (table 11). This might be due to the positive effects of physical exercises on sleeping patterns. For instance, exercises improve all body functions through improving systemic circulation, enhancing mood and emotional status, and promoting social contact with others. Also, physical exercises increase the body's need for sleep and rest during night. This is in accordance with result of another study 2000 which reported that practice of regular exercise is associated with better sleep through several physical and psychological pathways⁽³³⁾.

Regarding study subjects' number of sleeping hours per day, the current study result reveals that sleeping less than 5 hours is significantly associated with several domains of sleep disturbance (table 11). This might be due to that, inadequate sleeping hours may cause greater day time fatigue, decreased alertness, decreased mental concentration, increased irritability and higher emotional instability. So, the study subjects will experience new problems in their next sleeping time again such as difficult falling asleep and frequent awakening during sleep. The current study result supported by another research finding⁽³⁴⁾. The current study finding indicates that suitable sleep environment which characterized by proper ventilation, adequate natural light and sun rays, and minimal levels of noise is significantly associated with lower levels of sleep disturbance (table 12). This may be justified by that, proper ventilation means absence of bad odors and having suitable bedroom temperature. Also, adequate natural light and sun rays in the bedroom help in regulation of the circadian rhythm within the body which is mostly affected by the signals from the environment especially light. In addition, minimal level of noise at the bedroom is necessary to ensure quite, calm, and relaxed sleeping times. It was reported by Bergland, 2013 that exposure to light turns the genes that control an organism's internal clocks "on" and "off."⁽³⁵⁾. Furthermore, the present study finding reveals that changing of bed mattress periodically, less than 10 years, is found to be significantly associated with lower levels of sleep disturbance among the study subjects (table 12). This might be due to the fact that after 10 years, bed mattress may become inefficient and cause back and shoulder pain or stiffness if not changed. So, it will affect the quality of the older adults' bed and sleep. A study done by Jacobson et al, found that medium-firm mattresses decrease different musculoskeletal pains and discomfort, and promote sleep quality⁽³⁶⁾.

The current study finding indicates that disturbance in psychological status of the study subjects which characterized by feelings of sadness, depression, anxiety, or distress, and lower life satisfaction is associated significantly with higher levels of sleep disturbance (table 13). This can be justified by that bad psychological status may result in physical and mental exhaustion of the study subjects. For illustration, they may feel less energetic or motivated, and have frequent suffering from physical pains, fatigue, and poor mental concentration. So, these consequences will negatively affect the sleep patterns of the study subjects. Another study result revealed that Sleep disturbances are common among depressed older persons⁽³⁷⁾.

VII. Conclusion

Based on the present study results, it can be concluded that more than three quarters of the study subjects suffer from significant levels of sleep disturbance. There are many personal and environmental factors associated with sleep disturbance. Personal factors such as female sex, 80 years old and more, widowhood, lower levels of education, lack of work after retirement, inadequate monthly income, poor occupational status, living in rural area, and living alone are associated significantly with significant levels of sleep disturbance. Also, study subjects who have better self-rating health, did not complaint of nocturnal pain, and did not consume any medications have better sleeping patterns.

Greater sleep disturbance is associated significantly with unhealthy life style behaviors such as; smoking, irregular sleeping and eating patterns, having day naps more than one hour, lack of physical exercises, and consumption of caffeinated beverages before bed time.

Calm and well ventilated bed room with adequate sun rays and light and comfortable bed mattress are associated significantly with lower levels of sleep disturbance among the study subjects. Moreover, study subjects with low level of life satisfaction and have negative emotional feelings reported higher levels of sleep disturbance.

VIV. Recommendations

Based on the findings of the present study, the following recommendations are suggested:

- 1- Evaluation of older adults with sleep disturbance should be completed by the gerontological nurse through a comprehensive sleep history and sleep diary when indicated.
- 2- Developing and conducting an educational program by the gerontological nurses to all care providers and older adults themselves about; age related changes in sleeping patterns, factors affecting sleep and how to enhance sleep quality in old age.
- 3- Continuous monitoring and follow up of any deviation in older adults' health status which may affect their abilities to sleep, and institute appropriate nursing interventions accordingly.
- 4- Encourage active participation of the older adults in healthy life style behaviors such as performance of physical exercise and maintaining regular healthy meals in order to promote their sleep quality and to prevent sleep disorders.
- 5- Maintain suitable sleep environment, and help older adults to practice his usual sleeping habits.
- 6- Maintain social contact of the older adults with their significant individuals for gaining their support and to share and express their feelings in order to improve their quality of sleep and quality of life.

The future research in this field could include:

Evaluative studies are needed to test the value of nursing strategies for enhancing sleeping patterns in old age and limiting sleep disturbance.

Table (1): Distribution of the study subjects according to their sociodemographic characteristics

Sociodemographic characteristics	No= 170	%
Sex		
Male	109	64.1
Female	61	35.9
Age		
60 – 69	119	70.0
70 – 79	46	27.1
≥ 80	5	2.9
Mean± SD	66.47 ± 5.74	
Marital status		
Married	122	71.8
Widow	48	28.2
Level of education		
Illiterate	43	25.3
Read and write	25	14.7
Basic education	44	25.9
Secondary	24	14.1
University	34	20.0
Occupation prior to retirement		
Employee	72	42.4
House wife	40	23.5
Skilled worker	34	20.0
Unskilled worker	24	14.1
Current work status		
Yes	40	23.5
No	130	76.5
Monthly income		
Enough	53	31.2
Not enough	117	68.8

Table (2): Distribution of the Distribution of the study subjects according to their living conditions

Living conditions	No=170	%
Place of residence		
Urban	104	61.2
Rural	66	38.8
Living style		
With family	151	88.8
Alone	19	11.2
Caring for dependent family members within the last month		
Yes	23	13.5
No	147	86.5
Living with the care recipient (n= 23)	n= 23	
Yes	23	100.0

Table (3): Distribution of the study subjects according to their health history

Health history	No=170	%
Self-rating health		
Very good	17	10.0
Good	83	48.8
Accepted	10	5.9
Poor	60	35.3
Presence of health problems#		
Diabetes mellitus	110	64.7
Hypertension	92	54.1
Cardiovascular diseases (CAD)	59	34.7
Musculoskeletal diseases (OA)	54	31.8
Centralnervous system diseases (Stroke)	22	12.9
Respiratory diseases	10	5.9
Renal diseases	20	11.8
Gastrointestinal diseases	40	23.5
Lumber disc prolapse	22	12.9
Ophthalmological disorders	12	7.1
Presence of nocturnal pain		
No	31	18.2
Sometimes	46	27.1
Always	93	54.7
Consumption of medications		
No	6	3.5
Yes	164	96.5
Current prescribed consumed medications# for (n = 164)	n = 164	
Diabetes mellitus	107	65.2
Hypertension	93	56.7
Cardiovascular diseases	59	36.0
Musculoskeletal diseases	55	33.5
Centralnervous system diseases	21	12.8
Respiratory diseases	10	6.1
Renal diseases	20	12.2
Gastrointestinal diseases	41	25.0
Lumber disc prolapse	18	11.0
Ophthalmological disorders	11	6.7

More than one answer

Table (4): Distribution of the study subjects according to their life style behaviors

Life style behaviors	No=170	%
Multi vitamins consumption for nutritional and health improvements		
Never	87	51.2
One time per week	15	8.8
More than one time per week	68	40.0
Eating patterns		
Three regular meals	71	41.8
Irregular meals	99	58.2
Sleeping habits		
• Regular sleep schedule		
No	84	49.4
Sometimes	37	21.8
Always	49	28.8

• Day nap more than one hour		
No	60	35.3
Sometimes	60	35.3
Always	50	29.4
• caffeinated beverages consumption before sleep time		
No	62	36.5
Sometimes	36	21.2
Always	72	42.4
• The space between dinner and sleep time		
<One hour-1 hour	75	44.1
Two hours	37	21.8
More than three hours	58	34.1
• Number of sleeping hours per day		
<5 hours	39	22.9
5 – 7 hours	73	42.9
8 – 9 hours	39	22.9
10 hours and more	19	11.2
Practice of physical exercises		
Regular practice	30	17.6
Irregular practice	54	31.8
Practice no exercise	86	50.6
Smoking		
Current smoker	18	10.6
Previous smoker	27	15.9
Non smoker	125	73.5

Table (5): Distribution of the study subjects according to their sleep environment

Sleep environment	No=170	%
Presence of noise		
No	71	41.8
Sometimes	41	24.1
Always	58	34.1
Good ventilation		
No	6	3.5
Sometimes	44	25.9
Always	120	70.6
Adequate sun rays and light in the bed room		
No	4	2.4
Sometimes	48	28.2
Always	118	69.4
The last time to change bed mattress		
< 10 years	60	35.5
≥10 years	110	64.7

Table (6): Distribution of the study subjects according to their psychological status

Psychological status	No=170	%
Feeling of anxiety and distress		
No	25	14.7
Sometimes	39	22.9
Always	106	62.4
Feeling of sadness and depression		
No	28	16.5
Sometimes	67	39.4
Always	75	44.1
life satisfaction		
Min. – Max.	1.0 – 13.0	
Mean ± SD.	7.09 ± 3.79	

Table (7): Distribution of the study subjects according to sleep disturbance

Sleep disturbance domains	No sleep disturbance		Significant levels of sleep disturbance	
	No.	%	No.	%
1- Sleep onset latency	34	20.0	136	80.0
2- Mid sleep awakening	22	12.9	148	87.1
3- Early awakening	67	39.4	103	60.6
4- Quality of sleep	49	28.8	121	71.2
5- Quantity of sleep	110	64.7	60	35.3
6- Excessive daytime sleepiness or fatigue	53	31.2	117	68.8

7- Use of Substance to induce sleep	169	99.4	1	0.6
Overall sleep disturbance	42	24.7	128	75.3

Table (8): The relation between sociodemographic characteristics of the study subjects and sleep disturbance

sociodemographic characteristics	Sleep onset latency	Mid sleep awakening	awakening too early form sleep	Quality of sleep	Quantity of sleep	Day time fatigue	Use of Substance to induce sleep	Overall
	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.
Sex								
Male	4.50 ± 2.66	5.0 ± 2.50	3.67 ± 2.89	13.81 ± 8.35	6.64 ± 4.31	16.77 ± 9.98	2.98 ± 4.28	53.37 ± 23.75
Female	5.49 ± 2.09	5.89 ± 1.94	3.84 ± 2.94	18.33 ± 6.48	7.11 ± 3.60	21.49 ± 8.00	3.97 ± 4.45	66.11 ± 17.32
t(p)	2.649*(0.008*)	2.566*(0.001*)	0.357(0.721)	3.923*($<0.001^*$)	0.764(0.446)	3.371*(0.001^*)	1.420(0.157)	4.013*($<0.001^*$)
Age								
60 – 69	4.97 ± 2.52	5.26 ± 2.35	3.89 ± 2.88	15.02 ± 8.04	6.36 ± 4.06	18.27 ± 9.70	3.22 ± 4.42	56.98 ± 22.97
70 – 79	4.52 ± 2.55	5.39 ± 2.44	3.22 ± 2.97	16.65 ± 8.29	7.65 ± 3.87	19.26 ± 9.69	3.52 ± 4.32	60.22 ± 22.08
≥ 80	5.20 ± 2.05	6.0 ± 1.41	4.60 ± 2.88	14.0 ± 2.74	9.80 ± 4.09	15.80 ± 4.32	4.40 ± 3.21	59.80 ± 13.24
F(p)	0.567(0.569)	0.267(0.766)	1.125(0.327)	0.771(0.464)	3.145*(0.046^*)	0.376(0.687)	0.232(0.793)	0.359(0.699)
Marital status								
Married	4.65 ± 2.56	5.15 ± 2.42	3.63 ± 2.88	13.97 ± 8.11	6.82 ± 4.18	17.01 ± 9.55	3.03 ± 4.10	54.25 ± 22.82
Widow	5.38 ± 2.31	5.75 ± 2.12	3.98 ± 2.98	19.15 ± 6.48	6.79 ± 3.78	22.17 ± 8.65	4.10 ± 4.91	67.31 ± 18.66
t(p)	1.710(0.089)	1.512(0.132)	0.702(0.484)	3.954*($<0.001^*$)	0.040(0.968)	3.254*(0.001^*)	1.449(0.149)	3.847*($<0.001^*$)
Level of education								
Illiterate	5.58 ± 2.27	5.93 ± 1.99	3.86 ± 3.06	18.84 ± 7.54	6.40 ± 3.92	21.12 ± 8.90	3.56 ± 4.09	19.93 ± 3.04
Read and write	5.0 ± 2.53	5.96 ± 1.46	3.88 ± 2.93	15.32 ± 8.80	7.72 ± 3.61	19.60 ± 9.70	4.92 ± 5.17	23.73 ± 4.75
Basic education	5.50 ± 2.19	5.23 ± 2.49	3.82 ± 2.71	16.64 ± 7.78	6.75 ± 3.98	20.11 ± 8.02	3.25 ± 4.75	19.89 ± 3.00
Secondary	4.04 ± 2.37	4.58 ± 2.62	4.08 ± 3.11	13.75 ± 6.95	7.17 ± 4.26	15.92 ± 11.03	3.00 ± 4.28	24.82 ± 5.07
University	3.56 ± 2.72	4.71 ± 2.68	3.09 ± 2.85	10.82 ± 6.83	6.50 ± 4.59	13.94 ± 9.55	2.24 ± 3.29	20.65 ± 3.54
F(p)	4.968*(0.001^*)	2.464*(0.047^*)	0.546(0.702)	5.876*($<0.001^*$)	0.518(0.723)	3.805*(0.005^*)	1.455(0.218)	5.376*($<0.001^*$)
Occupation prior to retirement								
Employee	4.18 ± 2.65	4.64 ± 2.62	3.60 ± 2.88	12.99 ± 7.47	6.44 ± 4.61	15.47 ± 10.16	2.36 ± 3.66	49.68 ± 22.42
Housewife	5.60 ± 2.06	6.15 ± 1.76	3.88 ± 3.01	18.10 ± 7.30	6.85 ± 3.25	21.83 ± 8.51	4.60 ± 4.93	67.0 ± 18.46
Skilled worker	5.03 ± 2.47	5.53 ± 2.15	3.21 ± 2.95	16.62 ± 8.62	8.06 ± 3.32	20.47 ± 8.74	3.56 ± 4.24	62.47 ± 22.71
Unskilled worker	5.38 ± 2.45	5.67 ± 2.14	4.63 ± 2.68	16.63 ± 8.25	6.08 ± 4.33	19.0 ± 8.20	3.83 ± 4.98	61.21 ± 21.0
F(p)	3.447*(0.018^*)	4.177*(0.007^*)	1.217(0.305)	4.389*(0.005^*)	1.537(0.207)	4.825*(0.003^*)	2.259(0.059)	6.651*($<0.001^*$)
Current work status								
Yes	3.98 ± 2.64	4.0 ± 2.72	4.08 ± 2.89	12.88 ± 7.83	5.90 ± 4.04	16.63 ± 9.99	2.0 – 3.31	49.45 ± 23.41
No	5.12 ± 2.42	5.72 ± 2.07	3.62 ± 2.91	16.22 ± 7.93	7.09 ± 4.05	19.03 ± 9.40	3.75 ± 4.56	60.55 ± 21.59
t(p)	2.571*(0.011^*)	3.694*(0.001^*)	0.860(0.391)	2.336*(0.021^*)	1.631(0.105)	1.395(0.165)	2.653*(0.009^*)	2.670*(0.010^*)

Monthly income								
Enough	3.89 ± 2.59	5.08 ± 2.38	3.85 ± 2.97	12.72 ± 7.99	7.40 ± 4.22	15.38 ± 9.56	2.92 ± 4.17	51.23 ± 22.08
Not enough	5.29 ± 2.36	5.43 ± 2.33	3.68 ± 2.89	16.66 ± 7.75	6.55 ± 3.98	19.86 ± 9.27	3.52 ± 4.44	60.98 ± 22.06
t(p)	3.487*(0.001*)	0.905(0.367)	0.361(0.7190)	3.042*(0.003*)	1.265(0.208)	2.894*(0.004*)	0.827(0.409)	2.670*(0.008*)

t, p: t and p values for Student t-test

F: F value for ANOVA test *: Statistically significant at p ≤ 0.05

Table (9): The relation between living conditions of the study subjects and sleep disturbance

Living conditions	Sleep onset latency	Mid sleep awakening	awakening too early form sleep	Quality of sleep	Quantity of sleep	Day time fatigue	Use of Substance to induce sleep	Overall
	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.
Place of residence								
Urban	4.61 ± 2.62	5.07 ± 2.50	3.41 ± 2.93	13.79 ± 8.13	6.16 ± 4.16	16.80 ± 10.26	2.45 ± 4.15	52.29 ± 21.95
Rural	5.24 ± 2.29	5.71 ± 2.04	4.23 ± 2.82	18.02 ± 7.14	7.83 ± 3.72	21.09 ± 7.73	4.73 ± 4.32	66.85 ± 20.41
t(p)	1.619(0.107)	1.837(0.068)	1.792(0.075)	3.459*(0.001*)	2.658*(0.009*)	3.101*(0.002*)	3.426*(0.001*)	4.330*(0.001*)
Living style								
With family	4.87 ± 2.48	5.28 ± 2.34	3.83 ± 2.91	14.88 ± 8.01	6.80 ± 4.12	18.0 ± 9.51	3.38 ± 4.44	57.03 ± 22.73
Alone	4.74 ± 2.84	5.63 ± 2.41	2.95 ± 2.84	19.79 ± 6.75	6.89 ± 3.63	22.16 ± 9.45	3.0 ± 3.71	65.16 ± 19.27
t(p)	0.213(0.831)	0.618(0.538)	1.247(0.214)	2.558*(0.011*)	0.094(0.925)	1.798(0.074)	0.355(0.723)	1.491(0.138)
Caring for others within the last month								
Yes	5.26 ± 2.43	5.39 ± 2.19	3.78 ± 3.13	16.43 ± 7.25	6.26 ± 4.30	17.00 ± 7.17	4.39 ± 4.48	58.52 ± 19.28
No	4.79 ± 2.52	5.31 ± 2.38	3.72 ± 2.88	15.27 ± 8.14	6.90 ± 4.03	18.69 ± 9.89	3.17 ± 4.32	57.85 ± 22.98
t(p)	0.837(0.404)	0.161(0.872)	0.094(0.925)	0.646(0.519)	0.698(0.486)	0.789(0.431)	1.253(0.212)	0.133(0.894)

t, p: t and p values for Student t-test

F: F value for ANOVA test *: Statistically significant at p ≤ 0.05

Table (10): The relation between health history of the study subjects and sleep disturbance

Health history	Sleep onset latency	Mid sleep awakening	awakening too early form sleep	Quality of sleep	Quantity of sleep	Day time fatigue	Use of Substance to induce sleep	Overall
	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.
Self-rating health								
Very good	3.82 ± 2.88	3.76 ± 3.13	3.29 ± 3.06	10.29 ± 7.61	6.06 ± 4.13	13.88 ± 10.24	1.88 ± 3.50	43.0 ± 19.06
Good	4.67 ± 2.35	5.33 ± 2.14	4.02 ± 2.95	14.63 ± 7.39	6.53 ± 4.06	17.78 ± 9.01	3.13 ± 4.27	56.10 ± 20.70
Accepted	3.60 ± 2.88	3.90 ± 2.96	2.70 ± 2.79	10.40 ± 8.11	6.20 ± 3.49	13.0 ± 9.18	1.50 ± 3.47	41.30 ± 25.02
Poor	5.60 ± 2.38	5.98 ± 1.98	3.62 ± 2.82	18.83 ± 7.59	7.52 ± 4.14	21.62 ± 9.28	4.33 ± 4.63	67.50 ± 21.14
F(p)	3.8828*(0.010*)	5.755*(0.001*)	0.859(0.464)	8.536*(0.001*)	1.005(0.392)	5.038*(0.002*)	2.393(0.070)	9.353*(0.001*)
Presence of health problems								
Diabetes mellitus	5.03 ± 2.34	5.36 ± 2.28	3.58 ± 2.78	15.21 ± 7.93	7.14 ± 3.96	18.01 ± 9.65	2.67 ± 3.26	57.0 ± 21.60
Hypertension	5.35 ± 2.24	5.49 ± 2.29	3.57 ± 2.91	16.90 ± 7.32	7.34 ± 3.82	19.46 ± 9.21	3.40 ± 4.34	61.50 ± 20.59
Cardiovascular diseases	5.03 ± 2.31	5.59 ± 1.98	3.75 ± 2.95	16.83 ± 7.22	7.29 ± 4.32	18.05 ± 9.09	3.37 ± 4.46	59.92 ± 20.52
Musculoskeletal diseases	5.44 ± 2.37	5.63 ± 2.11	3.19 ± 2.91	17.13 ± 7.80	6.98 ± 4.05	20.41 ± 8.50	4.44 ± 4.47	63.22 ± 22.84
Central nervous system diseases	5.64 ± 2.24	5.41 ± 2.24	3.86 ± 3.03	16.59 ± 8.52	8.0 ± 2.89	20.09 ± 11.55	1.95 ± 3.21	61.55 ± 22.92
Respiratory diseases	4.70 ± 3.27	4.90 ± 3.38	3.0 ± 3.16	14.30 ± 9.79	5.80 ± 4.32	14.50 ± 10.31	3.60 ± 3.84	50.80 ± 29.83
Renal diseases	4.90 ± 2.59	5.50 ± 2.12	3.75 ± 2.63	15.70 ± 6.88	8.15 ± 3.48	18.25 ± 8.07	2.45 ± 3.05	58.70 ± 17.73
Gastrointestinal diseases	5.10 ± 2.46	5.75 ± 1.89	3.45 ± 2.93	15.20 ± 7.96	6.65 ± 4.29	19.50 ± 8.86	2.70 ± 3.38	58.35 ± 19.83
Lumber disc prolapse	5.50 ± 2.13	6.27 ± 1.61	4.14 ± 2.62	17.82 ± 8.01	8.45 ± 3.36	18.68 ± 8.58	4.41 ± 3.89	65.27 ± 21.61

Factors Associated with Sleep Disturbance Among Community Dwelling Older Adults

Ophthalmologic disorders	5.08 ± 2.50	6.08 ± 1.51	4.25 ± 2.93	20.0 ± 5.59	7.67 ± 3.37	22.58 ± 8.53	3.75 ± 4.94	69.42 ± 20.07
F(p)	0.424(0.922)	0.611(0.788)	0.384(0.943)	0.998(0.441)	0.749(0.664)	0.898(0.527)	1.461(0.160)	1.091(0.368)
Presence of nocturnal pain								
No	3.77 ± 2.57	4.03 ± 2.90	3.13 ± 3.18	10.42 ± 7.62	6.61 ± 3.96	12.23 ± 9.57	2.26 ± 3.02	42.45 ± 21.56
Sometimes	4.57 ± 2.58	5.17 ± 2.41	3.52 ± 2.75	14.35 ± 7.07	6.30 ± 3.98	18.33 ± 9.47	1.37 ± 3.98	53.61 ± 20.08
Always	5.35 ± 2.34	5.82 ± 1.93	4.03 ± 2.87	17.63 ± 7.78	7.13 ± 4.15	20.61 ± 8.75	4.67 ± 4.47	65.25 ± 20.83
F(p)	5.276*(0.006*)	7.357*(0.001*)	1.290(0.278)	11.209*(<0.001*)	0.677(0.510)	9.886*(<0.001*)	11.196*(<0.001*)	15.383*(<0.001*)
Consumption of medication								
No	3.0 ± 2.19	2.83 ± 2.93	3.83 ± 2.79	9.67 ± 5.65	7.17 ± 4.36	14.50 ± 8.34	1.67 ± 2.66	42.67 ± 20.44
Yes	4.92 ± 2.50	5.41 ± 2.28	3.73 ± 2.92	15.64 ± 8.02	6.80 ± 4.07	18.61 ± 9.60	3.40 ± 4.40	58.50 ± 22.39
t(p)	1.854(0.066)	2.688*(0.008*)	0.089(0.929)	1.806(0.073)	0.217(0.828)	1.034(0.303)	0.956(0.341)	1.705(0.090)

t, p: t and p values for Student t-test

F: F value for ANOVA test *: Statistically significant at p ≤ 0.05

Table (11): The relation between life style behaviors of the study subjects and sleep disturbance

Life style behaviors	Sleep onset latency	Mid sleep awakening	awakening too early form sleep	Quality of sleep	Quantity of sleep	Day time fatigue	Use of Substance to induce sleep	Overall
	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.
Multi vitamins consumption for nutritional and health improvement								
Never	4.78 ± 2.58	5.18 ± 2.60	3.90 ± 3.08	15.38 ± 8.67	5.91 ± 4.01	18.64 ± 10.26	3.51 ± 4.81	57.30 ± 24.02
One time per week	4.53 ± 2.36	5.87 ± 1.25	3.80 ± 2.73	14.80 ± 5.51	8.93 ± 3.24	16.87 ± 4.29	3.80 ± 3.41	58.60 ± 10.78
More than one time per week	5.01 ± 2.48	5.37 ± 2.19	3.50 ± 2.73	15.63 ± 7.68	7.50 ± 4.03	18.59 ± 9.54	3.01 ± 3.93	58.62 ± 22.52
F(p)	0.295(0.745)	0.564(0.570)	0.358(0.700)	0.069(0.993)	5.444*(0.005*)	0.228(0.796)	0.334(0.717)	0.072(0.931)
Smoking								
Current smoker	5.89 ± 2.08	5.78 ± 2.02	4.83 ± 2.62	16.44 ± 7.70	6.50 ± 4.53	20.78 ± 8.88	5.0 ± 6.48	65.22 ± 23.99
Previous smoker	4.41 ± 2.26	4.85 ± 2.43	3.26 ± 2.89	10.19 ± 6.83	6.19 ± 4.0	13.52 ± 9.74	1.78 ± 3.12	44.19 ± 19.17
Non smoker	4.80 ± 2.59	5.35 ± 2.37	3.67 ± 2.93	16.42 ± 7.90	6.99 ± 4.03	19.20 ± 9.34	3.43 ± 4.13	59.86 ± 21.89
F(p)	2.009(0.137)	0.890(0.413)	1.692(0.187)	7.396*(0.001*)	0.494(0.611)	4.704*(0.010*)	3.154*(0.045*)	6.920*(0.001*)
Eating patterns								
Three regular meals	4.65 ± 2.53	4.69 ± 2.54	3.32 ± 3.04	13.15 ± 8.70	5.94 ± 3.89	16.34 ± 10.49	2.28 ± 3.52	50.38 ± 22.15
Irregular meals	5.0 ± 2.50	5.77 ± 2.09	4.02 ± 2.78	17.06 ± 7.09	7.43 ± 4.09	19.99 ± 8.57	4.09 ± 4.74	63.36 ± 21.18
t(p)	0.901(0.369)	2.928*(0.004*)	1.548(0.124)	3.114*(0.002*)	2.392*(0.018*)	2.412*(0.017*)	2.723*(0.007*)	3.867*(<0.001*)
Regular sleep schedule								
No	5.55 ± 2.14	5.95 ± 1.97	3.88 ± 2.84	18.55 ± 6.81	7.07 ± 3.76	20.63 ± 8.81	4.25 ± 4.84	65.88 ± 19.11
Sometimes	4.97 ± 2.33	5.51 ± 1.77	3.14 ± 2.82	17.35 ± 5.26	7.32 ± 3.99	21.27 ± 7.0	2.86 ± 3.62	62.43 ± 16.06
Always	3.57 ± 2.78	4.08 ± 2.83	3.92 ± 3.07	8.63 ± 7.63	5.98 ± 4.55	12.63 ± 10.11	2.12 ± 3.63	40.94 ± 23.04
F(p)	10.753*(<0.001*)	11.204*(<0.001*)	0.993(0.373)	35.194*(<0.001*)	1.503(0.226)	14.983*(<0.001*)	4.120*(0.018*)	25.933*(<0.001*)
Day naps more than one hour								
No	4.90 ± 2.58	5.02 ± 2.69	3.92 ± 2.96	14.68 ± 8.79	4.10 ± 3.79	17.82 ± 11.18	3.60 ± 4.92	54.03 ± 25.91
Sometimes	5.17 ± 2.14	5.23 ± 2.17	3.53 ± 2.93	15.22 ± 7.01	7.42 ± 3.33	18.85 ± 8.56	3.40 ± 4.01	58.82 ± 19.02
Always	4.42 ± 2.81	5.78 ± 2.06	3.74 ± 2.86	16.58 ± 8.19	9.34 ± 3.22	18.78 ± 8.72	2.94 ± 4.07	61.58 ± 21.53
F(p)	1.226(0.296)	1.511(0.224)	0.259(0.772)	0.795(0.453)	32.563*(<0.001*)	0.212(0.810)	0.321(0.726)	1.621(0.201)
Caffeinated beverages consumption before sleep time								
No	4.66 ± 2.77	5.08 ± 2.52	2.94 ± 2.90	13.05 ± 8.41	5.97 ± 3.88	14.92 ± 10.86	1.63 ± 3.13	48.24 ± 23.54
Sometimes	4.53 ± 2.44	4.94 ± 2.33	3.83 ± 2.92	13.67 ± 7.34	6.69 ± 4.27	18.47 ± 8.77	2.86 ± 3.89	55.0 ± 20.13
Always	5.18 ± 2.30	5.71 ± 2.17	4.36 ± 2.77	18.36 ± 7.09	7.60 ± 4.01	21.51 ± 7.62	5.04 ± 4.86	67.76 ± 18.45
F(p)	1.097(0.336)	1.785(0.171)	4.195*(0.017*)	9.251*(<0.001*)	2.754(0.067)	8.634*(<0.001*)	11.861*(<0.001*)	15.144*(<0.001*)

t, p: t and p values for Student t-test

F: F value for ANOVA test *: Statistically significant at p ≤ 0.05

Table (11): The relation between life style behaviors of the study subjects and sleep disturbance, continue

Life style behaviors	Sleep onset latency	Mid sleep awakening	awakening too early form sleep	Quality of sleep	Quantity of sleep	Day time fatigue	Use of Substance to induce sleep	Overall
	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.
The space between dinner and sleep time								
<1hour-1 hour	4.93 ± 2.48	6.12 ± 1.75	4.0 ± 2.85	18.07 ± 7.67	7.63 ± 3.78	20.61 ± 8.44	5.05 ± 4.76	66.41 ± 20.93
Two hours	4.78 ± 2.47	4.41 ± 2.66	4.35 ± 2.94	13.76 ± 6.78	7.62 ± 3.96	18.70 ± 7.46	3.03 ± 3.95	56.65 ± 18.11
More than three hours	4.79 ± 2.61	4.86 ± 2.50	2.98 ± 2.85	13.09 ± 8.27	5.24 ± 4.08	15.53 ± 11.35	1.31 ± 2.96	47.81 ± 22.81
F(p)	0.068(0.934)	9.060*($<0.001^*$)	3.170*(0.045^*)	7.954*(0.001^*)	7.046*(0.001^*)	4.836*(0.009^*)	14.105*($<0.001^*$)	12.883*($<0.001^*$)
Practice of physical exercises								
Regular practice	3.50 ± 2.81	4.07 ± 2.79	3.97 ± 3.17	11.47 ± 8.96	5.57 ± 4.44	16.0 ± 10.59	2.77 ± 4.57	47.33 ± 24.97
Irregular practice	4.98 ± 2.32	5.17 ± 2.41	3.26 ± 2.85	13.06 ± 7.66	6.15 ± 3.72	15.59 ± 10.06	1.59 ± 3.06	49.80 ± 21.63
Practice no exercise	5.24 ± 2.38	5.85 ± 1.96	3.94 ± 2.84	18.30 ± 6.80	7.66 ± 3.99	21.13 ± 8.12	4.63 ± 4.58	66.76 ± 18.39
F(p)	5.780*(0.004^*)	7.047*(0.001^*)	1.038(0.356)	13.243*($<0.001^*$)	4.166*(0.017^*)	7.266*(0.001^*)	9.188*($<0.001^*$)	15.901*($<0.001^*$)
Number of sleeping hours per day								
<5 hours	6.28 ± 1.49	6.33 ± 1.54	4.59 ± 2.84	20.33 ± 7.04	6.87 ± 3.95	22.54 ± 9.79	5.69 ± 5.17	72.64 ± 19.66
5-7 hours	4.53 ± 2.48	5.19 ± 2.35	3.74 ± 2.95	13.33 ± 7.49	6.23 ± 4.08	17.52 ± 9.35	2.45 ± 3.29	53.0 ± 21.22
8-9 hours	4.28 ± 2.68	4.59 ± 2.73	3.54 ± 2.70	14.69 ± 7.66	7.72 ± 4.42	16.46 ± 8.99	2.36 ± 3.16	53.64 ± 22.46
10 hours and more	4.32 ± 2.96	5.21 ± 2.32	2.32 ± 2.87	14.95 ± 8.85	7.05 ± 3.31	17.84 ± 9.36	3.89 ± 6.29	55.58 ± 21.01
F(p)	6.067*(0.001^*)	3.967*(0.009^*)	2.783*(0.043^*)	7.438*($<0.001^*$)	1.169(0.323)	3.324*(0.021^*)	6.075*(0.001^*)	8.227*($<0.001^*$)

t, p: t and p values for Student t-test

F: F value for ANOVA test * : Statistically significant at $p \leq 0.05$

Table (12): The relation between sleep environment of the study subjects and sleep disturbance

Life style behaviors	Sleep onset latency	Mid sleep awakening	awakening too early form sleep	Quality of sleep	Quantity of sleep	Day time fatigue	Use of Substance to induce sleep	Overall
	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.	Mean ±SD.
The space between dinner and sleep time								
<1hour-1 hour	4.93 ± 2.48	6.12 ± 1.75	4.0 ± 2.85	18.07 ± 7.67	7.63 ± 3.78	20.61 ± 8.44	5.05 ± 4.76	66.41 ± 20.93
Two hours	4.78 ± 2.47	4.41 ± 2.66	4.35 ± 2.94	13.76 ± 6.78	7.62 ± 3.96	18.70 ± 7.46	3.03 ± 3.95	56.65 ± 18.11
More than three hours	4.79 ± 2.61	4.86 ± 2.50	2.98 ± 2.85	13.09 ± 8.27	5.24 ± 4.08	15.53 ± 11.35	1.31 ± 2.96	47.81 ± 22.81
F(p)	0.068(0.934)	9.060*($<0.001^*$)	3.170*(0.045^*)	7.954*(0.001^*)	7.046*(0.001^*)	4.836*(0.009^*)	14.105*($<0.001^*$)	12.883*($<0.001^*$)
Practice of physical exercises								
Regular practice	3.50 ± 2.81	4.07 ± 2.79	3.97 ± 3.17	11.47 ± 8.96	5.57 ± 4.44	16.0 ± 10.59	2.77 ± 4.57	47.33 ± 24.97
Irregular practice	4.98 ± 2.32	5.17 ± 2.41	3.26 ± 2.85	13.06 ± 7.66	6.15 ± 3.72	15.59 ± 10.06	1.59 ± 3.06	49.80 ± 21.63
Practice no exercise	5.24 ± 2.38	5.85 ± 1.96	3.94 ± 2.84	18.30 ± 6.80	7.66 ± 3.99	21.13 ± 8.12	4.63 ± 4.58	66.76 ± 18.39
F(p)	5.780*(0.004^*)	7.047*(0.001^*)	1.038(0.356)	13.243*($<0.001^*$)	4.166*(0.017^*)	7.266*(0.001^*)	9.188*($<0.001^*$)	15.901*($<0.001^*$)
Number of sleeping hours per day								
<5 hours	6.28 ± 1.49	6.33 ± 1.54	4.59 ± 2.84	20.33 ± 7.04	6.87 ± 3.95	22.54 ± 9.79	5.69 ± 5.17	72.64 ± 19.66
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F(p)	6.067*(0.001^*)	3.967*(0.009^*)	2.783*(0.043^*)	7.438*($<0.001^*$)	1.169(0.323)	3.324*(0.021^*)	6.075*(0.001^*)	8.227*($<0.001^*$)

t, p: t and p values for Student t-test

F: F value for ANOVA test * : Statistically significant at $p \leq 0.05$

Table (13): The relation between psychological status of the study subjects and sleep disturbance

Sleep disturbance	r_s (P)	Feeling of anxiety and distress	Feeling of sadness and depression	Life satisfaction
• Sleep onset latency	r_s	0.140	0.187*	-0.340*
	p	0.068	0.014	<0.001
• Mid sleep awakening	r_s	0.155*	0.095	-0.311*
	p	0.043	0.218	<0.001
• Awakening up too early	r_s	0.222*	0.225*	-0.026
	p	0.004	0.003	0.739
• Quality of sleep	r_s	0.340*	0.368*	-0.494*
	p	<0.001	<0.001	<0.001
• Quantity of sleep	r_s	0.095	0.041	-0.202*
	p	0.217	0.598	0.008

• Day time fatigue	r_s	0.290*	0.338*	-0.463*
	p	<0.001	<0.001	<0.001
• Use of Substance to induce sleep	r_s	0.316*	0.166*	-0.247*
	p	<0.001	0.031	0.001
Overall sleep disturbance	r_s	0.375*	0.376*	-0.537*
	p	<0.001	<0.001	<0.001

r_s : Pearson coefficient

*: Statistically significant at $p \leq 0.05$

References

- [1]. Shochat T, Ancoli S. *Insomnia in older adults*. 6th ed. Philadelphia: Elsevier; 2017.
- [2]. Dew MA, Hoch CC, Buysse DJ. Healthy older adults' sleep predicts all-cause mortality at 4 to 19 years of follow-up. *Psy Med J*. 2003; 65:63-73.
- [3]. Ohayon MM, Carskadon MA, Guilleminault C, Vitiello MV. Meta-analysis of quantitative sleep parameters from childhood to old age in healthy individuals: developing normative sleep values across the human life-span. *Sleep J*. 2004; 27:1255-73.
- [4]. Avidan AY. Sleep in the geriatric patient population. *Neuro J*. 2005; 25(1):52-63.
- [5]. Schmidt S, Peigneux P, Cajochen C. Age-Related Changes in Sleep and Circadian Rhythms: Impact on Cognitive Performance and Underlying Neuroanatomical Networks. *Neuro J*. 2012; 3: 118-27.
- [6]. Foley D, Ancoli S, Britz P. Sleep disturbances and chronic disease in older adults. *Psy Res J*. 2004;56:497-502.
- [7]. Vitiello MV, Rybarczyk B, Von Korff M. Cognitive behavioral therapy for insomnia improves sleep and decreases pain in older adults with co-morbid insomnia and osteoarthritis. *Clin Sleep Med J*. 2009;5(4):355-62.
- [8]. Reid KJ, Martinovich Z, Finkel S. Sleep: a marker of physical and mental health in the elderly. *Geriatr Psychiatry Am J*. 2006;14:860-6.
- [9]. Wood V, Wylie M, sheafor B. An analysis of a short self-report measure of life satisfaction: correlation with rater judgments. *Gero J*. 1969; 24: 465-9.
- [10]. Lee KA. Self-reported sleep disturbances in employed women. *Sleep J*. 1992;15:493-8.
- [11]. Foley D, Ancoli S, Britz P, Walsh J. Sleep disturbances and chronic disease in older adults: results of the 2003 National Sleep Foundation Sleep in America Survey. *Psy Res J*. 2004; 56 (5):497-502.
- [12]. Arber S, Hislop J, Williams S. Introduction: gender, sleep and the life course. *Soci Res J*. 2007;12 (5):218-24.
- [13]. Bliwise DL. Invited commentary: cross-cultural influences on sleep – broadening the environmental landscape. *Epidemiology Am J*. 2008; 168 (12):1365-6.
- [14]. Schubert CR, Cruickshanks KJ, Dalton DS, Nondahl DM. Prevalence of Sleep Problems and Quality of Life in an Older Population The epidemiology of sleep. *Am J*. 2002; 25 (8):48-52.
- [15]. Lindstrom V, Andersson K., Lintrup M. Prevalence of sleep problems and pain among the elderly in Sweden. *Nutr Health Aging J*. 2012; 16 (2): 180-3.
- [16]. Zdanyk KF, Steffens DC. Sleep Disturbances in the Elderly. *Psychiatr Clin Am J* 2015;38(4):723-41.
- [17]. Monk TH, Pfoff MK, Zarotney JR. Depression in the Spousal Bereaved Elderly: Correlations with Subjective Sleep Measures. *Psychiatr Am J*. 2013; 40:38-42.
- [18]. Ohayon MM, Zully J, Guilleminault C. How age and daytime activities are related to insomnia in the general population: consequences for older people. *Geriatr Soc Am J*. 2001;49: 360-6.
- [19]. Phelan CH, Middleton WS, Ryff CD, Brown RL, Heidrich SM. Psychosocial Predictors of Changing Sleep Patterns in Aging Women: A Multiple Pathway Approach. *Psychology and Aging J*. 2010;25 (4):858 – 66.
- [20]. Joseph L, Ramakrishnan T, Nalini S. Sleep Quality among Elderly Residing at Selected Old Age Home at Chennai. *Med Sci Clin Res J*. 2015; 3 (7):6772-7.
- [21]. Luo J, Zhu G, Zhao Q, Guo Q, Meng H, Hong Z, Ding D. Prevalence and Risk Factors of Poor Sleep Quality among Chinese Elderly in an Urban Community: Results from the Shanghai Aging Study. *Sleep med J*. 2013; 8(11):261-6.
- [22]. Troxel WM, Buysse DJ, Monk TH, Begley A, Hall M. Does social support differentially affect sleep in older adults with versus without insomnia? *Psy Res J*. 2010; 69: 459-66.
- [23]. Yoon HS, Yang JJ, Song M, Lee HW, Han S, Lee SA. Correlates of Self-Reported Sleep Duration in Middle-Aged and Elderly Koreans: from the Health Examinees Study. *Psy Res Am J*. 2015; 10(5): 237-40.
- [24]. Bilgili N, Kitiş Y, Ayaz S. Assessment of loneliness, quality of sleep and affecting factors in elders. *Geriatr J*. 2012; 15(1):81-8.
- [25]. Martin J, Shochat T, Ancoli S. Assessment and treatment of sleep disturbance in older adults. *Clin Psy Rev J*. 2000;20 (6): 783-805.
- [26]. Ohta T, Ando K, Iwata T, Ozaki N, Kayukawa Y, Terashima M, Okada T, Kashara Y. Treatment of persistent sleep-wake schedule disorders in adolescents with methylcobalamin (vitamin B12). *Sleep J*. 1991;14:414-8.
- [27]. Chan P, Huang TY, Chen YJ, Huang WP, Liu YC. Randomized, double-blind, placebo-controlled study of the safety and efficacy of vitamin B complex in the treatment of nocturnal leg cramps in elderly patients with hypertension. *Pharmac Clin J*. 1998;38:1151-4.
- [28]. Watter DW, Young TB. The Relation between Cigarette Smoking and Sleep Disturbance 2015. Available at: https://www.researchgate.net/publication/15120103_The_Relation_Between_Cigarette_Smoking_and_Sleep_Disturbance [accessed Apr 7, 2017].
- [29]. Dashti H, Scheer F, Jacques P, Lamon-Fava S, Ordovás J. Short Sleep Duration and Dietary Intake: Epidemiologic Evidence, Mechanisms, and Health Implications. *Adv Nutr J*. 2015; 6: 648-59.
- [30]. Goldman SE, Hall M, Boudreau R, Matthews KA, Cauley JA, Ancoli S, Stone KL, Rubin SM, Satterfield S, Simonsick EM, Newman AB. Association between nighttime sleep and napping in older adults. *SLEEP J*. 2008;31(5):733-40.
- [31]. Drake C, Roehrs T, Shambroom J, Roth T. Caffeine effects on sleep taken 0, 3, or 6 hours before going to bed. *Sleep Med Clin J*. 2013;9(11):1195-200.
- [32]. Kim S, DeRoo LA, Sandler DP. Eating patterns and nutritional characteristics associated with sleep duration. *Public Health Nutr J*. 2011;14: 889-95.
- [33]. Driver HS, Taylor SR. Exercise and sleep. *Sleep Med Rev J*. 2000; 4: 387-402.
- [34]. Tamakoshi A, Ohno Y. Study Group: Self-reported sleep duration as a predictor of all-cause mortality: results from the JACC study, Japan. *Sleep J*. 2004; 27: 51-4.

- [35]. Exposure to Natural Light Improves Workplace Performance, Study links light exposure in the workplace to improved sleep and vitality. Posted Jun 05, 2013. Online available at:
http://www.christopherbergland.com/retrived on 6/3/2017.
- [36]. Jacobson BH, Gemmell HA, Hayes BM, Altena TS. Effectiveness of a selected bedding system on quality of sleep, low back pain, shoulder pain, and spine stiffness. *Manipulative Physiol J.* 2002;25:88-92.
- [37]. Duijn EV, Comijs HC, Berg JF, Waal MW, Voshaar RC, Vander RC. Correlates of sleep disturbances in depressed older persons: the Netherlands study of depression in older persons (NESDO). *Aging & Mental Health J.* 2016;13 (1):1-6.

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