Quality of sleep and changes in the level of blood pressure

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ABSTRACT

Sleep is a naturally recurring state of mind and body in which the main features are the changes in the level of consciousness, reduced sensory and motor activity and reduced interactions with the environment. We need to have adequate sleep to maintain an optimal health and wellbeing. Human beings need to sleep at least 6 hours during night to maintain optimal health. People who are sleeping five hours or less than five hours can alter the level of blood pressure. Sleep promotes general health, concentration and regulates the blood stress hormones and it keeps our nervous system healthy. If a person doesn’t have adequate sleep for a longer period, can change the level of stress hormone in the blood and it can increase the level of blood pressure. This study was done to find out the relationship between quality of sleep and the level of blood pressure among working adults. The descriptive research design was used to assess the relationship between qualities of sleep with the history of changes in the level of blood pressure of working adults. The study was done among the working people who are living in Jazan region. Based on the inclusion and exclusion criteria, a total of 30 participants were selected by using convenient sampling technique. The Quality of sleep of the participants was assessed by using Pittsburgh Sleep Quality Index questionnaire (PSQI). The total number of male participants were 4 and female participants were 26. Majority of them were in the age group between 30 and 40 years, and most of them had a preference for mixed food habits. Majority of them were in the age group between 30 and 40 years, and most of them preferred mixed food habits. Assessment of the quality of sleep of participants shows that overall 60% of the participants have poor sleep quality.

INTRODUCTION

Hypertension is a major leading health problem of the world. The major challenges in the management are difficulties in accurate diagnosis of hypertension and adequate blood pressure control. According to the report, in developing countries the prevalence rate of hypertension is high compared with developed country (Ibrahim, 2018). Adequate sleep and rest is important for normal physiological process. Normally all the people spend one third of their lives for sleeping. Due to
modern life style and to keep pace with it, many changes are made in our life style. Now a days, the normal sleeping hours have reduced considerably. This is supported by the study done in Finland. The self-study report shows that the average duration of sleeping hours is reduced from 15 to 18 minutes over 33 years (Kronholm et al., 2008) and also National Sleep Foundation reports the duration of sleeping hours has declined from 1.5 to 2 hours over the past 50 years (National Sleep Foundation, 2005). These data suggest an emerging trend of reduced sleep, which leads to a growing sleep debt among the general population.

Lack of sleep has long term associated with neurological function like cognitive and attention impairment, reducing of physical ability and skill and decreasing the ability of judgment (Cao and Guillemainault, 2012). Many research studies are done to find out the association between duration of sleep and systemic chronic diseases. The findings show that individuals who sleep for less than five to six hours have a higher risk of hypertension. Another study findings also reports an association between the duration of sleep hours with systemic chronic conditions, including type 2 diabetes, obesity, atherosclerosis, and hypertension. (Ayas et al., 2003; Cappuccio et al., 2007). A cross-sectional study is done to find out the quality of sleep and the factors influencing quality of sleep among adults in Ethiopia. The results shows that 65.4% of the adults have poor sleep quality (PSQI score > 5) and the poor quality of sleep among males is higher proportion (79 (63.0%)) among the age group of 40-49 years (174 (28.6%)). (Berhanu, 2018). Another cross-sectional study is done to find out the sex specific associations of sleep duration with hypertension. According to the multivariate analysis, the participants who are sleeping less than 6 hours have shown significant increase in the risk of hypertension when compared with the participants who are sleeping at least 6 hours and the risk is common among women [OR: 1.66 (1.09 to 2.53)]. (Wang et al., 2015).

MATERIALS AND METHODS

The present study was conducted among 30 working adults in Jazan Region. The descriptive research design was used for the study. The samples which meet the inclusion criteria are selected for the study by using convenient sampling method. This study was conducted after obtaining formal permission from the Head of the institution and to ensure anonymity no name was written in the socio demographic data sheet. The informed consent was obtained from the study participants. The Socio personal data are collected by using the structured questionnaire. The Participants are asked to provide Socio-demographic characteristics such as age, dietary habits and bed time practices are assessed by using the self-administering questionnaire. The level of Sleep quality was assessed by using Pittsburgh sleep quality index scale. It consists of seven components namely subjective sleep quality, sleep latency, sleep duration, sleep efficiency, and sleep disturbances, use of sleep medication and day time sleep dysfunction. Participants were instructed to fill up the questionnaire. The questionnaire was used to collect personal information about the history of fluctuation in the level of blood pressure. The data were analyzed by using descriptive and inferential statistics.

RESULTS AND DISCUSSION

Among the participants who had consented, sixteen of the participants were between 30-40 years and fourteen were between 41-50 years. Similar study was conducted to investigate whether reduced sleep duration was associated with hypertension. Result showed that short sleep duration was significantly associated with hypertension among people aged 18-44 years in northeast China (Li et al., 2018). Regarding dietary habits, 24 (80%) were prepared to take non-vegetarians diet. Nearly half (14) of the participants had no bed time sleep habits like reading books, bath or exercises. Among 30 participants, 40% of them have a history of changes in the level of blood pressure less than 1 year, 37% have the history of changes in the level of blood pressure for 2-3 years and 23% have the history of changes in the level of blood pressure for more than 3 years.

In Figure 1 describes that nearly half (14) of the participants have no bed time sleep habits like reading books, bath or exercises. Figure 2 shows, The global PSQI score of the participants shows that more than 60% of the participants have the score of >5 and it indicates mild problem with sleep quality.

Table 1 shows, that among 30 participants only 6 (20%) were vegetarians and remaining 80% (24) were following mixed food habits

Table 2 shows, Among 30 participants 40% had history of changes in the level of blood pressure less than 1 year, 37% has the history for 2-3 years and 23% are suffering with the history of changes in the level of blood pressure for more than 3 years.

Table 3 describes the PSQI sub score is obtained by the participants. 60% of them expressed fair subjec-
Table 1: Dietary Habits of Participants (n=30)

| Type of Food preferred | Frequency | Percentage |
|------------------------|-----------|------------|
| Vegetarian             | 6         | 20         |
| Mixed food Habits      | 24        | 80         |

Table 2: Frequency and percentage of fluctuation of level of Blood pressure (n=30)

| Duration    | Frequency | Percentage |
|-------------|-----------|------------|
| ≤1years     | 12        | 40         |
| 2-3years    | 11        | 37         |
| ≥3years     | 7         | 23         |
Table 3: Sleep quality based on different components of Pittsburgh sleep quality index (n=30)

| S. No | PSQI Components | Category           | No. of Participants |
|-------|----------------|--------------------|---------------------|
| I     | Subjective sleep Quality | Very good          | 12                  |
|       |                 | Fairly good        | 18                  |
| II    | Sleep Latency  | 0                  | 12                  |
|       |                 | 1-2                | 18                  |
| III   | Sleep duration | 6-7 hours          | 30                  |
| IV    | Sleep efficiency | >80%               | 30                  |
| V     | Sleep disturbances | <Once in a week    | 30                  |
| VI    | Use of sleep medication | Not during the past month | 30      |
| VI    | Day time dysfunction | 0                  | 6                   |
|       |                 | 1-2                | 24                  |

Table 4: Association between quality of sleep and selected demographic variables

| Variable          | Category          | PSQI | Inference |
|-------------------|-------------------|------|-----------|
|                   |                   | >5   | ≥5        | P=0.05    |
| Age               | 30-40yrs          | 4    | 12        | Fishers Exact: 0.7 |
|                   | 51-50yr           | 8    | 6         | TV: 0.46  |
|                   |                   |      |           | Significant |
| Dietary Habits    | Vegetarian        | 2    | 4         | Fishers Exact: 0.93 |
|                   | Non Vegetarian    | 10   | 14        | TV: 0.46  |
|                   |                   |      |           | Significant |
| Bed time sleep    | Bath, Exercise, watching TV | 2    | 4         | Fishers Exact: 3.117 |
| practices         |                   |      |           | TV: 2.37  |
|                   |                   |      |           | Significant |

Table 4 shows the association between quality of sleep and selected demographic variables. Fisher’s exact test was done to find out the association. It was found that PSQI score was increasing and quality of sleep was decreasing with age and it was found to be statistically significant. Similarly participants with mixed food habits had poor sleep quality as compared to vegetarians. Bed time sleep practices like bathing, exercise significantly improved the quality of sleep.

According to the PSQI, sub score was obtained from the participants. 60% of them expressed fairly subjective sleep quality and they obtained a score of 1-2 in case of sleep latency. All the participants were sleeping 6 to 7 hours per night and all of them have a sleep efficiency of >85%. No one is using any medicine for sleep and 80% expressed slight day time dysfunction.

The global PSQI score of the participants shows that more than 60% of the participants have the score of >5 and it indicates a mild problem with sleep quality. This finding was supported by a cross-sectional study was done to find out the quality of sleep and the factors influencing quality of sleep among adults in Ethiopia. The results show that 65.4% of the adults had poor sleep quality (PSQI score > 5) and the poor quality of sleep among males was higher proportion (79 (63.0%)) and age group of 40–49 years (174 (28.6%). (Berhanu, 2018). Another cross-sectional study was done to find out the sex specific associations of sleep duration with hypertension. According to the multivariate analysis, the
participants who were sleeping less than 6 hours had significant increasing risk of hypertension when compared to the participants who were sleeping at least 6 hours and the risk is common among women [OR: 1.66 (1.09 to 2.53)] (Wang et al., 2015).

In our study 30 working people with history of changes in the level of blood pressure were used as a sample for the study. Out of 30 participants, sixteen of them between 30-40 years and 14 were between the age group of 41-50 years. Similar study was conducted to investigate whether sleep duration was independently associated with hypertension. Results showed that short sleep duration was significantly associated with hypertension among people aged 18–44 years in Northeast China (Li et al., 2018).

Regarding dietary habits, 24 (80%) were prepared to take non-vegetarians diet. These findings were supported by the study done to find out the association between fiber and saturated fat with sleep arousals and slow wave sleep. The findings showed that low fibre and high saturated fat and sugar intake is associated with lighter, less restorative sleep with more arousals (St-Onge et al., 2016).

Nearly half (14) of the participants have no bed time sleep habits like reading books, bath or exercises. The similar findings was found in the study done to find out the association between sleep hygiene practices and their relation to sleep quality in medical students of Qazvin University of Medical Sciences. The results showed that out of 285 students, 164 (57.5) of students had poor sleep quality and the study concluded that improper sleep hygiene behaviours may be the reason for poor quality of sleep (Yazdi et al., 2016).

Among 30 participants 40% have history of changes in the level of blood pressure within a year, 37% have the history of changes in the level of blood pressure between 2 and 3 years and 23% is suffering for more than 3 years. These findings were supported by the research study done to assess the effects of insufficient sleep on blood pressure in hypertensive patients. The findings show that the Blood pressure and heart rate significantly increased in the morning, after an insufficient sleep in the night (P < .05) (Lusardi et al., 1999).

PSQI sub score obtained by the participants. 60% of them expressed fair subjective sleep quality and they obtained a score of 1-2 in case of sleep latency. All the participants slept for 6 to 7 hours every night and all of them had a sleep efficiency of >85%. No one was using any medicine for sleep and 80% expressed slight day time dysfunction. The global PSQI square of the participants show that more than 60% of the participants have the score of >5 and it indicates the working people have poor sleep quality. A Similar study is done to evaluate the association between sleep quality, as determined by the Pittsburgh sleep quality index (PSQI), and hypertension in a rural Chinese population. The findings shows that the risk for hypertension in poor sleepers with sub scores over 0 in all of the elements had significantly increased, with ORs ranging from 1.16 (95% CI: 1.04–2.30) to 3.88 (95% CI: 1.24–12.16). The global PSQI score and its components are associated with hypertension and high Blood pressure (Liu et al., 2016).

Fisher’s exact test is performed to find out the association between quality of sleep and selected demographic variables. A significant association was found with the age, dietary habits and bed time sleep practices. This finding was supported by the study done to find out the association between Sleep Duration and Hypertension. The findings show that there was an association between duration of sleep with increased risk of hypertension was present across most age group (Grandner et al., 2018).

CONCLUSIONS

Within the limitations of the present study it can be concluded that poor sleep quality was more prevalent among participants with the history of changes in the level of blood pressure. Pittsburgh sleep quality index is used to assess the quality of sleep and it shows a global PSQI score of more than 5 for 60% of the participants. A large scale study can be conducted with more number of samples and an experimental study can be done to improve the quality of sleep among hypertensive people.

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