

## Sleep Quality Among Elderly Patients with Diabetes

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### Abstract

**Background:** Sleep disturbances are a common problem among patients with diabetes mellitus. **Aim of the study:** Assess sleep quality among elderly patients with diabetes. **Subjects and Methods;** **Research design:** A descriptive design used to accomplish this study. **Setting:** The study was conducted at outpatient clinic and diabetic unit At Al-Ahrar Educational Hospital at Zagazig City in Sharkia Governorate. **Subjects:** A purposive sample of 200 diabetic patients. **Tools of data collection:** Two tools were used for data collection. Tool (I): a structured interview questionnaire included demographic data, medical history, and knowledge scale for data collection. Tool (II): The Pittsburgh Sleep Quality Index (PSQI). **Results:** 86.5 % of the studied elderly patients were having unsatisfactory knowledge. On the other hand, 13.5% of them were having satisfactory knowledge regarding DM. Also, the mean score of sleep medication domain was the lowest between all PSQI domains  $.42 \pm .65$  while the mean score of sleep efficiency domain was the highest  $3.00 \pm .00$ . **Conclusion:** The majority of the diabetic elderly had unsatisfactory level of knowledge about diabetes especially among those who illiterate, farmer, and having insufficient income. Additionally, most of the studied elderly had poor sleep quality and those elderly who were having chronic diseases especially more than two diseases reported poor sleep quality. **Recommendation:** Development of comprehensive simple Arabic printed educational materials such as pamphlets, books for increasing knowledge of the elderly patients about diabetes. Designing awareness programs and counseling sessions for diabetic elderly aimed at updating their knowledge and guiding them to better control of diabetes mellitus.

**Keywords:** Sleep Quality, Elderly, Patients, Diabetes.

### Introduction:

Aging is a physiological process that does not directly lead to disease but causes the occurrence of many physical and mental diseases due to the passage of time and the influence of environmental factors, reduced social relations, the loss of a spouse and family members, and unhealthy lifestyle. In addition to social and economic issues, chronic diseases such as diabetes affect the elderly's quality of life<sup>(1)</sup>.

The geriatric population has been growing rapidly. Globally, the number of people aged 65 or older is projected to grow from an estimated 524 million in 2010 to nearly 1.5 billion in 2050, with most of the increase happening in developing countries. Developing countries are now the epicenter of the aging population whose proportion is set to grow from 60 percent to 80 percent between 2005 and 2050<sup>(2)</sup>.

Diabetes mellitus (DM) is a well-known and concerning public health problem with a high prevalence. It remains a global problem with increasing cases, particularly among the elderly. Physical degradation in elderly people with DM can lead to an increased risk of complications, including death and diminished quality of life<sup>(3)</sup>.

Disturbed sleep is very common, especially among elderly people. Poor sleep has been associated with both central and peripheral insulin resistance, facilitating impaired glucose metabolism and neurodegeneration. Indeed, acute and chronic sleep deprivation may alter glucose and insulin levels<sup>(4)</sup>.

Sleep plays a crucial role in maintaining overall health and well-being, particularly among elderly individuals. However, for those living with diabetes, the relationship between sleep quality and their condition

becomes even more complex. Diabetes, a chronic metabolic disorder characterized by high blood sugar levels, affects numerous bodily systems, including sleep patterns. As the world's population continues to age and the prevalence of diabetes rises, understanding the impact of diabetes on sleep quality among elderly patients becomes increasingly important<sup>(5)</sup>.

The role of nurses is crucial in promoting and addressing sleep quality among elderly patients with diabetes. Nurses play a significant part in the overall care and management of these patients, ensuring their physical and emotional well-being. When it comes to sleep quality, nurses can fulfill several important roles<sup>(6)</sup>.

### **Significance of the Study:**

Diabetes is a significant global challenge to the health and well-being of individuals, families and societies. It is also responsible for 6.7 million deaths in 2021 - 1 every 5 seconds around the world. The significance of good sleep cannot be over emphasized when it comes to chronic medicinal condition like DM. Poor sleep quality, apart from its usual effect of daytime sleepiness, has ramifications that affect every aspects of life. Therefore, the present study will be conducted to assess sleep quality among elderly patients with diabetes.

### **Aim of the study:**

#### **The aim of the study:**

Assess sleep quality among elderly patients with diabetes.

### **Research questions:**

What is the level of sleep quality among elderly patients with diabetes?

### **Subjects and Methods:**

#### **Research design:**

The descriptive design was used to conduct this study.

#### **Study Setting:**

The existing study was conducted at two settings: outpatient clinic and diabetic unit At Al-Ahrar Educational Hospital at Zagazig City in Sharkia Governorate. The

whole ward provides services throughout the day for all age group and for both sexes. The ward is located on the fifth floor in the hospital containing the clinic which consists of awaiting room, nursing staff room, a doctor's room and one bathroom. In addition to the unit which divided to 5 rooms with 10 beds, every room containing 2 beds where the researcher collected data.

### **Study Subjects:**

A purposive sample consisted of 200 elderly patients with diabetes who fulfilled the following criteria:

#### **▪ Inclusion criteria:**

1. 60 years old and more. Able to communicate.
2. Agree to participate in the study.

#### **▪ Exclusion criteria:**

1. Elderly who has communication problems as (speech & hearing problems).
2. Elderly who has psychiatric problems.

### **Tools for data collection:**

Three tools were utilized to collect the required data include:

#### **Tool I: Structured interview questionnaire:**

It was developed by the researcher to collect the necessary data for the study. It was composed of three parts:

**Part one:** Entails data about demographic characteristics of the elderly diabetics: This part was used to assess demographic characteristics of the studied diabetic elderly which included age, marital status, educational level, current working, monthly income, living condition, source & sufficiency of income, and living with whom.

**Part two:** Health profile of the studied elderly patients: This part was intended for collecting information about the medical history of the studied elderly. It involved questions about chronic diseases (e.g., hypertension, renal diseases, respiratory system diseases, heart diseases, liver

diseases and digestive system diseases. In addition to medication, and family history.

**Part three:** Diabetes knowledge questionnaire: It includes questions regarding elderly knowledge about diabetes definition, types, risk factors, sign and Symptoms, causes and complications.

#### **Scoring of knowledge:**

The total number of questions is 9, for each question several correct answers were allotted, each correct answer was allotted one grade with the total grade for all questions 27 and zero for don't know. The knowledge scores were depending on the numbers of grades the participant obtained regarding all questions. The total grade was computed out of twenty-seven (27) grades and knowledge was considered satisfactory if the percent score was 60% or more (>16.2 grade) and unsatisfactory if less than 60% (< 16.2 grade).

#### **Tool II: The Pittsburgh Sleep Quality Index (PSQI)<sup>(8)</sup>:**

The Pittsburgh Sleep Quality Index (PSQI) is a 19-item self-report questionnaire designed to measure sleep quality and disturbances over a one-month period. The first PSQI items ask respondents for their usual bedtime, length of time to fall asleep, usual wake-up time, and duration of actual sleep. The rest of the 15 Likert-type items inquire about the frequency of sleep disturbances and subjective sleep quality within the past month. Each item is rated on a 0-3 scale with 0 indicating no difficulty and 3 indicating severe difficulty.

#### **Scoring system:**

The 19 items are combined to form seven component scores or subscales: subjective sleep quality (item 6), sleep latency (item 2 and 5a), sleep duration (item 4), habitual sleep efficiency (items 1, 3 and 4), sleep disturbances (items 5b to 5j), use of sleep medications (item 7), and daytime dysfunction (items 8 and 9). Component scores range from 0, indicating no problem, to 3 indicating severe difficulties. In addition,

the seven component scores are summed to yield one global score that ranges from 0 to 21 with higher scores denoting poorer sleep quality. The global score has a cut-off of > 5 that has been used to distinguish poor sleepers from good sleepers. Scores < 5 refer to good sleepers; scores > 5 refer to poor sleepers<sup>(8)</sup>.

#### **Content Validity and Reliability:**

Once prepared, the tools were presented to a panel of 3 experts from community health nursing, Obstetrics and Gynecological and medical surgical Nursing at the faculty of nursing in Zagazig University. They assessed the tools for clarity, relevance, application, and comprehensiveness. This constituted the content validation of tools. All recommended modifications were applied.

The reliability of tools was tested by measuring their internal consistency. It demonstrated a good level of reliability with Cronbach's Alpha as follow: knowledge was 0.82 and 0.62 sleep quality which indicates an accepted reliability of the tool.

#### **Field work:**

Once the permission was granted to proceed with the study, the researcher started to prepare a schedule for collecting the data. Each elderly was interviewed individually by the researcher who introduced herself and explained the aim of the study briefly and reassured them that information obtained is strictly confidential and would not be used for any purposes other than research. After that, the oral approval was obtained to collect the necessary data. The researcher used to go to study setting for interviewing the elderly who fulfills the criteria. The study tools were answered by each elderly during the interview, and the time needed ranged from 15 to 20 minutes, according to understanding and cooperation of the elderly. The fieldwork was executed over six months from June 2022 up to the end of January 2023; three days per week (Sunday, Tuesday, and Thursday) from 10.00 Am to 1.00 pm.

**Pilot study:**

Before performing the main study, a pilot study was carried out on 20 elderly from the study setting, constituting about 10% of the calculated sample for the main study. The purposes of the pilot were to test the questions for any obscurity and to assess the practicability and feasibility of using the structured interview questionnaire sheet for the elderly. It also helped the researcher to determine the time needed for filling out the forms, which turned to be 20 to 30 minutes. All of them received a clear explanation for the study purpose. According to the results of pilot study no modification made to the tools. Elderly who shared in the pilot study were involved in the studied sample.

**Administration and Ethical consideration:**

Firstly, the study proposal was approved by the Research Ethics Committee (REC) and Postgraduate Committee of the Faculty of Nursing at Zagazig University. Then, oral informed consent for participation was obtained from each subject after full explanation of the aim of the study. Participants were given the opportunity to refuse participation, and they were notified that they could withdraw at any stage of filling the questionnaire. They were assured that the information would be confidential and used for research purpose only.

**Statistical Analysis:**

Data entry and statistical analysis were done using SPSS 22.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and means and standard deviations and medians for quantitative variables. The Cronbach alpha coefficient was calculated to assess the reliability of the developed tools through their internal consistency. Qualitative categorical variables were compared using a chi-square test ( $\chi^2$ ). Whenever the expected values in

one or more of the cells in a 2x2 tables was less than 5, Fisher exact test was used instead. The Spearman rank correlation was used for assessment of the interrelationships among quantitative variables and ranked ones.

**Results:**

**Table 1** reveals that, the studied elderly's age ranged between 60 and 79 years, with mean  $66.23 \pm 5.29$  years, 73.0 % of them were aged between 60 and 69 years old, with slightly more female (56.5%) who were married (60.5%). In addition, 94%, 75.5%, and 41.5% of the studied elderly weren't currently worked and were live with their family respectively. Concerning income, 56.5% of the studied elderly were depending on the retirement pension.

**Table 2** explains the medical history of the studied elderly. Regarding to the table, 77.5 % of the studied elderly patients were having chronic diseases other than diabetes and the most commonly diseases were hypertension (52.5%), heart diseases (16.0%), and GIT diseases (14.0%). The table also reveals that the mean number of chronic diseases among the studied elderly was  $1.13 \pm .85$ .

**Table 3** explains the diabetes mellitus history of the studied elderly. Regarding to the table, 48.0 % of the studied elderly patients were having DM from less than 1 year to 6 years with mean number of years  $9.31 \pm 7.55$  and 55.5% of them were having family history of DM especially father & mother (37.5%). Additionally, the table reveals that 61.0 % of the studied elderly patients didn't know their medication.

**Figure 1** portrays that 86.5 % of the studied elderly patients were having unsatisfactory knowledge. On the other hand, 13.5% of them were having satisfactory knowledge regarding DM.

**Figure 2** portrays that 86.0 % of the studied elderly patients reported poor sleep quality while, 14.0% of them reported good sleep quality.

**Table 4** reveals that the mean score of sleep medication domain was the lowest between all PSQI domains  $.42 \pm .65$  while the mean score of sleep efficiency domain was the highest  $3.00 \pm .00$ .

**Table 5** reveals no statistically significant relations between the elderly sleep quality and their demographic characteristics.

**Table 6** points to statistically significant relations between elderly's sleep quality, having chronic diseases, and number of diseases ( $p < 0.05$ ). As it is obvious from the table, those elderly who were having chronic diseases especially more than two diseases reported poor sleep quality.

**Table 7** reveals a statistically significant relation between the elderly sleep quality and their functional ability. As it is obvious from the table, those elderly women who needed assistance reported poor sleep quality.

#### Discussion:

Diabetes, as the most common hormone deficiency in the elderly people, can lead to many physical and psychological problems in this population. One of the most common problems caused by diabetes is sleep disorder, which puts patients at greater risk of sleep disorders compared to the normal population. Sleep disorder has been reported to be associated with an increased incidence of diabetes or inadequate blood sugar control in diabetic patients. On the other hand, diabetes may reduce patients' quality of life and increase the risk of functional dependency causing impaired functioning<sup>(9)</sup>.

Sleep is a complex, highly organized biological process essential for the normal functioning of the human body. It is achieved by the coordination of the retina and the thalamic area of the brain. Poor quality of sleep has been reported to have an effect on diabetes and its major microvascular complications such as diabetic retinopathy<sup>(10)</sup>. Therefore, the present study was conducted to assess

sleep quality and functional status among elderly patients with diabetes at Alahrar Educational Hospital.

Regarding total knowledge among the studied elderly patients about diabetes, the current study showed that majority of them was having unsatisfactory knowledge.

The previous finding agreed with a study conducted in Benin by **Alaofè et al.**<sup>11</sup> who showed that most of the studied diabetic patients had poor knowledge about DM. on other hand; this finding disagreed with **Tamornpark et al.**<sup>12</sup> who showed that most of the studied sample had adequate knowledge about diabetes. This discrepancy might be attributed to cultural differences, difference in living standards, and study setting.

Regarding Sleep quality components and items among elderly patients with diabetes, the present study revealed that the subjective sleep quality was fairly good among less than half of them, taking 16 to 30 minutes to fall asleep, and more one third of them were having a trouble sleeping less than once a week. Concerning daytime dysfunction, more than two fifths of the studied elderly were having trouble staying awake less than once a week and about two fifths of them were having only a very slight problem to keep up enough enthusiasm.

This finding consistent with study done in Ethiopia by **Birhanu et al.**<sup>13</sup> who stated that more than half of the studied taking 16 to 30 minutes to fall asleep and having a trouble sleeping less than once a week.

The present study revealed that less than half of the studied elderly patients the sleep duration were 6-7 hours, most of them reported that their habitual sleep efficiency was less and about two thirds of them weren't taking sleep medication during past month. This finding was similar to the studies conducted in Thailand by **Htut et al.**<sup>14</sup> who represented that most of the studied sample weren't taking sleep medication during past month.

Regarding sleep disturbance among elderly patients with diabetes, the current study revealed that the most common causes of sleep disturbance were getting up to use the bathroom three or more times week, having pain once week, difficulty in breathing comfortably, and waking up in the middle of the night or early morning once week.

Likewise, the finding of an Egyptian study conducted in Ain Shams by **Hamza et al.**<sup>15</sup> who reported that most common causes of sleep disturbance were getting up to use the bathroom three or more times week.

With regards sleep quality among elderly patients with diabetes, the present study portrayed that most of the studied elderly patients reported poor sleep quality while, more than one tenth of them reported good sleep quality. This finding might be due to symptoms such as polyuria, urination during night and administration of medication insulin, as major concerns in patients with diabetes mellitus.

These findings were matched with a study carried out in India by **Jesudoss et al.**<sup>16</sup> who demonstrated that two thirds of the studied sample had poor sleep quality.

On other hand, this finding disagreed with study conducted in Malaysia by **Razali et al.**<sup>17</sup> who showed that more than half of the studied sample had good sleep quality. Moreover, study done in Japan by **Narisawa et al.**<sup>18</sup> who revealed that less than two thirds of the studied sample had good sleep quality. These discrepancies might be due to the sleep quality cut-off point of PSQI, a different measurement tool, and sociocultural differences, and that the setting of data collection.

Regarding to Relation between participants' sleep quality and their demographic characteristics, the present study showed that no statistically significant relations between the elderly sleep quality and their demographic characteristics.

This finding was consistent with a study conducted in Iran by **Shamshirgaran et al.**<sup>19</sup> who showed that the same result. Contrary to our results, a, this finding disagreed with study carried out in Poland by **Mikołajczyk-Solińska et al.**<sup>5</sup> who showed that statistically significant relations between the elderly sleep quality and age and gender. Evident it advanced age is one of the most important risk factors promoting sleep dysregulation. Moreover, poor sleep quality in patients with T2DM was associated with female gender. Also, this disagreed with study by **Kheirkhah et al.**<sup>20</sup> who showed that gender which effect on sleep quality. This difference might be due to the characteristics of study populations.

The current study pointed that there statistically significant relation between elderly's knowledge and DM diagnosis history, family history of DM, and knowing their medication. As, those elderly who were having DM from less than one year to 6 years, having no family history of DM, and weren't knowing their medication, were having unsatisfactory knowledge.

On the contrary, this finding disagreed with study carried out in the United Arab Emirates by **Hashim et al.**<sup>21</sup> who showed that the knowledge score did not increase with the number of years since diagnosis.

Regarding relation between participants' sleep quality and their medical history, the current study reported that statistically significant relations between elderly's sleep quality, having chronic diseases and number of diseases. This might be due to comorbidities resulting in poor glycemic control, more chronic complications and increased emotional disorder which can result in disturbed hemostasis and poor sleep quality.

The pervious study results agreed with a study conducted in Singapore by **Chiang et al.**<sup>22</sup> who conducted their study to investigate determinants of poor sleep quality which is an under-diagnosed and under-treated problem in elderly patients with diabetes mellitus, hyperlipidemia and

hypertension and found that statistically significant relations between elderly's sleep quality, having chronic diseases, and number of diseases associated with higher incidence of poor sleep quality.

As well, these findings were agreed with a study carried out in Turkey by **Bayrak & Çadirci**,<sup>23</sup> who found that longer duration of diabetes, and number of diseases were significantly associated with poor sleep quality. As well, the study carried out in Ethiopia by **Jemere et al.**<sup>24</sup> who revealed that comorbidity among diabetic patients' effect on poor sleep quality.

#### **Conclusion:**

**On the light of results of the current study and answer of the research question, it was concluded that** most of the studied elderly had poor sleep quality and those elderly who were having chronic diseases especially more than two diseases reported poor sleep quality. Additionally, there was a statistically significant positive relation between the elderly sleep quality and their functional ability.

#### **Recommendations:**

**In the light of the findings of the current study, the following recommendations are suggested:**

1. Development of comprehensive simple Arabic printed educational materials such as pamphlets, books for increasing knowledge of the elderly patients about diabetes.
2. Educational consultation interventions for improving the quality of sleep and developing preventive and treatment strategies to relieve sleep disorders for diabetic elderly.

**Table (1): demographic characteristics of participants in the study sample (n=200)**

Demographic characteristics	Frequency	Percent
<b>Age:</b>		
60-69	146	73.0
70-79	54	27.0
<b>Mean ± SD Rang</b>	<b>66.23 ± 5.29 (60-79)</b>	
<b>Gender :</b>		
Male	87	43.5
Female	113	56.5
<b>Marital status</b>		
Married	121	60.5
Divorced	17	8.5
Widow	60	30.0
Single	2	1.0
<b>Previous work before retiree:</b>		
House wife	83	41.5
Employee	56	28.0
Farmer	26	13.0
Tradesmen	14	7.0
Crafts	21	10.5
<b>Current work:</b>		
Work [bakery, carpenter, tradesmen & farmer]	12	6.0
Not work	188	94.0
<b>With whom you live:</b>		
With family	151	75.5
Alone	49	24.5
<b>Source of income: @</b>		
Pension	113	56.5
Sons assistants	46	23.0
Properties revenue	24	12.0
Still work	12	6.0
Others [ social assistants]	5	2.5
<b>Treated on state expenses:</b>		
Yes	175	87.5
No	25	12.5

@ Responses are not mutually exclusive

**Table (2): Medical history of participants in the study sample (n=200)**

Medical History	Frequency	Percent
<b>Having any chronic disease than DM:</b>		
Yes	155	77.5
No	45	22.5
<b>Diseases:@</b>		
Hypertension	105	52.5
Kidney & urology	21	10.5
Respiratory	16	8.0
Heart	32	16.0
Liver	22	11.0
GIT	28	14.0
Skin	2	1.0
<b>Others [teeth loss, Parkinson's, rheumatoid]</b>	3	1.5
<b>No. of diseases: n=155</b>		
<b>No disease</b>	45	22.5
≤ 2	144	72.0
> 2	11	5.5
<b>Range</b>		<b>0-5</b>
<b>Mean±SD</b>		<b>1.13±.85</b>

@ Responses are not mutually exclusive

**Table (3): DM history of participants in the study sample (n=200)**

DM History	Frequency	Percent
<b>History of DM disease / diagnosis:</b>		
< 1 year – 6 years	96	48.0
7 years – 15 years	67	33.5
16 years – 40 years	37	18.5
<b>Mean ± SD</b>	<b>9.31 ± 7.55</b>	
<b>Family history of DM:</b>		
Yes	111	55.5
No	89	44.5
<b>Degree of relation: @ n= 111</b>		
Father - mother	75	37.5
Brother - sister	35	17.5
Uncle – aunt	10	5.0
Grandma -pa	13	6.5
<b>Discovering DM / diagnosis:</b>		
Feel signs and symptoms	98	49.0
By Chance	45	22.5
During medical examination	57	28.5
<b>Know the medication:</b>		
Yes	78	39.0
No	122	61.0
<b>Medication name: @</b>		
Insulin	34	17.0
Cidophage	6	3.0
Amyral	19	9.5
Diamacron	2	1.0
Glibophen	1	0.5
Glimet	2	1.0
Insulin & tablet	2	1.0

@ Responses are not mutually exclusive

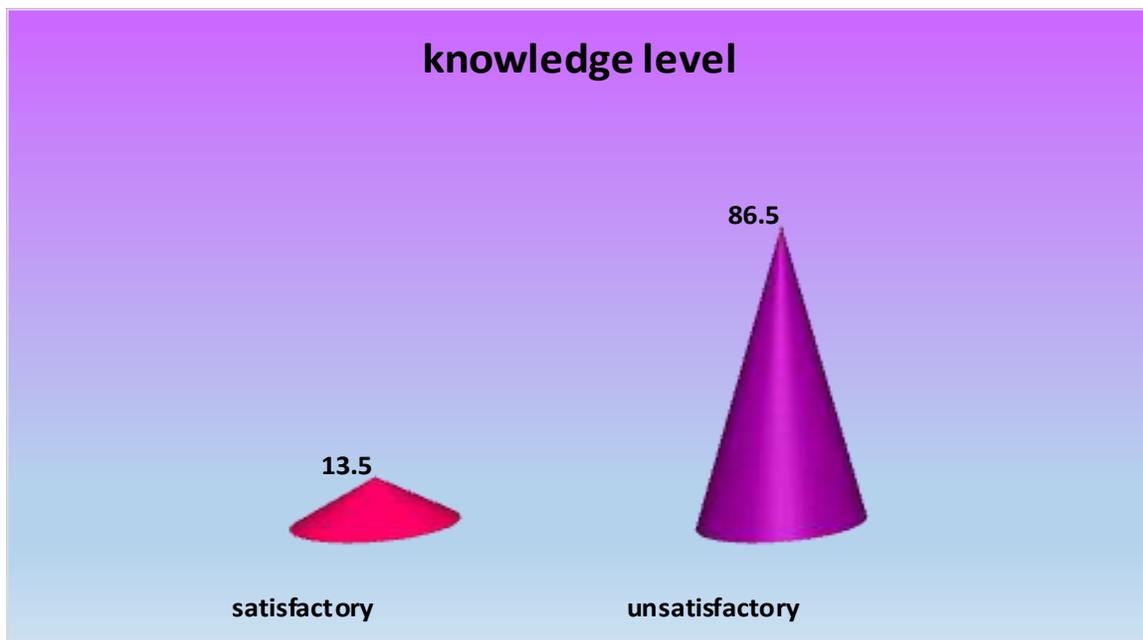


Figure (1): knowledge level among participants in the study sample (n=200)

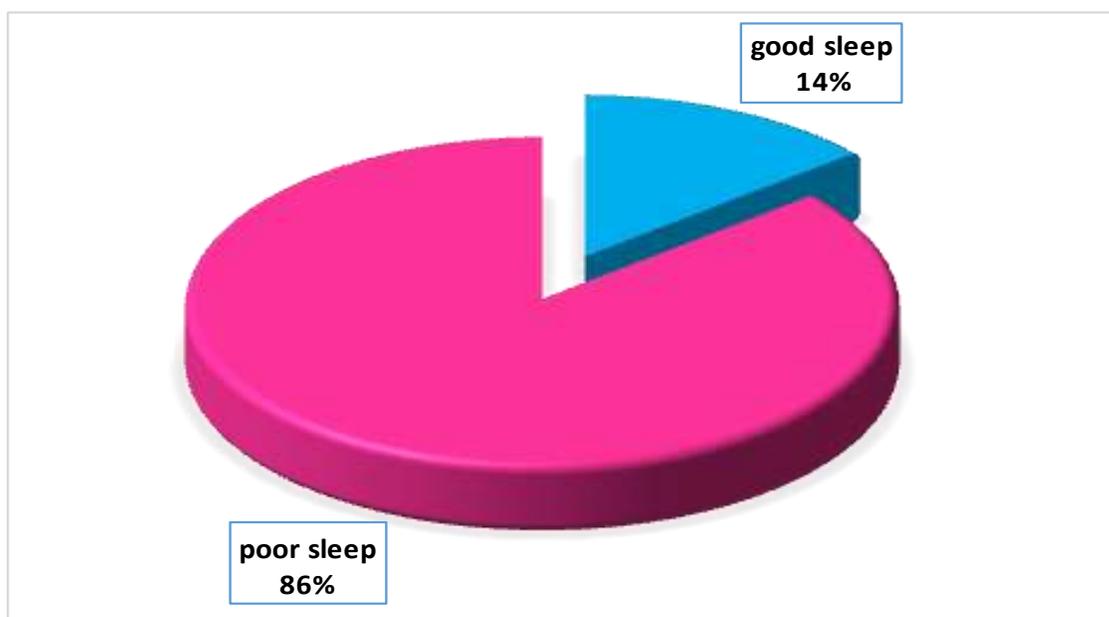


Figure (2): sleep quality among studied participants (n=200)

**Table (5): Sleep quality components and items among the studied participants (n = 200)**

Sleep quality components and items	Frequency	Percent
<b>Subjective sleep quality:Q6</b>		
Very good 0	22	11.0
Fairly good 1	95	47.5
Fairly bad 2	64	32.0
Very bad 3	19	9.5
<b>Sleep latency (min)2: Q2&amp;Q5a</b>		
<b>Q2 time to fall asleep:</b>		
< 15 minutes 0	34	17.0
16-30 minutes 1	90	45.0
31-60 minutes 2	53	26.5
> 60 minutes 3	23	11.5
<b>Q5a trouble sleeping</b>		
Not during past month 0	40	20.0
Less than once a week 1	72	36.0
Once or twice a week 2	61	30.5
Three or more times a week 3	27	13.5
<b>Daytime dysfunction: Q 8 &amp; 9</b>		
<b>Q8 trouble staying awake:</b>		
Not during past month 0	79	39.5
Less than once a week 1	83	41.5
Once or twice a week 2	35	17.5
Three or more times a week 3	3	1.5
<b>Q9 keep up enough enthusiasm</b>		
No problem at all 0	30	15.0
Only a very slight problem 1	79	39.5
Somewhat of a problem 2	66	33.0
A very big problem 3	25	12.5

**Table (4): total mean score of sleep quality domains among the studied participants (n = 200)**

<b>T-PSQI</b>	<b>Mean</b>	<b>SD</b>
<b>Subjective sleep quality</b>	<b>1.40</b>	<b>.81</b>
<b>Sleep latency</b>	<b>1.59</b>	<b>.80</b>
<b>Sleep duration</b>	<b>1.07</b>	<b>.81</b>
<b>Sleep efficiency</b>	<b>3.00</b>	<b>.00</b>
<b>Sleep disturbances</b>	<b>1.07</b>	<b>.81</b>
<b>Daytime dysfunction</b>	<b>1.36</b>	<b>.79</b>
<b>Sleep medication</b>	<b>.42</b>	<b>.65</b>

**Table (5): Relation between participants' sleep quality and their demographic characteristics**

Demographic characteristics	Total sleep quality				X <sup>2</sup> test	p-value
	Good (n=28)		Poor (n=172)			
	No.	%	No.	%		
<b>Age:</b>						
60-69	20	13.7	126	86.3	.821	.501
70-79	8	14.8	46	85.2		
<b>Gender :</b>						
Male	10	11.5	77	88.5	.803	.370
Female	18	15.9	95	84.1		
<b>Marital status</b>						
Married	17	14.0	104	86.0		
Divorced	2	11.8	15	88.2	.446	.931
Widow	9	15.0	51	85.0		
Single	0	0.0	2	100.0		
<b>Education:</b>						
Illiterate	8	10.5	68	89.5		
Read & write	5	15.6	27	84.4		
Basic education	2	8.3	22	91.7	4.87	.432
Preparatory	3	18.8	13	81.3		
Secondary	6	15.4	33	84.6		
University / post graduated	4	30.8	9	69.2		
<b>Previous work before retiree:</b>						
House wife	11	13.3	72	86.7		
Employee	9	16.1	47	83.9	4.326	.364
Farmer	3	11.5	23	88.5		
Tradesmen	0	0.0	14	100.0		
Crafts	5	23.8	16	76.2		
<b>With whom you live:</b>						
With family	22	14.6	129	85.4	.815	.444
Alone	6	12.2	43	87.8		
<b>Income:</b>						
Sufficient:	17	16.0	89	84.0	3.26	.195
Insufficient	10	10.9	82	89.1		
Sufficient and save	1	50.0	1	50.0		
<b>Treated on state expenses:</b>						
Yes	24	13.7	151	86.3	.759	.477
No	4	16.0	21	84.0		

(\*) Statistically significant at  $p < 0.05$

Table (6): Relation between participants' sleep quality and their medical history

Items	Total sleep quality				X <sup>2</sup> test	p-value
	Good (n=28)		Poor (n=172)			
	No.	%	No.	%		
<b>Having chronic diseases:</b>						
Yes	17	11.0	138	89.0	5.26	<b>.022*</b>
No	11	24.4	34	75.6		
<b>No. of diseases: n=155</b>						
No disease	11	24.4	34	75.6	6.44	<b>.040*</b>
≤ 2	17	11.8	127	88.2		
> 2	0	0.0	11	100.0		
<b>History of DM disease / diagnosis:</b>						
< 1 year – 6 years	13	13.5	83	86.5	.655	.721
7 years – 15 years	11	16.4	56	83.6		
16 years – 40 years	4	10.8	33	89.2		
<b>Family history of DM:</b>						
Yes	14	12.6	97	87.4	.399	.528
No	14	15.7	75	84.3		
<b>Degree of relation: @ n= 111</b>						
Father - mother						
Brother - sister	6	8.0	69	92.0	3.58	.058
Uncle – aunt	4	11.4	31	88.6	.233	.629
Grandma -pa	4	40.0	6	60.0	5.91	<b>.015*</b>
	1	7.7	12	92.3	.459	.498
<b>Know the medication:</b>						
Yes	15	19.2	63	80.8	2.91	.088
No	13	10.7	109	89.3		
<b>Carry DM Identification card :</b>						
Yes						
No	20	13.4	129	86.6	.162	.688
	8	15.7	43	84.3		

(\*) Statistically significant at  $p < 0.05$ .

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