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Sleep quality disorders among the people of old and presenile age

Zaburzenia jakości snu wśród osób w wieku starczym i przedstarczym

**Marta Podhorecka¹, Magdalena Cytarska¹, Dominika Gębka¹, Radosław Perkowski¹,
Alina Jaroch², Emilia Siedlecka–Główczewska¹, Remigiusz Sokółowski¹,
Michalina Radzińska¹, Walery Zukow³, Kornelia Kędziora-Kornatowska¹**

- 1. Faculty of Health Sciences, Department and Clinic of Geriatrics, Nicolaus Copernicus University, Toruń, Poland, M. Skłodowskiej-Curie 9, 85-094 Bydgoszcz, Poland**
- 2. Faculty of Health Sciences, Department and Institute of Nutrition and Dietetics, Nicolaus Copernicus University in Torun, Ludwik Rydygier Collegium Medicum in Bydgoszcz, Poland**
- 3. Department of Spatial Management and Tourism, Faculty of Earth Sciences, Nicolaus Copernicus University in Torun, Torun, Poland**

Streszczenie:

Według najnowszych badań na zaburzenia snu cierpi ponad połowa osób w populacji geriatrycznej. Obniżona jakość snu wpływa negatywnie na biopsychospołeczne funkcjonowanie jednostki. Celem badań było określenie wielkości problemu występowania zaburzeń jakości snu u osób starszych. Badania do pracy zostały przeprowadzane za pomocą anonimowej ankiety, która składała się z dwóch kwestionariuszy: Kwestionariusza Jakości

Snu Pittsburgh (PSQI) oraz ankiety własnej konstrukcji. W badaniach wzięło udział 100 osób a ankieta była skierowana do osób po 50 roku życia.. Badania pokazały, że ponad jedna piąta badanych ocenia swój sen na raczej zły oraz wykazano istotne korelacje między wydłużeniem czasu potrzebnego do zaśnięcia a budzeniem się w nocy lub nad ranem czy brakiem energii.

Słowa kluczowe:

sen, osoby starsze, geriatryka

Summary:

According to the newest research over the half of geriatric population suffers from sleep disorders. Lowered quality of sleep has got a negative influence on biopsychosocial functioning of an individual. The aim of the study was to define the magnitude of the problem of sleep quality disorders occurrence in the elderly. The research for the study was carried out by means of anonymous survey which consists of two questionnaires: The Pittsburgh Sleep Quality Index (PSQI) and a survey constructed for the sake of the study. 100 people took part in the study and the survey was aimed at people over the age of 50. The research showed that over one fifth of the subjects assess their sleep as rather bad and significant correlations between lengthening the time needed to fall asleep and waking up at night or before dawn and the lack of energy.

Key words:

sleep, the elderly, geriatrics

Introduction

One of the most common sleep disorders is insomnia, which constitutes 90% of sleep disorders and is characterised by low quality of sleep, which impairs functioning during the day. Poor quality of sleep can be caused by difficulties with falling and staying asleep or a shortened sleep duration. Two main forms of insomnia can be distinguished and they are described below. According to the research, women and the elderly suffer from insomnia most frequently. In the elderly insomnia is connected with the process of ageing, deterioration of physical and mental health and the lack of physical activity [1,2].

Two phases called NREM and REM occur during sleep. NREM phase – non rapid eye movement comprises 80% of sleep duration. In this phase 4 stages are distinguished:

- In the first stage the inflow of external stimulus is limited and it lasts up to 7 minutes. In this stage slow eye movement, decreased muscle tension and eyelid drooping can be observed. This stage is called interim between wakefulness and sleep. The person in this stage can sense watchfulness and hence can wake up easily.
- The second stage is defined as light sleep. During this phase bioelectrical activity of the brain declines. The person falling asleep loses contact with the environment around, muscle tension declines and eye movement slowly disappears.
- The third stage starts after about 10-25 minutes of sleep. This phase is characterised by further decline in bioelectrical activity of the brain and gradual rise of its amplitude.
- The fourth stage is the stage of deep sleep and lasts about 20-40 minutes from falling asleep. In this phase body temperature and blood pressure lowers, heartbeat, breathing frequency and blood circulation in the brain slows down [3, 4].

REM phase is characterised by rapid eye movements and encompasses about 20% of sleep duration. It starts after NREM phase finishes, about 70-90 minutes from falling asleep. The first REM phase lasts about 10 minutes and the following phases last a bit longer. During this phase the activity of brain waves, which resembles watchfulness, changes. Quick and irregular eye movement, full loss of muscle tension in trunk and extremities, body temperature falling to the level of ambient temperature, heartbeat and breathing acceleration can be observed. Dreams occur in this phase [3, 5].

We distinguish short-term insomnia, which lasts shorter than 3 months, however its negative influence on the quality of life is noticeable. It is usually caused by stress factors. Symptoms of short-term insomnia subside when stress disappears or adaptation to a new situation takes place [6].

The second type is chronic insomnia with symptoms occurring at least 3 times a week for a period longer than 3 months. This type of insomnia is caused by inter alia: problems with falling asleep, problems with keeping sleep continuity, waking up too early and unrefreshing sleep. Lengthened sleep latency, that is lengthened time from lying down to falling asleep, lengthens to over 30 minutes. Frequently, the reason is anxiety experienced in the evening hours or being afraid of the next sleepless night. The next problem is waking up at night and staying awake for longer than 15 minutes. Interruption of sleep continuity causes

marked deterioration of its quality and is caused by inter alia: sleep apnea, pain, dyspnea, noise or temperature. Waking up too early is a typical symptom of depression. Person wakes up after 3-4 hours of sleep and is unable to fall asleep again. There are also situations when the sleep duration is proper or even longer than usual, however person wakes up tired. This type of sleep disorder is called unrefreshing sleep [7,8].

The aim of the study

The aim of the study is to assess frequency of sleep disorders occurrence among the people of old and presenile age.

Material and methods

The studied group comprised of 100 randomly chosen people at the age from 50 to 75. The study was carried out by means of anonymous survey consisting of The Pittsburgh Sleep Quality Index (PSQI) (9) and a form constructed for the sake of the study.

Methods of statistical analysis

All the obtained results were input into STATISTICA 13 database. Calculations of basic statistical characteristic were applied to the studied parameters. Numerical amount of answers and percentage share in the population were calculated. The results were presented by means of bar charts. Spearman's rank correlation coefficient was used. Value of $p \leq 0.05$ was identified as statistically significant level. The results of correlation were presented by means of scatterplots. The strength of correlations (R Spearman):

- less than +/- 0.2 - weak correlation (practically no dependence)
- from +/- 0.2 to +/- 0.4 - low correlation (marked dependence)
- from +/- 0.4 to +/-0.6 - moderate correlation (significant dependence)
- from +/- 0.6 to +/-0.8 - high correlation (major dependence)
- from +/- 0.8 to +/-0.9 - very high correlation (very high level dependence)
- from +/- 0.9 to +/-1.0 - practically full dependence

Results

Answers of the interviewees concerning sleep quality

To the question concerning the time needed to fall asleep the most frequently given answer was the scope of 5 to 20 minutes - 53% of the subjects gave such answer. 12% of the subjects need 30 minutes to fall asleep and 9% of the interviewees need 55 minutes. Figure 1 presents the time that the subjects needed to fall asleep in the past 4 weeks.

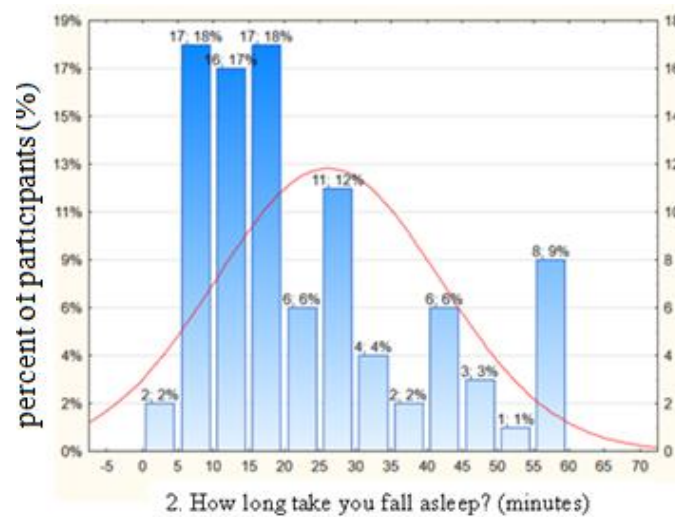


Figure 1. Time needed by the interviewees to fall asleep.

Quality of sleep was defined as good by 49% of the subjects, 23% assessed it as rather bad and 27% - as very good. Figure 2 presents quality of sleep of the subjects in the past 4 weeks.

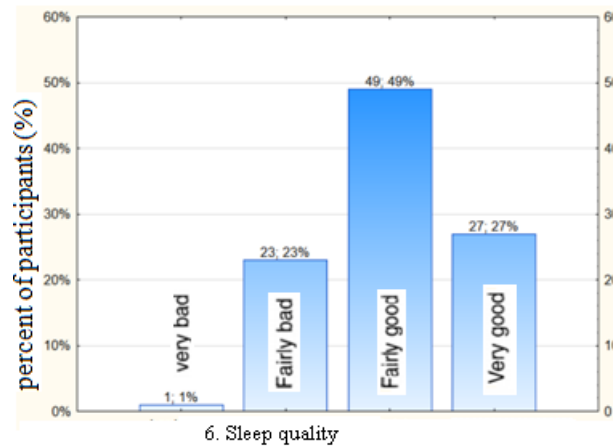


Figure 2. Quality of sleep of the subjects in the past 4 weeks.

The causes and frequency of bad quality of sleep based on The Pittsburgh Sleep Quality Index (PSQI) are presented in the table below. 46% of the subjects reports problems with falling asleep at least twice a week. As many as 46 subjects wake up at night of before dawn twice a week. 46% of the interviewees wake up to visit the toilet at least twice a week. 50% report problems with breathing once a week. 51% are disturbed by cough or loud snoring. Feeling cold woke up 80% of the subjects approximately once a week and too high temperature was a problem for the 48% of the subjects. Bad dreams were reported by 45% - they occurred twice a week. Pain was the cause of sleep disorders for 43% of the subjects and it also occurred twice a week.

Table 1. The causes and frequency of bad sleep quality.

The causes of bad sleep quality:	Frequency rate			
	During the past four weeks not even once	Less than once a week	Once or twice a week	Three or more times a week
Could not fall asleep during 30 minutes	18%	46%	34%	2%
Woke up at night or before dawn	15%	45%	36%	4%
Going to the toilet	13%	47%	31%	9%
Problems with breathing	50%	45%	5%	-
Cough or loud snoring	35%	51%	13%	-
Too cold	80%	32%	8%	-
Too hot	48%	46%	5%	-
Bad dreams	37%	45%	17%	-
Pain	23%	43%	25%	9%
Other reasons	26%	51%	15%	6%

Barbiturates are used by 68% of the subjects and over the half - 56% reported that they use barbiturates less than once a week, 12% once or twice a week. Whereas, 32% do not use barbiturates. Figure 3 presents frequency of using barbiturates during the past 4 weeks.

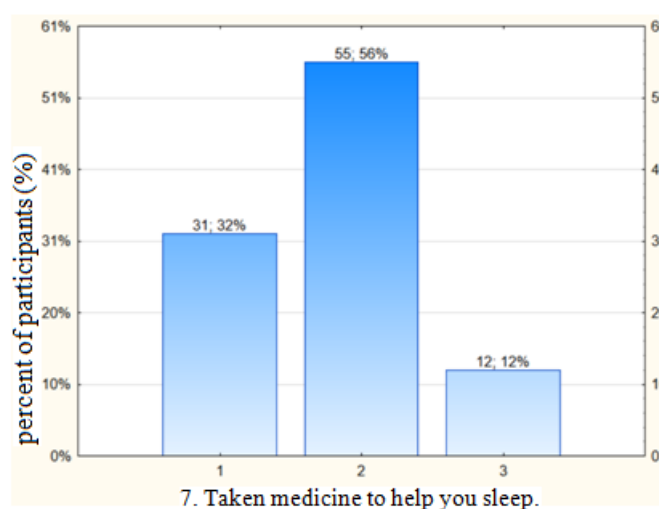


Figure 3. Frequency of using barbiturates during the past 4 weeks.

Problems with staying alert while doing everyday activities once a week were reported by 44% of the subjects, 12% reported having this problem once or twice a week. Good level of staying alert was reported by 44% of the interviewees.

Lack of energy while doing everyday activities once a week was reported by over the half of the subjects – 52% and 37% did not report such problems. The remaining number of 11% have too little energy twice or three times a week. Figure 4 presents frequency of lack of energy occurrence during the past 4 weeks.

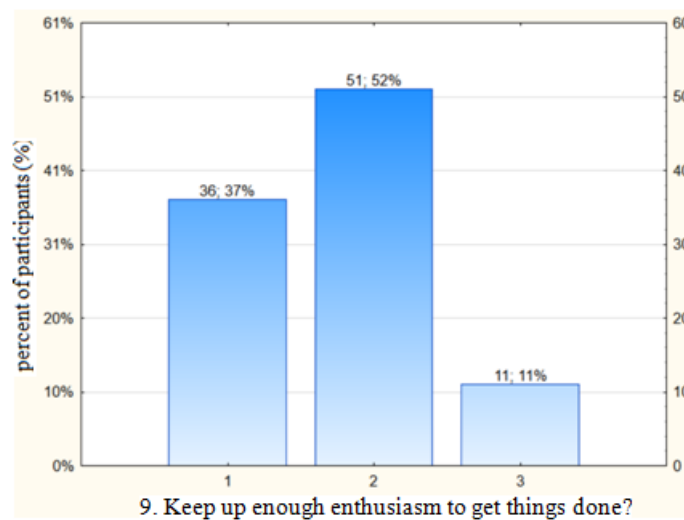


Figure 4. Frequency of lack of energy occurrence during the past 4 weeks.

- **Analysis in regard to age**

Next, correlation of sleep quality parameters in regard to age of the subjects was carried out (Table 2).

Table 2. Spearman's rank correlation [R] of anthropometric data to parameters of sleep quality

Spearman's rank correlation [R] of anthropometric data to parameters of sleep quality	Age
1. Time of going to bed	-0,16
3. Time of getting up	-0,18
5a. Poor quality of sleep: Could not fall asleep during 30 minutes	0,14
5b. Poor quality of sleep: Waking up at night or before dawn	0,05
5c. Poor quality of sleep: Going to the toilet	0,12
5d. Poor quality of sleep: Problems with breathing	-0,02
5e. Poor quality of sleep: Cough or loud snoring	-0,01
5f. Poor quality of sleep: Too cold	-0,05
5g. Poor quality of sleep: Too hot	-0,05
5h. Poor quality of sleep: Bad dreams	0,03
5i. Poor quality of sleep: Pain	0,01
5j. Poor quality of sleep: Other reasons	-0,03
6. Quality of sleep	-0,02
7. Barbiturates	0,10
8. Problems with staying alert	-0,15
9. Lack of energy	0,23*
10a. Snoring	0,07
10b. Pauses in breathing	-0,03
10c. Physiological myoclonus	0,00
10d. State of agitation or orientation disorders at night	-0,04

* *statistical significance $p < 0.05$ for Spearman's rank correlation*

The dependence of age in years and lack of energy was marked and statistically significant ($p < 0.05$) and equalled $R = 0.23$. The dependence means that the older the subjects, the more frequently they experienced lack of energy during the day. The dependence is presented in Figure 5.

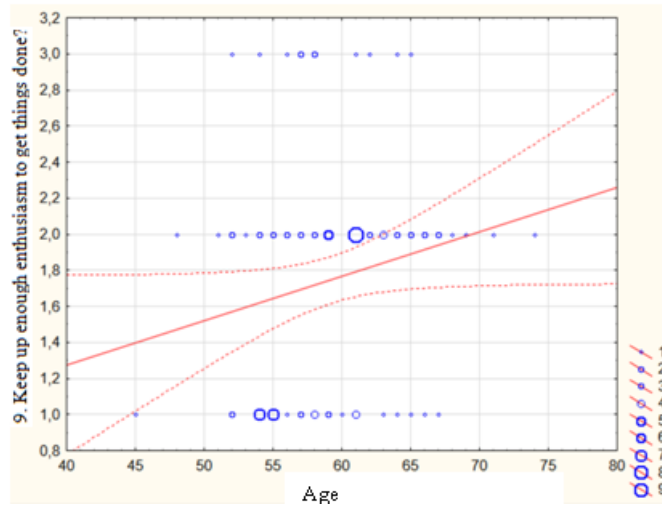


Figure 5. The dependence of age in years and lack of energy during the day, source

3.4.2 Analysis in regard to the time needed to fall asleep and sleep duration

The dependence between the time needed to fall asleep and sleep duration to sleep quality was also assessed (Table 3).

Table 7 Correlations [R] of time needed to fall asleep and sleep duration to sleep quality parameters.

Correlations [R] of time needed to fall asleep and sleep duration to sleep quality parameters.	2. Time needed to fall asleep	4. Sleep duration
1. Time of going to bed	-0,10	0,00
3. Time of getting up	-0,01	0,18
5a. Poor quality of sleep: Could not fall asleep during 30 minutes	0,43*	-0,30*
5b. Poor quality of sleep: Waking up at night or before dawn	0,31*	0,10
5c. Poor quality of sleep: Going to the toilet	0,24*	-0,37*
5d. Poor quality of sleep: Problems with breathing	0,17	-0,12
5e. Poor quality of sleep: Cough or loud snoring	0,13	-0,06
5f. Poor quality of sleep: Too cold	0,19	0,08
5g. Poor quality of sleep: Too hot	0,03	0,00
5h. Poor quality of sleep: Bad dreams	0,15	-0,11
5i. Poor quality of sleep: Pain	0,37*	-0,27*
5j. Poor quality of sleep: Other reasons	0,25*	-0,09
6. Quality of sleep	-0,81*	0,42*
7. Barbiturates	0,05	0,00
8. Problems with staying alert	0,40*	-0,27*
9. Lack of energy	0,57*	-0,18
10a. Snoring	0,45*	-0,54*
10b. Pauses in breathing	0,15	-0,10
10c. Physiological myoclonus	0,09	0,09
10d. State of agitation or orientation disorders at night	0,19	-0,12

* statistical significance $p < 0.05$ for Spearman's rank correlation

The dependence of time needed to fall asleep in minutes and poor sleep quality caused by waking up at night or before dawn was marked and statistically significant ($p < 0.05$) and equalled $R = 0.23$. The dependence means that the longer the time needed to fall asleep, the more frequently the subjects woke up at night or before dawn.

The dependence of time needed to fall asleep in minutes and poor sleep quality caused by pain was marked and statistically significant ($p < 0.05$) and equalled $R = 0.23$. The dependence means that the longer the time needed to fall asleep, the more frequently the subjects woke up at night because of the pain they experienced. The dependence of time needed to fall asleep in minutes to poor sleep quality caused by other reasons means that the longer the time needed to fall asleep, the more frequently the subjects woke up because of other reasons.

The dependence of time needed to fall asleep in minutes and sleep quality was marked and statistically significant ($p < 0.05$) and equalled $R = 0.23$. The dependence means that the longer the time needed to fall asleep, the more frequently the subjects defined sleep quality as rather bad or rather good. The dependence is presented in Figure 6.

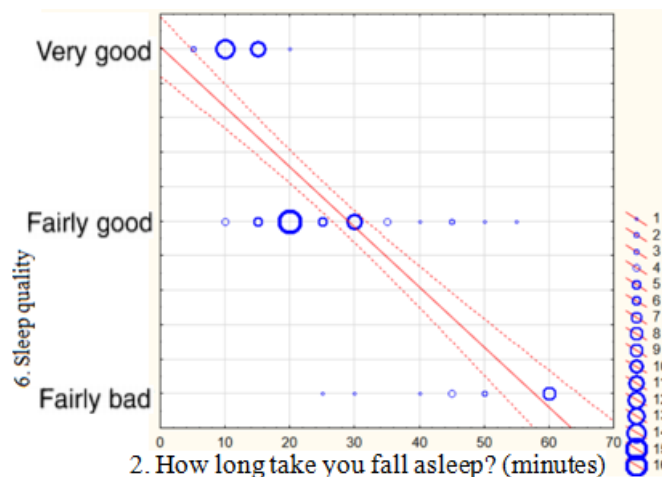


Figure 6. The dependence of time needed to fall asleep in minutes and the sleep quality.

The dependence of time needed to fall asleep in minutes and problems with staying alert was marked and statistically significant ($p < 0.05$) and equalled $R = 0.23$. The dependence means that the longer the time needed to fall asleep, the more frequently the subjects

experienced problems with staying alert during the day. The dependence is presented in Figure 7.

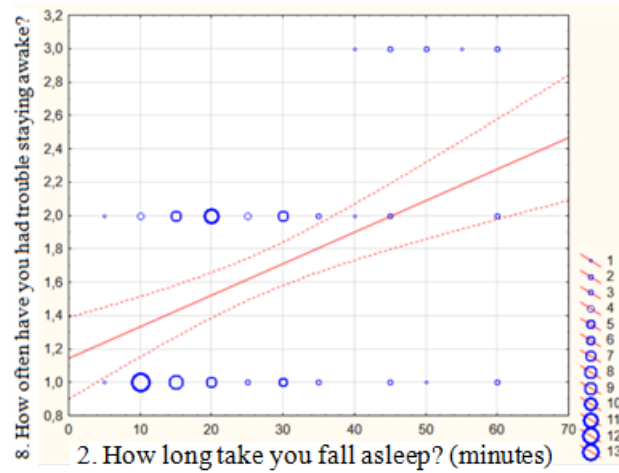


Figure 7. The dependence of time needed to fall asleep in minutes and problems with staying alert during the day.

The dependence of time needed to fall asleep in minutes and lack of energy was marked and statistically significant ($p < 0.05$) and equalled $R = 0.23$. The dependence means that the longer the time needed to fall asleep, the more frequently the subjects experienced lack of energy during the day. The dependence is presented in Figure 8.

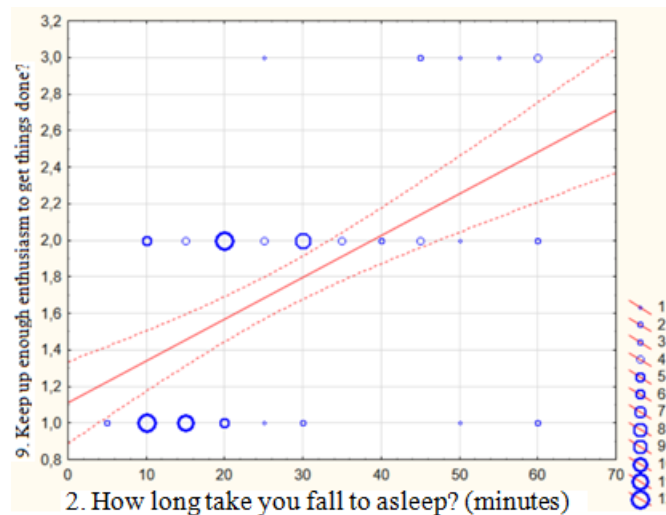


Figure 8. The dependence of time needed to fall asleep in minutes and experiencing the lack of energy during the day.

The dependence of sleep duration in hours to the frequency of not being able to fall asleep during 30 minutes was marked and statistically significant ($p < 0.05$) and equalled $R = 0.23$. The dependence means that the shorter the sleep duration, the more frequently the subjects could not fall asleep during 30 minutes.

The dependence of sleep duration in hours and poor sleep quality caused by going to the toilet was marked and statistically significant ($p < 0.05$) and equalled $R = 0.23$. The dependence means that the longer the sleep duration, the more frequently the subjects went to the toilet.

The dependence of sleep duration in hours and poor sleep quality caused by pain was marked and statistically significant ($p < 0.05$) and equalled $R = 0.23$. The dependence means the shorter the sleep duration, the more frequently the subjects woke up because of pain. The dependence is presented in Figure 9.

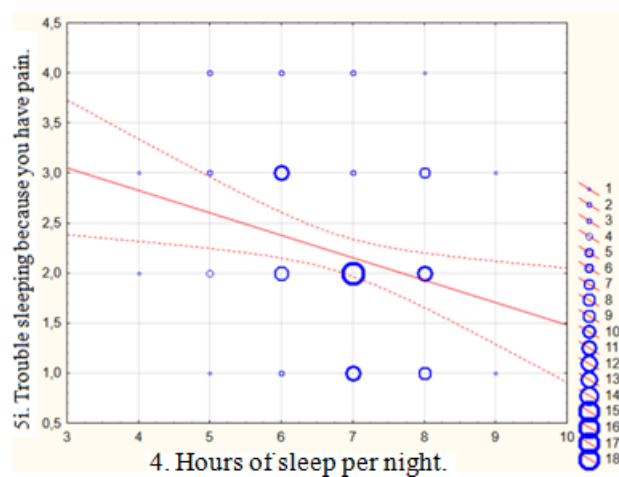


Figure 9. The dependence of sleep duration in hours and poor sleep quality caused by pain.

The dependence of sleep duration in hours and problems with staying alert was marked and statistically significant ($p < 0.05$) and equalled $R = 0.23$. The dependence means that the shorter the sleep duration, the more frequently the subjects experienced problems with staying alert during the day. The dependence is presented in Figure 10.

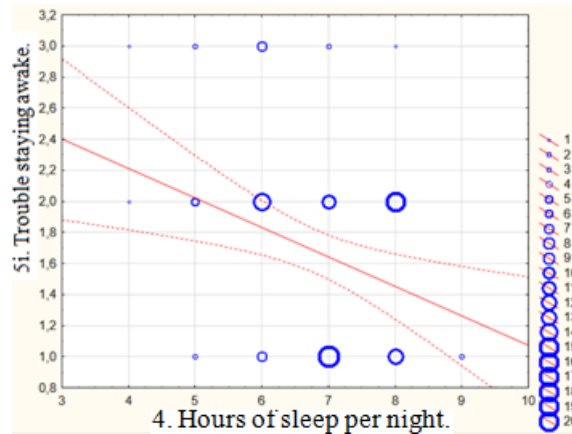


Figure 10. The dependence of sleep duration in hours and problems with staying alert during the day.

The dependence of sleep duration in hours and sleep quality was marked and statistically significant ($p < 0.05$) and equalled $R = 0.23$. The dependence means that when the sleep duration was longer, sleep quality was defined as quiet good or very good.

Discussion and conclusions

Based on the above results, it was stated that people of presenile and old age are at risk of sleep quality disorders, in particular with lengthened time needed to fall asleep and sleep duration. The results are in accordance with studies presented by other authors [10,11,12]. The study showed that the most frequent cause of difficulties with falling asleep is too low temperature in a room, what confirms the observations of other researchers [12]. The study showed that the most common sleep disorders among the subjects were: inability to fall asleep within 30 minutes, waking up at night, nocturia and pain. It is noteworthy that there was no dependence demonstrated between the age of the subjects and deterioration of sleep quality, except the increased loss of energy in patients of older age. The study and studies carried out by other researchers suggest significant problem with sleep quality deterioration among geriatric patients and show the need of continuing the research in this area [13-21].

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