



Factors Affecting the Sleep Quality of the Elderly in Thailand

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Abstract

One of challenging global phenomena is the growth of elderly population which underlines human longevity across the globe. Thailand has emerged and become a society of older persons. Sleep problems are neither uncommon nor inherent of physiological change of ageing process. The elderly health vulnerability and complex evidently derive from one of sleep problems. This research explored and presented sleep problems of the elderly at the national perspective scales. Research objectives were established to examine sleep quality throughout the country and explore correlation between individual factors and sleep quality in the elderly. The established research question asks “How do individual factors affect sleep quality in the elderly in Thailand?” This correlative study was purposely designed to explore the relationship of essential elements of individual factors and sleep quality of the elderly population in Thailand. The stratified sampling method [1] was employed in identifying 400 samplings in 15 provinces of 4 regions across Thailand. The field survey approach engaged the in-depth interview by using a modified PSQI questionnaire [2] whose content validity and reliability was approved by the established Expert Committee. The study results succinctly identified three core elements. The first one is related to individual and personal factors. The majority of samplings occupied age ranges of 65-70 years who are mostly male and married and have adequate income and their own lodgings. Though having some personal medical conditions, the majority of them drink neither alcohols nor caffeine and do not smoke and do not practice physical exercise either. The most disturbing environment factors affecting sleep is noise. The majority of samplings experienced depression and did not perform prayers or meditation before sleep. The second element is related to sleep quality under the PSQI guidelines. It was found that the majority of 315 persons (78.8%) did not have a good sleep quality with the total PSQI scores of greater than 5 points.

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The minority of them or 85 persons (21.2 %) has a good sleep quality with the total PSQI scores of less than 5 points. The third element captures and present the result of hypothesis testing which found that age, marital status, medical conditions, consumption of alcohol and caffeine, physical exercise, disturbing environment, depression with known and unknown causes and practice of prayers and meditation before sleep are correlated with sleep quality of the elderly. Gender has no correlation with sleep quality of the elderly as the good and bad sleep quality of either gender is of proportional results.

Keywords: Sleep quality ; Elderly; Individual factors; PSQI.

1. Introduction

The greying of the nations is a global phenomenon of dramatic growth of older persons as illustrated by the World Health Organization [3]. The United Nations has forecasted that the contemporary century (2001-2100) should become the century of older persons. The longer the people live, the more health risk factors become increasingly challenging. The ageing is inevitably linked with numerous health concerns and the poor quality of sleep knowingly contributes to a number of health issues and reduce quality of life of older persons. As emphasized by Hodgson [4] that human health is generally dependent on the balance between rest and activities and the best rest sleep. To which one third of human time is dedicated to sleep. A number of biological and mental conditions, e.g., depression, anxiety, heart disease, diabetes, arthritis, side effects of medicine and other causes of pain, etc. may affect sleep behavior of older persons. Sleep is physically and mentally the physiological stage of full rest. In the course of sleep, physiology is back to balance stage, e.g., heart beats and pulses, all types of hormones while daily data is compiled to store in the memory. The human mind is thus relaxing and physically overcomes a number of issues. Inadequate sleep causes fatigue and inefficiency in performing daily activities.

Thailand has reached the stage of aged society whose population at age 60 and over is higher than 20% of the total populations and become one of the world's rapidly aged society. TDRI [5] commented that Thailand is ageing fast, faces multitude of challenges and stands at a crossroad. The average life expectancy is 75 years which becomes a longevity society, though it should promote the older and the healthier simultaneously. A number of previous studies focused on specific issues, groups and locations related to sleep problems of the elderly.

Research problem, objectives/purpose of study

The research places emphasis on the study of factors affecting sleep quality in the entire elderly population of Thailand in ascertaining and obtaining the broad national perspectives differing from previous studies whose focus is scoped at specific issues, groups and locations of the elderly. It is hypothesized that sleep quality in the elderly correlates with individual factors which are inclusive of gender, age, marital status, income adequacy, physical diseases, physical exercises, smoking, drinking alcohol and caffeine, environmental factors and lodging as well as depression. The established research question is how individual factors affect and correlate with sleep quality in the elderly in Thailand. The research objectives were to examine the sleep quality in the

elderly throughout the country and explore correlation between individual factors and sleep quality.

Theory, concept and conceptual framework

The study extensively explored concepts and theories related to ageing, sleep and sleep quality which constitute, contribute and encompass thorough elements in establishing the conceptual framework.

a) Concept and theory of ageing

There is yet no universally common definition of ageing. Concepts and theories of aging have been broadening and encompassing in several dimensions. Mark Stibich [6] elaborated that aging is a complex process of genetics, chemistry, physiology and behaviour. Simultaneously there prompts other emerging theories explaining the human aging process, e.g., Programmed Theories of Aging; Error Theories of Aging; Genetic Theory of Aging and Biochemical Theory of Aging and so on. As initiated and presented by Denham Harman [7] which is related to physiological dimensions, i.e., Free Radical Theory of Aging and Mitochondrial Theory of Aging which has played a vital role in determining human lifespan.

b) Concept and theory of sleep

Sleep is perceived as a process along the line with rhythms of other physiological functions. Essentially when one sleeps, the consciousness and stimulant responses as well as physiological movement are at the minimum level or even in absence. There is a sleep/wake cycle covering the period of 1 day or 24 hours which is known as circadian rhythm or biological clock. The relationship between aging and sleeping is inevitably intertwined. This study takes into account of identified sleep theories inclusive of the Active Theory of Sleep. Hodgson (4) underlined that sleep is a functioning process of some groups of neuro-cells and further describes the stages of sleep, i.e., NREM, REM.; E.B. Ezenwannee (8) presented the Restorative Theory of Sleep and explained that sleep served as a behavioral state of the body to save energy by lowering our body metabolism. The Evolutionary Theory of Sleep or Adaptive Theory of Sleep which was also presented by E.B. Ezenwannee [8] emphasized that periods of activity and inactivity are the process of energy conserving. The physiology adapts to sleep at the time of hazard for wakefulness.

c) Sleep quality

There is yet no established definition of sleep quality, though widely used in sleep medicine. Barsocchi (2019) explained that sleep quality is related to health, balance effects, satisfaction, etc. which is of related to sleepiness rather than sleep quantity. Sleep quality is focused on the role of sleep in daily life. His research places focus on the age of target population in studying impact of sleep quality which was concluded that growing old affects characteristics of sleep habits inclusive of pattern, duration and quality of sleep.

There is yet another term of sleep hygiene which is a term to describe good sleep habits associated with insomnia and relevant treatment and therapy approaches. Hannh Peach and his colleagues [9] applied the Sleep Hygiene Practice Scale (SHPS) measuring practices of daily life activities and sleep habits impacting sleep in

four areas, i.e., arousal behaviours, sleep scheduling and timing, eating/drinking behaviours and sleep environment. M.D. Gellman and J.R. Turner [10] elaborated that sleep quality is vitally defined by clinicians and researchers due to high prevalence of disturbed sleep and insomnia. The definition of sleep quality continues to be expansive in according to research and clinical topics related to research findings and clinical treatment of sleep disorders, sleep problems and relevant sleep elements.

2. Literature review of previous studies

The researcher undertook extensive literature review of previous studies on determined relevant main topics concerning ageing and sleep in the elderly both foreign and Thai literatures. It was identified that the focus of previous studies was concentrated on particular topics, specific samplings and locations for purposes of treatment and planning management of elderly samplings in selected communities and hospitals of studies. Instead this study encompassed and presented the results of the national scale of the entire elderly population in Thailand.

Conceptual framework

Taking into consideration of described concepts and theories, the conceptual framework is established to guide this research.

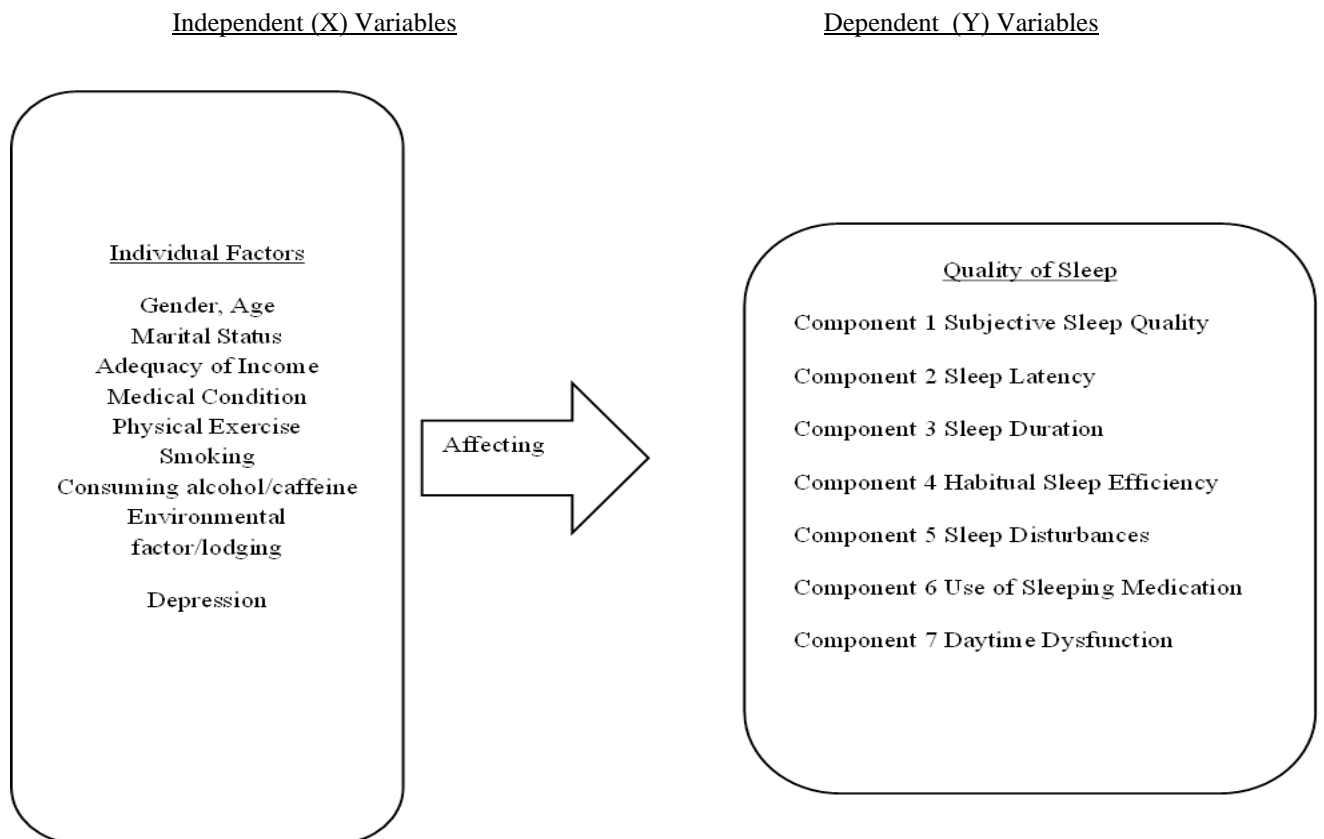


Figure 1

The conceptual framework illustrates the correlation between two groups of variables. The group of independent variables is the essential individual factors which are of personal particulars and characteristics. This study examined the correlation between independent variables and dependent variables which are composed of established components of sleep quality.

Research methodology

This quantitative research applied a descriptive statistical approach enabled to report basic features of study data and summarized samples and measured of findings.

a) Population and Sample Size

The research population is based on the total older persons of 11,135,069 persons in Thailand on the 31st December 2019 officially published by the Department of Older Persons. The research population applied the formula of Taro Yamane (Yamane 1973).

$$n = \frac{N}{1 + NE^2} = \frac{11136059}{1 + (11136059 \times 0.05^2)} = 399.9 \approx 400$$

n = sample size required

N = people size

e = allowable error 5% (0.05)

Given the size and scattered location distribution of samplings, the Stratified Random Sampling was employed in identifying the research samplings. The older persons were grouped by provinces and region, i.e., Middle, North, Northeast and South and simultaneously categorized by the population size of small, medium and large which the statistical Range was engaged.

b) Research tools and ethics

The primary research tool is the modified Pittsburgh Sleep Quality Index (PSQI) Questionnaire which is the validated Thai version used in previous numerous studies. For this specific research, the PSQI questionnaire was modified as advised by the research panel, evaluated and verified under the process of Item Objective Congruence (IOC) yielding the scores of 0.67-1.0 and Cronbach's reliability at 0.812. The results were in the acceptable and reliable standards of research tool verification. The research proposal together with the modified questionnaire was authorized by the Human Research Ethics Committee of Dhurakij Pundit University under the reference of COE no.125/64 dated 5 July 2021.

c) Data Collection and analysis

The data collection process took place amidst the peak of Covid-19 pandemic, the data collection team was designated to each target community area under the guidance and cooperation of community leaders and health guidelines.

The analysis of research data was undertaken in two steps, i.e., firstly analysis of primary data of samplings by employing descriptive statistics, e.g., frequency, percentage, means, standard deviation and secondly the hypothesis testing by employing Chi-square test.

Results

a) General individual profiles

The 400 individual samplings are inclusive of residents in Bangkok and 14 provinces. The majority of samplings are male and married with age range of 60-70 years who have adequate living income and mostly possess medical conditions. They drank no alcohols, no caffeine and no smoking, though the majority neither regularly practice physical exercise nor perform prayer and meditation regularly. Noise pollution and negative feelings were the most disturbing factors affecting their sleep quality. The statistical significance is set at the level of 0.05. Almost all individual factors statistically affect the sleep quality, i.e., age, marital status, medical condition, alcohol consumption, physical exercise and noise disturbing. The profiles of age ranges are hereunder reflected in the graphic bar chart.

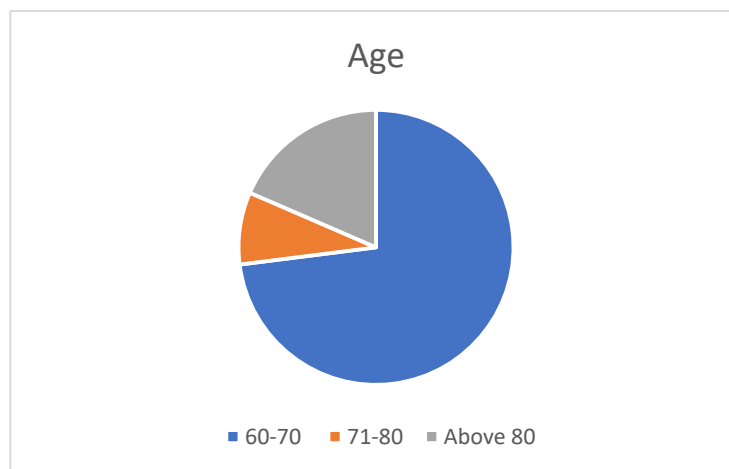


Figure 2

b) Troubling sleep habits

The majority of 328 persons (82%) made a self assessment that they had fairly bad sleep quality. While there are 68 persons (17%) experienced good sleep, though only 4 persons (1%) reported very bad sleep quality which they did not appear to satisfy with their sleep quality. The majority with 107 persons (26.80%) went to bed at 2100 hrs. and the minority group of 9 persons (2.30%) went to bed at 2400 hrs. It is interesting to note that their sleep or bed time of the elderly tend to be varied and tend to go to bed between 2200-2300 hrs. which is

quite late. This indication may impact their sleep quality.

The element of how long it took to fall asleep each night whose response showed 177 persons/44.30% required 30 minutes to fall asleep. The minority group requires only 10 minutes to fall asleep which could imply that the samples took quite substantial time to actually fall asleep. This habit may correlate with the overall sleep quality. The majority of 255 persons/63.70% woke up at 0500 hrs. The minority group of 7 persons/ 1.80% got up at 0400 am. Despite their response of late bed time in the other question, the majority woke up early between 0500-0600 hrs. None woke up later than 0700 hrs. The sleep duration each night of the majority of 187 persons/46.80% is 8 hours. The minority group of 1 person /0.10% took 5 hours of sleep. The indication of total sleep hours may support the quality of sleep, though it is also required to take into consideration of other factors.

c) Sleep problems/sleep latency

The analysis results provide another dimension of sleep problems impacting sleep quality of elderly samplings in which are reflected in the below bar charts.

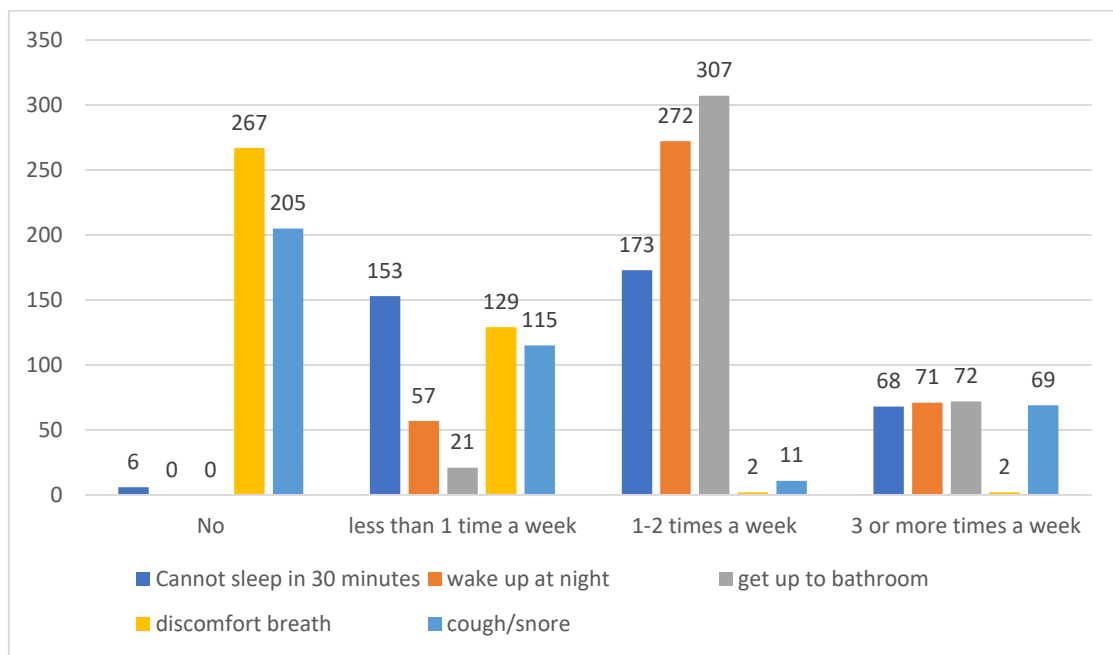


Figure 3: Statistical Bar Chart showing sleep latency profiles

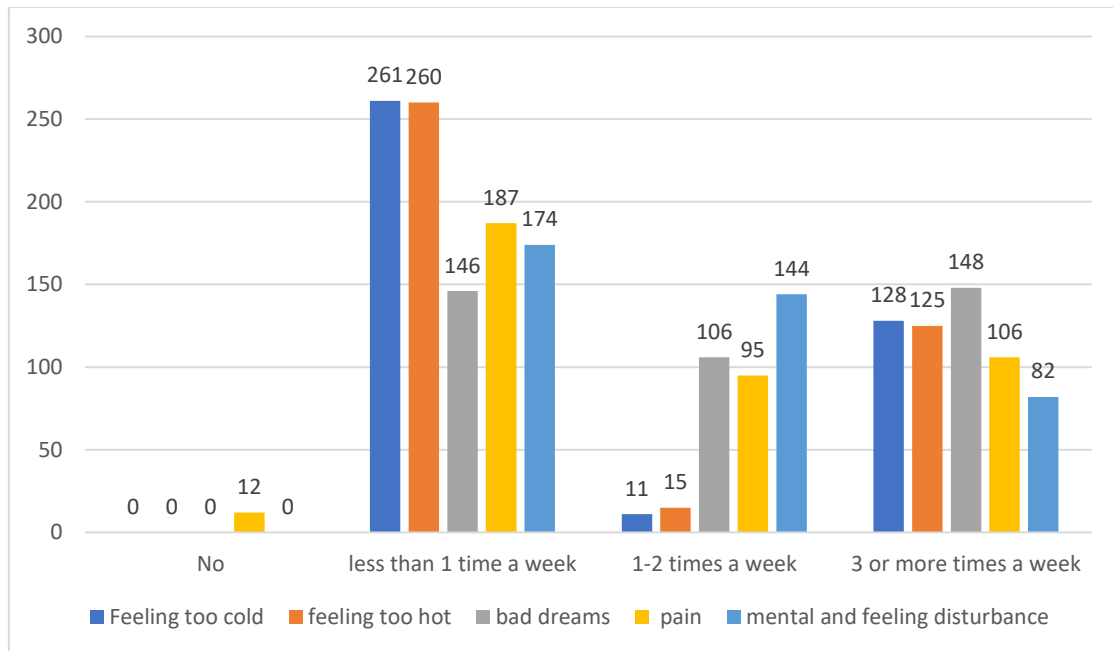


Figure 4: Statistical Bar Chart showing sleep latency profiles

- a) Cannot fall asleep within 30 minutes. The majority of samples with 173 persons (43.3%) could not fall asleep within 30 minutes experienced this problem 1-2 times in a week. The minority group of 6 persons (1.5%) could fall asleep within 30 minutes. The majority of samples could not fall asleep within 30 minutes, though the result is contrary to the minority group. Therefore, the inability to fall asleep within 30 minutes is a sleep problem correlating with sleep quality.
- b) Wake up at night with frequency. None of samplings slept through or never woke up at night. The majority of 272 persons (68%) woke up 1-2 times in a week. The minority group of 57 persons (14.3 %) woke up less than one time in a week. This individual factor in waking up at night is not uncommon among the elderly samplings.
- c) Get up to use bathroom. The habit of getting up to use bathroom at night became one of sleep problem factors among the elderly samplings. The majority with 307 persons (76.8%) got up to use bathroom 1-2 times in a week. The minority group of 21 persons (5.3%) got up to use bathroom less than 1 time in a week. This factor is inevitable a cause of sleep problems ompromising sleep quality
- d) Cannot breathe comfortably. The known factor of uncomfortable breathing while sleeping is one of sleep problems. The majority of 267 persons (66.8%) did not have this breathing problem. The minority of 2 persons (0.5%) had this problem 3 or more times in a week. The breathing discomfort persisted but the symptom only experienced by the minority groups.
- e) Cough or snore loudly. The majority of 205 persons (51.3%) did not cough or snore during sleep at night. The minority group of 11 persons (2.8%) coughed and loudly snored 1-2 times in a week. Given the results, the majority of samplings did not experience this particular sleep problem in the past one month.
- f) Feel too cold. All samplings felt too cold while sleeping at night, though frequency of experiences is different. 261 persons (65.3%) felt too cold less than 1 time in a week. The minority group of 11 persons (2.8%) felt too cold 1-2 times in a week. Feeling too cold is a factor impacting sleep quality, though none

of samplings felt too cold in the past one month.

- g) Feel too hot. All samplings never felt too hot in the past one month. The majority of 260 persons (65%) felt too hot less than 1 time in a week. The minority group of 15 persons (3.8%) felt too hot 1-2 times in a week. Feeling too hot is considered a factor impacting sleep quality, though none of samplings felt too hot in the past one month.
- h) Bad dreams. All samplings had bad dreams at different frequencies. The majority of 148 persons (37%) had bad dreams 3 or more times in a week. The minority group of 106 persons (26.5%) had bad dreams 1-2 times in a week. Bad dreams was found to be a factor correlating with sleep quality.
- i) Pain. The majority of 187 persons (46.8%) had pain from different reasons less than 1 time in a week. The minority group of 12 persons (3.0%) did not have pain at all in the past one month. Pain became individual factor impacting sleep quality.
- j) Causes of mental health affecting sleep quality. All samplings experienced sleep problems due to mental health causes. The majority of 174 persons (43.5%) experienced it less than 1 time in a week. The minority group of 82 persons (20.5%) experienced this problem 3 or more times in a week. None of samples never had this symptom in the past one month.

a) Sleep quality

The sleep quality was evaluated under the context of 7 components according to the PSQI guidelines.

Component 1 : Subjective sleep quality

The majority scored 2 PSQI points representing fairly bad sleep quality (2 points), the subsequent groups scored 1 point representing good sleep quality and the minority scored 3 points representing very bad sleep quality respectively. It could be elaborated that 328 persons (82%) elderly samplings experienced bad sleep quality as affected by relevant individual factors (independent variables). It is also noted that the group of 68 persons (17%) scored 1 point experienced good sleep quality. The minority group of 4 persons (1%) scored 3 points and experienced very bad sleep quality. The individual factors empirically and logically affect and correlate with quality of sleep in the past one month among the 400 elderly samplings across all regions in Thailand

Component 2 : Sleep latency

The timing required to fall asleep was examined in which the majority of 235 persons (58.8%) scored 3-4 (2 points), the subsequent group of 98 persons (24.5%) scored 1-2 (1 point) and the minority group of 67 persons (16.8%) scored 5-6 (3 points) respectively. It is interpreted that the majority required longer than 30 minutes to fall asleep, the subsequent group required 60 minutes to fall asleep.

Component 3 : Sleep duration

The majority of 309 persons (77.3%) managed to sleep more than 7 hours and scored 0 point, the subsequent group of 73 persons (18.3%) slept up to 5-6 hours and scored 2 points and the minority group of 18 persons (4.5%) slept up to 7 hours and scored 1 point.

Component 4 : Habitual sleep efficiency

The majority of 325 persons(81.3%) scored 0 point (85%) experienced good habitual sleep efficiency and the subsequent group of 67 persons(16.8%) scored 3 points (less than 65%) had less habitual sleep efficiency.

Component 5 : Sleep disturbances

The majority scores 10-18 (2 points), the subsequent group scores 19-27 (3 points) and 1-9 (1 point) respectively which is referred to the effects of sleep disturbances. The result indicated that the majority experienced sleep disturbances 1-2 times in a week.

Component 6 : Use of sleep medication

The majority did not use sleep medication and scored 0 point and the subsequent group scored 1 point because of using it less than 1 time per week. The majority appears to sleep without using sleeping medicine.

Component 7 : Daytime dysfunction

The majority scored 0 point, the subsequent group scored 1 point, 2 and 3 points respectively. It is referred to the impact of sleep quality on daytime dysfunction which the majority experiences no consequences of daytime dysfunction.

When adding PSQI scored of 7 components, the majority of elderly samplings did not have good sleep quality as the total PSQI scores were 6 points (78.8%). While the minority group of 21.2 % had good sleep quality as their PSQI scores were less than 5 points.

Table 1: Scoring conclusion of sleep quality

Sleep Quality	Count	Percentage
Good sleep	85	21.2
Bad sleep	315	78.8
Total	400	0.100

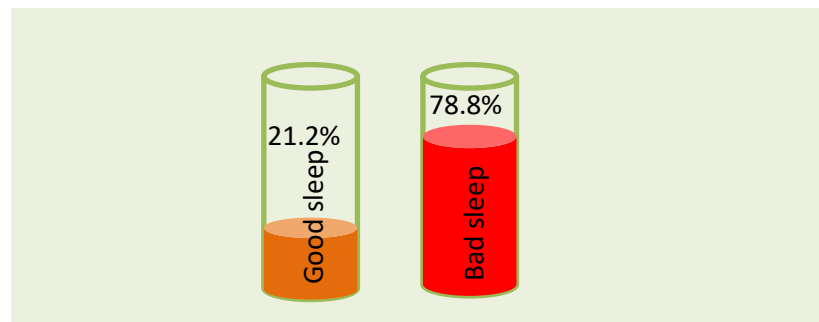


Figure 5

When adding PSQI scores of 7 components, the majority of elderly samplings did not have good sleep quality as the total PSQI scores were 6 points (78.8%). While the minority group of 21.2 % has good sleep quality as their PSQI scores were less than 5 points.

Hypothesis testing

To strengthen the analytical process and hypothetical reliability, it was simultaneously analyzed the relationship between individual factors and sleep quality by employing the Chi-square statistical tests at the statistical value of 0.05. Summary of hypothesis testing results is reflected in the below table.

Table 2

Elements of individual factors	Good sleep %	Bad sleep %	X ²	p-value
Age			27.359	0.000*
60-70	27.7	72.3		
71-80	5.9	94.1		
81 over	2.7	97.3		
Gender	Male 23.5 Female 16.3	Male 76.5 Female 83.7	2.643	0.104
Marital s.	Married 25.9 Divorce 3.2 Single 0.00	Married 74.1 Divorce 98.2 Single 100%	21.089	0.000*
Medical Condition	Yes 0.5 No 44.7%	Yes 99.5 No 55.3	116.372	0.000*
Alcohol Consumption	Yes 0 No 29.5	Yes 100 No 70.5	41.975	0.000*
Physical exercise	Yes 25.1 No 4.1	Yes 74.9 No 95.9	15.677	0.000*
Disturbing environment	Noise 42.4 Bright/Dark 0 Smoke/dust 0 Odour 1.4	Noise 57.6 Bright/Dark 100 Smoke/dust 100 Odour 98.6	105.100	0.000*
Symptom of negative feelings	Yes 1.0 No 81.2	Yes 99.0 No 18.8	290.073	0.000*
Prayer, meditation	Yes 33.96 No 27.8	Yes 66.04 No 72.2	15.548	0.000*

The findings showed that the majority of the elderly samplings possess bad quality of sleep of 78.8% while 21.2% represented the ones having good sleep quality. Findings of correlation between sleep quality and individual factor discovered that there is a significant relationship with age, marital status, medical condition, consumption of alcohols, performing physical exercise, depression, negative feelings with known and unknown causes and practice of prayer or meditation. Results of hypothesis testing substantiate that determined individual factors of this study empirically affect 7 components of sleep quality of the elderly population in Thailand in accordance with the PSQI guidelines.

Research findings

Earlier research focus and findings are particularly specific at solutions and management of sleep problems

among the elderly population at different groups and locations. The findings found similar conclusions about individual profiles of samplings as well as their common sleep complaints. The correlation between individual factors and sleep quality is proved and endorsed by results of hypothesis testing.

1. The marital status is related to sleep quality of the elderly samplings. The majority of married elderly do not have good sleep quality which conforms with the research of Oranid Nikom and his colleagues [11] who examined the relationship of factors concerning sleep quality of the third quarter of pregnancy. The couple with good relationship has no impact to sleep quality and on the contrary, bad sleep quality exists in the case of couple having bad relationship.
2. Medical condition is reasonably related to sleep quality. Possessing medical condition or sickness cause biological changes in controlling the rhythm of sleep and wake up which impacts sleep of the elderly samplings in particular those having chronic medical conditions. Chotima Chinvararak and his colleagues [12] found that sleep quality of the elderly population in Prachanives Housing Estate in Bangkok were impacted by medical conditions, e.g., hypertension, pain, muscles, etc.
3. Physical exercise is reportedly related to sleep quality. The elderly samplings do not practise regular physical exercise having no good sleep quality. On the contrary, ease of sleep among the elderly is supported by practicing regular exercise. Thitima Narongsak and his colleagues [13] reported that regular and consistent physical exercise promotes better sleep quality.
4. Environment factors with noise disturb sleep quality and affect sleep quality of elderly samplings. Sudarat Chairj and his colleagues [14] reported on the noise and concluded that there was a negative impact to sleep quality and satisfactory sleep. It also conforms with the findings of other studies which concluded that temperature, light and sound or noise negatively affect sleep satisfaction.
5. Depression and negative feelings with causes and no causes are related to sleep quality. The elderly samplings having these mental symptoms do not have a good sleep quality. Thitima Narongsak and his colleagues [13] found that depression is relating to sleep quality and potentially indicates the bad sleep quality.
6. Prayer and meditation before sleep are related to sleep quality. The elderly samplings who do not practise prayer and meditation had bad sleep quality. Patsamon Kumtaweeri and his colleagues [15] found that prayers support mindfulness, wisdom, calm and gentleness which enhances relaxation and balance of body, mind and spirit. In turn, it enhances a good sleep quality.

The research findings identified effects and correlation patterns of individual factors and sleep quality among the elderly samplings throughout Thailand. It could thus be concluded that individual factors meaningfully impact and affect sleep quality in the entire elderly population of Thailand.

The Sleep Foundation in USA underlines that quality of life and health concern in older persons are affected by poor sleep. The relationship between aging and sleep is intertwined. The John Hopkins Sleep Disorder Center

also determines that poor sleep habits contribute to apnea and several other health issues.

Constraints of this research are inevitably inclusive of the Covid-19 effects during data collection process which caused disruption and deviation of plannings and operations. Target sampling groups were identified and accommodated available groups prepared by local community leaders with abrupt and frequent changes of samplings and locations. The process was much more time consuming in the stages of data collection and verification.

The research recommendations are inclusive of expanding to study the association of sleep problems among the elderly samplings with more common comprehensive individual factors and various comorbidities which should be conducted at the national level; evaluate the impact on physical, psychological and social aspects relating to sleep quality of the elderly at the national scale; examine other factors which affect the stress of the elderly population and in turn negatively impacted the sleep quality and perhaps establish guidelines on standard sleep quality markers and identify common essential individual factors contributing to sleep quality among the elderly population. The end results and recommendations of this study are not exhaustive but there is ample research opportunity broadening further study at the national scale which may benefit the planning of public health in the elderly population in Thailand.

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