

# Insomnia and its associated factors among elderly population in debre markos town, north west Ethiopia.

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## Abstract

**Background:** Insomnia is one of the most common sleep problems throughout the world which affects 38% of the elderly population worldwide. It reduces psychomotor skills, memory, decision-making, and attention but there are few studies carried out about its prevalence and its factors in the elderly population. The objective of this study was to assess the prevalence of insomnia and its associated factors among the elderly population who live in Debre Markos town.

**Methods:** Community-based cross-sectional study design was conducted among 423 study participants. Participants were selected by computer-generated random number method. Insomnia was assessed by Regensburg Insomnia Scale. The total score of the tool ranges from 0 to 40 points. Those individuals who scored above 12 are considered to have insomnia. Both bivariable and multivariable logistic regression was performed. Variables with a p-value <0.25 in the bivariable logistic regression were entered into multivariable logistic regression. The finding was expressed with a 95% confidence interval and p < 0.05 was considered statically significant. **Results:** The prevalence of insomnia was 280 (67.3%). Poor sleep hygiene (AOR= 8.91, 95% CI 5.121-15.524), low level of income (AOR=2.94 95% CI 1.293 - 6.7), poor social support (AOR = 2.91, 95% CI 1.316 - 6.471), anxiety (AOR=2.54 95% CI, 1.439 - 4.489), and not educated (AOR= 2.59, 95% CI, 1.082 - 6.237) were statistically significant factors for insomnia.

**Conclusion:** The prevalence of insomnia among the elderly population was relatively high. Being uneducated, having low income, poor social support, anxiety, and poor sleep hygiene was significantly associated with insomnia, and recommended that health care providers better include reduction of risk factors in the health education programs.

**Keywords:** Associated factor, Elderly, Ethiopia, Insomnia, Prevalence.

## Introduction

Insomnia is the complaint of dissatisfaction with sleep quality or duration (inadequate quality and quantity of sleep). It is accompanied by difficulties in initiating sleep at bedtime, frequent or prolonged awakenings, or early-morning awakening with an inability to return to sleep [1, 2]. Even though the etiological aspect of sleep problems is numerous and complex many scholars briefly express those factors like mental illness, medical/neurological conditions, environmental factors, socio-demographic characteristics, stressful life events, and substance use are involved as risk factors for insomnia[3].

The increment of chronic conditions in the elderly population may lead to insomnia which is due to reduced mobility, retirement, and reduced social interaction are sources of sleep disturbances[4]. From many different factors that affect or alter the sleep approach the most common of which is the normal result of aging. When compared with younger adults,

elderly people normally spend additional time in bed but less time asleep, wake up more often and remain awake for longer periods, and have less well-organized sleep [5].

It is a reason for morbidity and mortality among elderly people. WHO reports the occurrence of insomnia in the elderly was 38% [6]. It has a great financial load on people and employers by increasing the price of medicinal treatment and drugs, increasing absenteeism, accidents, hospitalization, depression, and alcohol consumption. The overall annual price of insomnia was intended at \$92.5 to \$107.5 billion [7]. A recent study conducted by Henry Ford reported that insomnia weakens cognitive and physical functioning and is related to an extensive variety of reduced daytime functions in several emotional, community, and physical domains [8, 9].

However, it has pressure on health, finances, and quality of life it has little significant implication for health care organizations and professionals in screening and treating insomnia. The present study suggests that insomnia-related work absences

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attributable to (76%) [10]. It has severe health costs including problems related to performance, daytime lethargy, and weakness as temporary and long-standing effects on early morbidity and mortality. Also, it affects mental processes and intellectual abilities, impedes decision-making and memory, reduces performance on difficult tasks, and harmful effects on psychomotor, and communication skills, and declines lifetime [11]. Individuals who suffered from insomnia were increased with depression emotional stress, the presence of musculoskeletal problems, respiratory disorders, and worry about children [12].

As age increases changes in sleep period and quality are more common problems in the individual population [3, 11, 13]. Among several health-related problems, disturbance in sleep patterns is one of the most important community health concerns and affects more than 150 million people in the developing world [14, 15].

Many factors can affect Insomnia. Sleep hygiene, engaging in behaviors like improper sleep scheduling, using sleep-disturbing products, activating or arousing activities close to bedtime, using the bed for activities other than sleep, and maintaining an uncomfortable sleep environment. The notion of inadequate sleep hygiene as a contributor to insomnia [16]. Alcohol can have a stimulating effect that increases sleep latency. insomnia is widely prevalent in those alcohol drinkers [17]. Increased day-to-day stress and excess worry will make it harder to fall asleep.

Even though the etiological aspect of sleep problems is numerous and complex many scholars briefly express those factors like mental illness, medical/neurological conditions, environmental factors, socio-demographic characteristics, stressful life events, and substance use are involved as risk factors for insomnia [3, 18, 19]. The different studies recommended that creating awareness and expanding health care coverage for elderly people are vital for reducing the cost of the diseases. But still, insomnia has a significant problem in this population [20, 21].

Even though health care management services are being expanded, still the level of insomnia in the elderly population is common with sleep problems. The study was giving some information about different factors of insomnia rather than age among the elderly and gave techniques for health care personnel to include sleep hygiene practices and means of reducing anxiety in health education programs. This study has two objectives, to determine the prevalence of insomnia among the elderly population who live in Debre Markos town and to identify factors associated with insomnia among the elderly population.

## Methods and Materials

### Study Area and Period

The study was conducted in Debre Markos Town which is located in Northwest Ethiopia, a distance of 300 Km from Addis Ababa and 265 km to the capital of Amhara Nation Regional State Bahir Dar. It is administratively structured into 11 Kebeles. The health infrastructure of this town comprises

3 health centers and 1 compressive specialized hospital. The total population of the town was n were 138, 996 of which 64737 of them were males and 74259 were females. The total numbers of the elderly population in the town were 5788 (2906 male and 2882 female) (east Gojjam administrative office 2021). The data was collected from March 20/2021 up to April 20, 2021.

**Study Design:** Community based cross-sectional study design was conducted.

**Population:** All elderly people who live in Debre Markos Town.

**Study Population:** All elderly people who live in 11 Kebele for at least six months of duration

### Eligibility Criteria

**Inclusion Criteria:** Elderly populations who live at least 6 months in Debre Markos town and are available during the study period.

**Exclusion Criteria:** Elderly populations who were seriously ill (unable to communicate) and unable to hear during the data collection period.

**Sample Size Determination and Sampling Technique:** The number of samples required for the study was calculated by taking 50% of the prevalence of insomnia among the elderly population in a single population proportion for unknown prevalence, with 5% of marginal error and standard normal distribution with a 95% confidence interval.

$$n = \{(Z a/2)^2 p (1-p)\} \div d^2$$

Sample size n = 384 non-respondents = 10%, 39, n=423

The list of individual households was taken from health extension workers and used as a sampling frame and the study unit was selected by computer-generated random number method.

### Operational Definition

**Insomnia:** Those participants who scored above 12 on Regensburg Insomnia Scale were considered to have insomnia [22].

**Elder:** people whose age is  $>_{65}$  years old [23].

**Depression:** Those participants who scored 3 and more on the PHQ 4 Scale were considered to have depression [24].

**Anxiety:** Those participants who scored 3 and more on the PHQ 4 Scale was considered to have Anxiety [24].

**Social Support:** Those participants who scored on Oslo social support scale 3–8 was considered to have poor social support, 9–11 moderate social support, and 12–14 strong social support [25].

**Perceived Stress:** Those participants who scored from Perceived Stress Scale: 0-13 was

considered low stress, 14-26 was considered moderate stress and 27-40 was considered as high perceived stress [26].

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**Alcohol Use Disorder:** Those participants who scored 3 and above from AUDIT-C was considered an alcoholic [27].

**Good Sleep Hygiene:** Those participants who scored less than the mean score of the sleep hygiene index tool were considered to have good sleep hygiene [28].

**Poor sleep hygiene:** Those participants who scored more than the mean score of the sleep hygiene index tool were considered to have poor sleep hygiene [28].

### **Data Collection Tool**

Data collection tools were adopted from different reviewed literature after having permission from the developer via Gmail conversation. The occurrence of insomnia was assessed by RIS which is a ten-item questionnaire. The RIS was designed in German. The sum of items ranges from 0 up to 40 points. The introductory questions regarding bedtime hours are not included in the score. Those individuals who scored above 12 are considered to have insomnia [22]. In this study, the Cronbach's alpha of RIS was 0.83.

Sleep hygiene practices were assessed by using SHI which is produced by Mastin and two classmates in 2006. It has a 13-item questionnaire that is widely used in research and clinical practice and scores from 0 to 52[28].

Depression and anxiety were assessed by PHQ-4. It is four items assessment tool that has separate parts for depression and anxiety. It contains the two core symptoms of depression and anxiety. Two items for depression and two items for anxiety [24]. Social support was assessed by 3 item questionnaires of the Oslo Social Support Scale. The internal consistency can be considered satisfying the correlations between the items were all positive and within the critical threshold between  $r=.30$  and  $r=.90$ . The mean correlation was  $r=.377$  [25]. The participant's alcohol consumption status was assessed by Alcohol Use Disorders Identification Test – C. It is a 3 item alcohol screen tool that can help to identify persons who are hazardous drinkers or have active alcohol use disorder. [27, 29].

### **Data Collection Procedure and Quality Control**

The data were collected through face-to-face interviews. In the case of greater than one fitting member in the house, the lottery method was used to choose just one in the family. When the participant was not available during data collection time at least three repeated checks at the differences were done to interview them. 5% pretest was done at Fnote Selam town. The tool was translated from English to Amharic and then back to English for analysis. The three-day training was given to data collectors and supervisors before the actual data collection started. The completeness of the collected data was examined during data storage, cleaning, and analysis. The entered and cleaned data were checked by the principal investigator before analysis.

### **Data Analysis**

The data were entered into Epi-data 4.2 and exported to SPSS Version 25 for analysis. Descriptive statistics were derived

and bivariable and multivariable logistic regression analyses were performed. Significant variables in bivariable logistic regression analyses ( $P<0.25$ ) were included in multivariable logistic regression analyses to identify independent predictors of insomnia.  $P<0.05$  with 95% CI was considered significant in all cases. Multicollinearity of independent variables was checked for all variables and had Variance Inflation Factors less than two.

### **Ethics**

Ethical clearance and approval were obtained from Debre Markos University health science college ethical review committee. A permission letter was taken from the East Gojjam Administrative office, names and addresses of the participants were not asked. The researcher explained the purpose, data collection process, and all the reasons why the participants were chosen, possible risks, and why the research was being conducted to the study subjects verbally. Participants used as they have a right to withdraw from the interview at any time, privacy, and confidentiality of personal information is kept. Oral and written informed consent was taken from participants after an explanation of the aim of the study during questionnaire administration.

### **Result**

#### **Socio-Demographic Characteristics of the Respondent**

A total of 416 participants were interviewed with a response rate of 98.34%. The respondent's median age was  $68 \pm 7$  years old. Among study participants, above half of the respondents were females 231(55.5%). The majority of the participants, 253 (60.8%) were married, and 205 (49.3) respondents attained up to the preparatory level of education. 116 (27.9 %) were retired in occupation one-fourth of 185 (44.5%) of respondents were in the monthly income group between 1500-3000ETB. For further information (Table 1).

#### **Prevalence of Insomnia**

This study revealed that from four hundred sixteen elderly participants 280 (67.3%) had insomnia with 95% CI (63.2-71.4). Among those who have insomnia, 50.4% were females and 63.6% were under the age group 75 -85 years old.

#### **Lifestyle and Health-Related Characteristics**

The prevalence of stress among respondents classified in to low 86(20.7%), moderate 315(75.7%), and high stress 15(3.6%). Two-thirds of the respondents had poor social support 278 (66.8%). More than four in ten 188 (45.2) of the respondents had alcohol consumption habits Three-fourth 302(72.6%), and 297 (71.4%) of the respondents had anxiety and depression respectively over the last 2 weeks. More than half 214 (51.4%) of the respondent had poor sleep hygiene practice with a mean score of  $14.96 \pm 6$ . Around one-third of 113 (27.2%) of the respondent had a different chronic illness that was diagnosed by health care professionals from those 50(12.2%) had hypertension, 59 (14.2%) use current medication, 22 (5.4) takes anti-hypertensive drugs. For further information (Table 2).

**Table 1: Socio-demographic characteristics of the elderly population who live in Debre Markos Town, North West Ethiopia (n=416).**

Variables	Frequency	Percentage (%)	
Age	65-75	343	82.5
	76-85	62	14.9
	>=86	11	2.6
Sex	Male	185	44.5
	Female	231	55.5
Marital status	Single	9	2.2
	Married	253	60.8
	Divorce	38	9.1
	Widowed	116	27.9
level of education	Not educated	106	25.5
	up to preparatory	205	49.3
	collage and above	105	25.2
Occupation	Housewife	99	23.8
	Jobless	81	19.5
	Private business	94	22.5
	Gard	26	6.3
	Retired	116	27.9
Income	<1500ETB	72	17.3
	1500-3000ETB	185	44.5
	>3000ETB	159	38.2

**Table 2: Lifestyle and Health-related characteristics of the elderly population who live in Debre Markos Town, Northwest Ethiopia (n=416).**

Variables	Frequency	Percentage %	
Social support	Poor	278	66.8
	Moderate	76	18.3
	Strong	62	14.9
Perceived stress	Low	86	20.7
	Moderate	315	75.7
	High	15	3.6
Alcohol consumption	Drinker	188	45.2
	Non-drinker	228	54.8
Anxiety	Yes	302	72.6
	No	114	27.4
Depression	Yes	297	71.4
	No	119	28.6
sleep hygiene	Good	202	48.6
	Poor	214	51.4
chronic illness	Yes	113	27.2
	No	303	72.8
Types of chronic illness	CHF	5	1.2
	Epilepsy	1	0.2
Current medication use	HIV	6	1.4
	Arthritis	6	1.4
	Asthma	23	5.5
	DM	17	4.1
	Hypertension	50	12.2
	Hypertension and DM	4	1
	Asthma and CHF	1	0.2
Types of Current medication	Yes	59	14.2
	No	357	85.8
Types of Current medication	ART	6	1.4
	Insulin	5	1.2
	Metformin	3	0.7
	Prednisolone	5	1.2
	Anti-HTN	22	5.4
	Frusimide	2	0.5
	Salbutamol	11	2.6
	Anti-HTN and Insulin	4	1
Sulbutamol and Frusimide	1	0.2	

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**Table 3:** Bivariable and multivariable analysis of socio-demographic, lifestyle, and health-related factors of insomnia among the elderly population who live in Debre Markos Town (n = 416).

Variables		Insomnia		COR with 95% CI	P-value	AOR with 95% CI	P-value
		Yes	No				
Sex	Female	141	90	0.518(0.339-0.793)	0.002	0.910(0.531-1.558)	0.73
	Male	139	46	1	1	1	1
Age	65-75	227	116	1	1	1	1
	76-85	43	19	1.157 (0.645-2.075)	0.626	1.097(0.522-2.305)	0.807
	>=86	10	1	5.11 (0.646-40.406)	0.122	4.776(0.495-46.107)	0.177
Level of education	Not educated	95	11	4.699 (2.238-9.865)	0	2.598 (1.082 -6.237)	0.033*
	Up to preparatory Collage and above	117	88	0.723 (0.445-1.177)	0.192	0.587 (0.312-1.10)	0.097
		68	37	1	1	1	1
Income	<1500ETB	61	11	3.099 (1.510-6.361)	0.002	2.944 (1.293-6.703)	0.010*
	1500-3000ETB	117	68	0.962(0.619-1.494)	0.861	0.847 (0.496-1.446)	0.542
	>3000ETB	102	57	1	1	1	1
Social support	Poor	188	90	1.319 (0.747-2.332)	0.34	2.918(1.316-6.471) 2.244(0.930-5.416)	0.008*
	Moderate	54	22	1.550(0.761-3.159)	0.227	1	0.072
	Strong	38	24	1	1	1	1
Depression	Yes	207	90	1.449(0.929-2.260)	0.102	0.750(0.389-1.446)	0.391
	No	73	46	1	1	1	1
Anxiety	Yes	217	85	2.067(1.323-3.229)	0.001	2.541(1.439-4.489)	0.001*
	No	63	51	1	1	1	1
Alcohol	Drinker	161	67	1.393 (0.929-2.102)	0.114	0.933(0.541 -1.677)	0.804
Use	Non-drinker	119	69	1	1		
sleep hygiene	Poor	195	30	8.106(5.02-13.083)	0	8.916(5.121-15.524)	0.000*
	Good	85	106	1	1	1	1
Current medication	Yes	46	13	1.860(0.968-3.574)	0.063	1.518(0.718-3.209)	0.275
	No	234	123	1	1	1	1
Perceived stress	High	14	1	7.89(0.990-62.908)	0.598	2.352(0.191-28.979)	0.505
	Moderate	211	104	1.144(0.694-1.883)	0.051	0.616(0.332-1.140)	0.123
	Low	55	31	1	1	1	1
Occupation	housewife	56	43	0.712(0.411-1.234)	0.226	0.984(0.428-2.263)	0.97
	jobless	62	19	1.784(0.941-3.382)	0.076	1.117(0.470-2.654)	0.802
	Private business	69	25	1.509(0.832-2.736)	0.176	1.098(0.504-2.391)	0.814
	Gard	18	8	1.230(0.492-3.073)	0.658	0.507(0.164-1.571)	0.239
	Retired	75	41	1	1	1	1

### Factors Associated with Insomnia

Many factors which are grouped under mental illness, medical conditions, environmental factors, socio-demographic characteristics, stressful life events, and substance use can affect insomnia in the elderly population.

In this study insomnia was statistically significant with a low level of education, low income (<1500ETB), poor social support, anxiety, and poor sleep hygiene. The odds of poor sleep hygiene practice were nine times higher (AOR= 8.916, 95% CI 5.121-15.524) to developing insomnia than those who had good sleep hygiene practice. The odds of low monthly income (<1500ETB) elderly population developing insomnia were three times greater (AOR=2.944, 95% CI 1.293-6.703) than high monthly income (>3000) elderly people. The odds

of poor social support to developing insomnia were three times higher (AOR = 2.918, 95% CI 1.316-6.471) than those who had strong social support. The odds of anxiety patients developing insomnia were two times more likely (AOR=2.541 95% CI, 1.439-4.489) than non-anxiety patients. People with a low level of education (not educated) are three times more likely (AOR= 2.59, 95% CI, 1.082 -6.237) to develop insomnia than those who had diplomas and above (Table 3).

### Discussion

Our study finding the prevalence of insomnia is higher in the elderly. Insomnia is high in the elderly because of the following, sleep duration and quality are reduced with increasing age, higher prevalence of comorbidity and polypharmacy in the elderly, issues regarding social aspects and com and, body

composition, and organ function change with increasing age [30]. Insomnia is due to a state of hyper arousal during sleep and wakefulness which is manifested as an elevated whole-body metabolic rate during sleep and wakefulness, elevated cortisol and adrenocorticotropic hormone during the early sleep period [4]

Even though the etiological aspect of sleep problems is numerous and complex many scholars briefly express those factors like mental illness, medical/neurological conditions, environmental factors, socio-demographic characteristics, stressful life events, and substance use are involved as risk factors for insomnia[3].

In this finding two-thirds (67.3%) with 95% CI (63.2-71.4) of the elderly population had insomnia. This finding was consistent with studies conducted in Nepal (71.1%). But it is higher than studies conducted in Wayne State University School of Medicine in USA 48%[4], Northern Thailand 44.0% , Egypt (62.1%) [12],Pakistan 42.1%, Indian 30%, Nigeria 27.5%, and Korean rural community 32.4%. This disparity might be due to the low socioeconomic status of the participant here in Ethiopia and also the prevalence of Comorbidities like anxiety (72%), chronic illness (27.2%), and depression (71.4%) in our study was higher than the study conducted in northern Thailand and Egypt.

The other reason for this difference may be the lifestyle of participants; in this study, the prevalence of moderately stressed, poor social support, drinking alcohol, smokes cigarettes was higher than in the study conducted in northern Thailand, Wayne State University School of Medicine and in the USA. Additionally, the difference might be due to the study setting; a study conducted at the community level was higher in prevalence than a study conducted in the hospital. This study was conducted at the community level but a study done in Pakistan and Nigeria were conducted in the hospitals.

Tool differences used to assess insomnia may be another cause for variation in results. In this study, insomnia was assessed by RIS but Egypt uses Athene's insomnia and Northern Thailand uses The World Health Organization Composite International Diagnostic Interview version 3.

Low income was a significant factor in insomnia. This result was in line with a study conducted in Nepal and Nigeria. This might be because the health of people with low incomes often suffers from conditions like inadequate housing, food, health care service, psychosocially stressful way of life, and Behavioral. People with low incomes are more likely to adopt unhealthy behaviors.

Low educational level (not educated) was an important factor in insomnia in this study. This finding is consistent with studies conducted among the Korean elderly Community, Nepal, and Pittsburgh. This may be due to individuals with a low level of education were a risk of enhancing their health and well-being difficulty to know the need for health care, inability to promote and sustain healthy lifestyles like (exercise, nutrition) and positive choices, difficulty to maintain

physical infrastructure and other aspects of environmental health. Education is associated with the general health of the population via income, access to healthcare, problem-solving skills, social networks, and relative social position.

Poor social support was an important predictor of insomnia. This was supported by a study conducted in Northern Thailand and the United States. This is maybe due to social support can improve the ability to cope with stressful situations and anxiety, alleviate the effects of emotional stress, reduce the feelings of isolation, promoting lifelong good mental and physical health in the later stages of life. Good family relationships can be a buffer against loneliness and depression that affect sleep quality in the elderly.

Anxiety was a significant predictor of insomnia in this study. This was consistent with a systematic review conducted at Wayne State University School of Medicine (USA) [4], a systematic review in South Africa [15]. This is because Anxiety causes many people to experience tiredness, excess trouble, and fear which makes it difficult to sleep.

Poor sleep hygiene was an important factor in insomnia in this study. This is supported by a study conducted in China and Bangladeshi. This might be due to poor sleep hygiene reduce sleep behavior (having an irregular sleep program or using a large amount of caffeine or alcohol), using an uncomfortable bed and room, and decrease physical activities which can lead to insomnia.

## Conclusion

The prevalence of insomnia among the elderly population was relatively high. Low level of education (not educated), low income, poor social support, anxiety, and poor sleep hygiene were significant factors of insomnia. Reducing those risk factors and regular screening for insomnia and providing interventions targeting sleep health education and behavior change and other important variables to reduce both the prevalence and impact of insomnia in elderly populations.

## Abbreviations

CI; Confidence Interval, DMT; Debre Markos Town, PHQ; Patient Health Questionnaire, RIS; Regensburg Insomnia Scale, SHI; Sleep Hygiene Index, SPSS; Statistical Product and Service Solution, USA; the United State of America, WHO; World Health Organization

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## Author Contributions

All authors made a significant contribution to the work

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reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

## Disclosure

The authors report no conflicts of interest for this work.

## Availability of data and materials

All the data included in the manuscript can be accessed from the corresponding author with an email: yideg18@gmail.com

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