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Poor Sleep Quality and Associated Factors among Midlife Women at Dessie Town, Northeast Ethiopia, 2022: A Cross-Sectional Study

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Abstract

Introduction: Poor sleep quality is defined as a lack of restful and restorative sleep, which is a common complaint among midlife women. There aren't enough studies on the prevalence and contributing factors of poor sleep quality among Ethiopian midlife women, even though it affects these women's quality of life. Therefore, this study aimed to determine the prevalence and associated factors of poor sleep quality among midlife women in Dessie town.

Methods: A community-based cross-sectional study was conducted from April 01, 2022, to May 01, 2022. A cluster sampling technique was employed. Moreover, data were collected using interviewer-administered pretested questionnaires. Data were entered and analyzed using Epidata version 3.1 and SPSS version 26 respectively. Bivariable and multivariable binary logistic regression analysis models were fitted to find the association of each independent variable with the outcome variable. The strength of the association was computed by using an adjusted odds ratio with a 95% confidence interval. Variables having a P-value ≤0.05 were considered statistically significant.

Result: A total of 652 women were included in the study with a response rate of 98.3% and the mean age was 47.6 ±5.81 with the age range of 40-65. The prevalence of poor sleep quality among midlife women in Dessie town was 55.5% (95% CI (=51.9, 59.0)). Women who had no formal education (AOR=2.51, 95%CI(=1.30, 4.86)),being obese (AOR=2.41, 95% CI(=1.10, 5.32)), khat chewing(AOR=2.05, 95% CI(=1.13, 3.74)), hot flashes (AOR=5.58, 95%CI(=3.31, 9.39)), being Diabetics (AOR=3.16, 95% CI(=1.43, 6.94)), having stress (AOR=2.72, 95 % CI (=1.32, 5.59)) were significantly associated with poor sleep quality.

Conclusion: More than half of the participant had poor sleep quality. Lack of formal education, khat chewing, being obese, diabetic, and having hot flashes and stress were significantly associated with poor sleep quality. It is recommended to avoid modifiable risk factors.

Keywords: Ethiopia; Midlife Women; Poor Sleep Quality

Abbreviations: AOR: Adjusted Odds Ratios; CI: Confidence Interval; CMHS: Collage of Medicine and Health Science; HADS: Hospital Anxiety and Depression Scale; IRB: Institutional Review Board; PSQI: Pittsburgh Sleep Quality Index; PSS: Perceived Stress Scale; SPSS: Statistical Package for the Social Sciences.

Introduction

Poor sleep quality defined as a lack of restful and restorative sleep which is a common complaint among midlife women [1]. Which is associated with a decrease in estrogen secretion [2]? During this time, women commonly report reduced sleep quality due to significant physiological changes such as vasomotor symptoms (hot flashes, night sweats), sleep-disordered breathing (SDB), frequent nocturia, and osteoporosis [3-5]. Approximately one-third of the world's population has poor sleep quality [6]. The overall pooled prevalence of poor sleep quality in low and middle-income countries was 33.2 % [7]. Over 40-60% of midlife women have poor sleep quality [8]? The prevalence of poor sleep quality among midlife women in the United States is estimated at 31 % [9]. Furthermore, studies conducted in Latin America, Europe, and Asia revealed that the prevalence of poor sleep quality among midlife women ranged from 20% [10] to 67.8% [11]. Moreover, the prevalence of poor sleep quality among midlife women has increased in Africa, with 59.6% in Cameron [12] and 69.5% in Egypt [13]. The prevalence of poor sleep quality in the Ethiopian population was 53% [14]. However, there is no enough study on the prevalence of poor sleep quality among Ethiopian midlife women.

The main symptoms of not getting enough quality sleep are fatigue, daytime sleepiness, falling asleep while driving, personality changes, difficulty paying attention or concentrating at work, slowed responses, and memory problems [15]. Poor sleep quality during midlife is caused by a combination of factors such as socio-demographic characteristics (age, occupation, educational status, Employment),midlifestatus(premenopause,perimenopause, post-menopause), vasomotor symptoms (hot flashes, night sweats), comorbidities (hypertension, arthritis, diabetics), anxiety, depression, and lifestyle (smoking, alcohol drinking, physical exercise, caffeine intake) [1,16-18].

Increased stress reactivity, somatic difficulties, poor quality of life, emotional distress, mood disorders, cognitive impairments, memory loss, performance deficiencies, and behavioral problems are some of the short-term consequences of poor sleep and Long-term consequences of poor sleep quality include hypertension, dyslipidemia, cardiovascular disease, metabolic syndrome, and Type 2 Diabetes Mellitus, as well as an increased risk of cancer and death [19]. To improve poor sleep quality, cognitive behavioral therapies such as counseling, sleep hygiene practices e.g. maintaining a regular sleep schedule, getting regular exercise, minimizing noise and light, and medications such as hormonal replacement therapy for midlife women were administered [20,21].

Even though poor sleep quality has an impact on midlife women's quality of life, productivity, social interaction, and the cost of medication to treat sleep disorders, there have been not enough studies on the prevalence and associated factors of poor sleep quality among Ethiopian midlife women. As a result, the current study will narrow this gap by providing information about the problem. Therefore, this study aimed to assess the prevalence and associated factors of poor sleep quality among midlife women in Dessie town, Northeast Ethiopia.

Methods and Materials

Study Setting and Population

A community-based cross-sectional study was conducted in Dessie town from April 1st to May 1st, 2022. Dessie is the capital of Ethiopia's south Wollo administration zone, located 471 kilometers east of Bahir Dar, the capital of the Amhara regional state, and 401 kilometers north of Addis Ababa, the country's capital. The town is situated at 11°8′ N 39°38′ E, at a height of 2,470 to 2,550 meters above sea level. The current estimated total population of Dessie is 285,530 people, with 152,283 women and 26,219 women aged 40 to 65 years old, according to the 2007 census and projected to the current population [22]. Dessie is divided into 5 sub-cities, all with 22,393 households.

All women aged between 40 and 65 in Dessie town were the source populations for this study and among those all women aged between 40 and 65 in randomly selected sub-cities were study populations. The study included women between the ages of 40 and 65. Women, who were taking hormone replacement therapy, newcomers to the house (stayed less than six months), critically ill and unable to communicate at the time of data collection were excluded from the study. The outcome variable of the study was Poor Sleep Quality and the independent variables includes age, marital status, education, employment, premenopause, perimenopause, post menopause, hot flashes, night sweats, chronic disease, depression, anxiety, stress, physical activity, caffeine use, smoking, and alcohol consumption were used as independent variables.

Operational Definitions

- **Sleep Quality:** is a condition of women's sleep, whether good or poor determined by the Pittsburgh Sleep Quality Index (PSQI), PSQI scores of more than 5 were classified as poor sleepers and ≤5 as good sleep quality [16].
- **Menopause:** usually occurs in the midlife of women 40 to 65 years of age [23,24].

- **Vasomotor Symptoms:** (Hot Flashes) Are Sudden Feelings Of Intense Body Heat That Can Occur During The Day Or Night [16].
- **Habitual Khat Use:** was defined as chewing at least once a week while **occasional use** was defined as khat chewing less than once in a week, **Never khat chewer** is defined as never chewed khat during his lifetime [25,26].
- **BMI Classification**: Normal BMI =≤ 25 kg/m^2, Overweight if BMI= 25-30 kg/m^2, Obese if BMI ≥30 kg/m^2 [27]

Sample Size Determination

The sample size was determined by the single population proportion formula

$n_i = Deff \times (Z\alpha/2)^2\ p\ (1-p) = 1.5 \times (1.96)^2 \times 0.5(1-0.5) = 576$
$d^2\ (0.05)^2$

- ✓ n_i = minimum sample size required for the study
- ✓ p=50%, due to the lack of a study in a population with similar socio-demographic characteristics
- ✓ Z =Standard normal deviation at 1.96 (which corresponds to 95% level)
- ✓ d = margin of error (5%).
- ✓ Deff=design effect=1.5
- ✓ Adding 10% for the non-response rate, the final sample size for this study was 634.
- ✓ Due to cluster sampling, 652 women were included in this study.

Sampling Technique and Procedures

The study subjects were chosen using a cluster sampling technique that includes simple random sampling. First, four sub-cites were selected from a total of five using simple random sampling. Then, eligible women between the ages of 40 and 65 were interviewed in a household chosen using house numbers in sequence. When participants could no longer be reached at home, three additional attempts were made to interview each eligible respondent rather than skipping them entirely. If the individual could not be interviewed after three attempts, the cases were closed.

Data Collection Procedures and Tools

After receiving written informed consent from participants, each study participant's socio-demographic, behavioral factors, clinical factors, midlife status, and vasomotor symptoms were collected using a pre-tested structured questionnaire adapted from kinds of literature [1,4,16]. Two trained data collectors (two BSc nurses) and two supervisors (both MSc holders) were hired and received one day of training. The supervisors and principal investigator monitored the data collection process daily, and corrective measures were implemented based on the issues encountered.

Sleep Quality

The Pittsburgh Sleep Quality Index (PSQI) was used to collect subjective sleep quality using a pre-tested Amharic version. Subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction are among the 19 items that make up the PSQI. A single global score ranging from 0 to 21 is calculated by adding the seven component scores. The PSQI global score, with optimal cut-off scores of 5, is a valid measure of sleep quality in midlife women. Cronbach's alpha of 0.702 [28].

Anxiety and Depression

The Hospital Anxiety and Depression Scale were used to assess women's mental health (HADS). The HADS is a self-administered scale that is commonly used in clinical and general populations to quantify anxiety and depression severity and to identify cases of these disorders [29]. The HADS is divided into two subscales, each with seven items, to assess anxiety and depression. A higher score on a Likert scale indicates more severe symptoms. The total score is calculated by adding the scores for each item on the anxiety and depression subscales (range 0–21). It was validated in Ethiopia, and the internal consistency for the anxiety, depression, and full-scale subscales was 0.78, 0.76, and 0.87, respectively. For anxiety and depression, a cut-off score of greater than or equal to 8 is used on the scales [29].

Perceived Stress

A 10-item perceived stress scale (PSS-10) was used to assess women's stress levels over the previous month. The tool responds on a 5-point Likert scale. 0 = Never, 1 = Almost Never, 2 = Sometimes, 3 = Fairly Often, and 4 = Very Often were assigned to each item. The total score ranged from 0 to 40 on a scale of one to ten. Low-stress scores ranged from 0 to 13, moderate stress scores ranged from 14 to 26, and high perceived stress scores ranged from 27 to 40 [30]. A reliability test was conducted in Ethiopia, and the results were positive (Cronbach's alpha = 0.84) [30,31].

Data Quality Control

To maintain consistency and reduce information bias, the questionnaire was first developed in English, then translated into Amharic, and lastly retranslated into English by language experts. Two BSc nurses and two public health professionals (MSc) were employed for data collection and

supervision respectively. Data collectors and supervisors get one day of training about the data collection process. The questionnaire was pretested in 5% or 30 of the total actual sample size of volunteer participants of midlife women at Kombolcha town before the real data collection process to increase the validity and quality of the data. Supervisors and the principal investigator monitored the data collection process daily so that responses could be given based on the problems encountered.

Data Processing and Analysis

After data were collected, it was checked for completeness, coded, and entered into the computer using Epi-Data software version 3.1. Then, it was exported to SPSS version 26 for analysis. Descriptive data were presented in tables and text with means, standard deviations, proportions, and frequency distributions. Bivariable and multivariable binary logistic regression analyses were performed to determine the potential associated factors for sleep quality in menopause. Variables having a p-value <0.25 in the bivariable binary logistic regression were fitted into the multivariable binary logistic regression model for final analysis. Adjusted odds ratios (AOR) with 95% confidence intervals (CI) were used to measure the strength of the association. Variables having a p-value of ≤0.05 at a 95% confidence level in the multivariable binary logistic regression analysis were considered statistically significant. The Hosmer and Lemeshow test was used to determine the model's goodness of fit, with a p-value >0.05 indicating that the logistic regression model is a good fit.

Ethical Consideration

Before data collection, ethical clearance was obtained from University of Gondar Institutional Review Board, School of Medicine, College of Medicine and Health Sciences, with reference number of SOM/1482/2022. Along with ethical clearance, the supportive letter was sent to Dessie's town administrative office. A supportive letter was given from Dessie's town administrative office. Before the questions were asked, the participants were asked to give their informed consent. And data were collected using codes or without personally identifiable information. All study participants read and signed the written informed consent form, but when they are illiterate; the data collectors read it to them and take their signature or thumb impression when they agree.

Result

Socio-Demographic Characteristics of the Respondents

A total of 652 women were included in the study with a response rate of 98.3% and the mean age was 47.6 ±5.81 with an age range of 40-65. The majority of participants (65.2%) were married, 51.7 % had a diploma or higher, 41.3 % were civil servants, 25.6 % were aged 40-44, and 46.5% women had 3-4 children (Table 1).

Variable	Group(s)	Frequency (N)	Percentage (%)
Age	40-44	167	25.6
	45-49	145	22.2
	50-54	144	22.1
	55-59	101	15.5
	60-65	95	14.6
Marital status	Married	425	65.2
	Unmarried	78	12
	Divorced	64	9.8
	Widowed	85	13
Occupational status	Housewife	230	35.3
	Civil servant	269	41.3
	Merchant	116	17.8
	Private employee	37	5.7
Number of children	0-2	134	20.6
	4-Mar	303	46.5
	6-May	150	23
	=>7	65	10

Educational status	No formal education	93	14.3
	Primary school	132	20.2
	Secondary school	90	13.8
	Diploma and above	337	51.7
Monthly Income (mean + SD)	N/A	5949.77±4027.900	

Table 1: Socio-demographic characteristics of midlife women in Dessie town, Northeast Ethiopia, 2022. (n=652).
SD= standard deviation, N/A=not applicable

Behavioral Characteristics of the Participants

Of the total respondents, 506 (77.6%) drank less than 5 cups of caffeine intake per day, 18.4 % used khat at least once a week, 12.1 % were obese, 13.3 % drank moderate alcohol, and 79.3% performed moderate physical exercise (Table 2).

Variable	Group	Frequency(N)	Percentage %
Caffeine intake	Never	113	17.3
	Less than 5 cups per day	506	77.6
	More than 5 cups per day	33	5.1
Khat chewing	Never	396	60.7
	Occasional khat use	136	20.9
	Habitual khat use	120	18.4
Physical exercise	Light exercise	122	18.7
	Moderate exercise	517	79.3
	Vigorous exercise	13	2
Alcohol consumption	Never	504	77.3
	Past drinker	61	9.4
	Current moderate drinker	87	13.3
BMI	Normal weight	442	67.8
	Overweight	131	20.1
	Obesity	79	12.1

Table 2: Behavioral factors of midlife women in Dessie town, Northeast Ethiopia, 2022. (n=652).

Menopausal Status, Midlife Symptoms, and Clinical Characteristics 0f the Participants

Among participants 47.4 % were under post-menopausal status, 37.6 % had hot flashes daily, 13.8% and 9.4% were hypertensive and diabetics respectively. Women who were affected by depression, anxiety, and stress were 37.0%, 36.2 %, and 30.5%, respectively (Table 3).

Variable	Group	Frequency (N)	Percentage (%)
Menopausal status	premenopause	132	20.2
	perimenopause	211	32.4
	post menopause	309	47.4
Hot flashes	Never	279	45.6
	Once a week	110	16.9
	Daily	245	37.6
Presence of known Disease(s)	Hypertensive	90	13.8
	Diabetic	61	9.4
	Osteoporosis	29	4.4
	Others	30	4.6

Depression	Normal (0-7)	338	51.8
	Borderline (8-10)	73	11.2
	Abnormal (11-21)	241	37
Anxiety	Normal (0-7)	334	51.2
	Borderline (8-10)	82	12.6
	Abnormal (11-21)	236	36.2
Stress	Low stress (0-13)	418	64.1
	Moderate stress (14-26)	35	5.4
	High stress (27-40)	199	30.5

Others Arthritis, thyroid abnormality, migraine

Table 3: Menopausal status, menopausal symptoms, and clinical characteristics of midlife women in Dessie town, Northeast Ethiopia, 2022. (n=652).

Prevalence of Poor Sleep Quality Among Midlife Women

The prevalence of poor sleep quality among midlife women in Dessie town was 55.5% (95% CI=51.9, 59.0) (Figure 1).

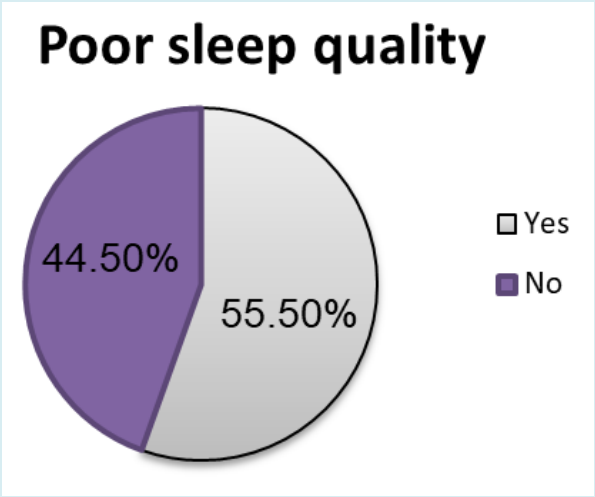

Figure 1: Prevalence of poor sleep quality among midlife women in Dessie town, northeast Ethiopia, 2022 (n=652).

Factors Associated with Poor Sleep Quality

On bivariable binary logistic regression analysis educational status, chewing khat, caffeine intake, alcohol drinking, physical exercise, body mass index, hot flashes, menopausal status, presence of chronic disease(s), depression, anxiety, and stress were associated with poor sleep quality at (p-value of ≤0.25). In multivariable binary logistic regression analysis, educational status, chewing khat, body mass index, hot flashes, diabetics, and stress were significantly associated with poor sleep quality (a p-value of ≤0.05).

Among midlife women who had no formal education, the odds of having poor sleep quality increased by 2.51 times as compared with those having a diploma or higher (AOR=2.51, 95% CI(= 1.30, 4.86)). When midlife women who chewed khat were compared to those who did not chew khat, the odds of having poor sleep quality increased by 2.05 times (AOR=2.05, 95 % CI (=1.13, 3.74)). Obesity increased the chances of having poor sleep quality by 2.41 times compared to normal-weight women (AOR=2.41, 95 % CI (=1.10, 5.32)). Women who had hot flashes every day were 5.58% times more likely to have poor sleep quality than women who had no symptoms of hot flash (AOR=5.58, 95 % CI (=3.31, 9.39)), while those who had hot flashes every week were 2.46 times more likely to have poor sleep quality than women who had no symptom of hot flash (AOR= 2.46, 95 % CI (= 1.25, 4.83)). When compared to non-stressed women, women who reported feeling stressed had a 2.72 times greater chance

of having poor sleep quality (AOR=2.72, 95 % CI (=1.32, 5.59)). Diabetic women had a 3.16 times higher chance of developing poor sleep quality compared to non-diabetics (AOR=3.16, 95%CI (=1.43, 6.94) (Table 4).

Variables	Category	Sleep Quality		COR(95%CI)	AOR(95%CI)
		Poor sleep N (%)	Good sleep N (%)		
Educational status	No formal education	71(10.9)	22(3.4)	0.29(0.17,0.50)	2.51(1.30,4.86)*
	Primary school	81(12.4)	51(7.8)	0.60(0.40,0.90)	1.51(0.89,2.56)
	Secondary school	46(7.1)	44(6.7)	0.91(0.60,1.44)	0.86(0.46,1.60)
	Diploma and above	164(25.2)	173(26.5)	1	1
Caffeine	Never	48(7.4)	65(9.9)	1	1
	Less than 5 cups per day	285(43.7)	221(33.9)	0.60(0.38,0.87)	1.15(0.67,1.98)
intake	More than 5 cups per day	29(4.4)	4(0.6)	0.10(0.03,0.31)	1.64(0.42,6.32)
Khat	Never	196(30.1)	200(30.7)	1	1
	Occasional khat use	82(12.6)	54(8.3)	0.65(0.43,0.96)	1.48(0.86,2.52)
chawing	Habitual khat use	84(12.9)	36(5.5)	0.42(0.27,0.65)	2.05(1.13,3.74)*
Alcohol	Never	288(44.1)	216(33.1)	1	1
	Past drinker	33(5.1)	28(4.3)	1.13(0.66,1.93)	0.84(0.42,1.70)
consumption	Current light drinker	41(6.3)	46(7.1)	1.50(0.95,2.40)	0.79(0.43,1.44)
Physical	Moderate exercise	270(41.4)	247(37.8)	1	1
	Vigorous exercise	9(1.4)	4(0.6)	0.47(0.15,1.60)	1.04(0.23,4.68)
exercise	Light exercise	83(12.7)	39(59.8)	0.51(0.34,0.78)	1.34(0.76,2.37)
BMI	Normal weight	221(33.8)	216(33.1)	1	1
	Overweight	62(9.5)	60(9.2)	0.88(0.59,1.31)	1.56(0.94,2.60)
	Obesity	79(12.1)	14(2.1)	0.23(0.12,0.41)	2.41(1.10,5.32)*
Menopausal status	premenopause	60(9.2)	72(11.0)		
	perimenopause	111(17.0)	100(15.3)	0.75(0.49,1.20)	1.10(0.61,1.97)
	Post menopause	191(29.3)	118(18.1)	0.52(0.34,0.78)	1.10(0.61,2.00)
Hot flashes	Never	83(12.7)	214(32.8)	1	1
	Once a week	75(11.5)	35(5.4)	0.18(0.11,0.29)	2.46(1.25,4.83)*
	Daily	204(31.3)	41(6.3)	0.08(0.05,0.12)	5.58(3.31,9.39)*
Depression	Normal (0-7)	128(19.6)	210(32.2)	1	1
	Borderline (8-10)	34(5.2)	39(5.9)	0.69(0.42,1.16)	1.23(0.57,2.66)
	Abnormal (11-21)	200(30.7)	41(6.3)	0.12(0.08,0.18)	1.25(0.67,2.33)
Anxiety	Normal (0-7)	120(18.4)	214(32.8)	1	1
	Borderline (8-10)	37(5.7)	45(6.9)	0.68(0.41,1.11)	0.76(0.36,1.62)
	Abnormal (11-21)	205(31.4)	31(4.8)	0.08(0.05,0.13)	1.71(0.81,3.57
Stress	Low stress (0-13)	170(26.1)	248(38.0)	1	1
	Moderate stress (14-26)	16(2.5)	19(2.9)	0.81(0.40,1.62)	1.22(0.41,3.60)
	High stress (27-40)	176(27.0)	23(3.5)	0.09(0.05,0.14)	2.72(1.32,5.59)*

Presence of Disease	No known disease present	198(30.4)	236(36.2)	1	1
	Hypertension	75(11.5)	15(2.3)	0.17(0.09,0.31)	1.90(0.92,3.93)
	Diabetics	46(7.1)	15(2.3)	0.28(0.15,0.52)	3.16(1.43,6.94)*
	Osteoporosis	18(2.8)	11(1.6)	0.53(0.24,1.15)	0.76(0.26,2.16)
	Others	17(2.6)	13(1.9)	0.66(0.31,1.40)	1.30(0.50,3.38)

Table 4: Bivariable and multivariable binary logistic regression analysis results for factors associated with poor sleep quality among midlife women at Dessie town, northeast Ethiopia, 2022. (n=652).
Note: COR=crude odd ratio: AOR=Adjusted odds ratio; CI= confidence interval; *= significant at p-value ≤0.05; 1=Reference group

Discussion

This study aimed to determine the prevalence of poor sleep quality and its associated factors among midlife women in Dessie town. The prevalence of poor sleep quality in this study was 55.5%, (95% CI= 51.9, 59.0). The result of this study was consistent with the study carried out in Taiyuan, Shanxi 55% [32], 57.8% Turkish women [33], 57.2% Colombia [34], and 58.2% China [35]. The results of this study were lower than those of previous studies conducted in West Tehran: 62.5%, [36], 59.6% Cameroonian women [37], 69.5% Egyptian midlife women [13], and 67.8% in Brazil [11]. This discrepancy might be explained by sample size and a difference in socio-demographic and cultural status.

However, the finding of this study was higher than the results of a study conducted in the USA 31% [38], 42% in California [39], 37.5% in Spain [40], 20% in Iran [10], 23% in Australia [41], 26% in Korea [1], 38.6% in Chines women(16), 49.2% in southern Brazil [42]. Differences in lifestyle, socioeconomic and demographic characteristics and cutoff points for poor sleep quality could all be contributing factors to these discrepancies [43]. This study found that women who had no formal education were more likely to have poor sleep quality than those with a diploma or higher educational status. This finding was consistent with previous research findings done in West Tehran and South Korea [36,44]. Individuals with lower educational levels might have less access to optimal medical care which may lead to poor overall health status. This is expected to increase the likelihood of poor sleep quality [36,43].

The findings from the respondents revealed that chewing khat increased the likelihood of having poor sleep quality when compared to non-chewers. This study's findings were supported by various works of literature [45-48]. Cathinone in khat might stimulate dopaminergic pathways involved in sleep regulation. These effects might be mediated by decreased dopamine uptake by nerve terminals, increased dopamine release, and monoaminoxidase inhibition, and all of these processes might be contributed to poor sleep quality as a result of persistent stimulation of postsynaptic neurons following a high level of dopamine in the synaptic cleft [47,49-51].

According to the findings of this study, women who were obese were more likely to have poor sleep quality than people who were normal weight. This discovery was supported by previous research [44,52]. The possible justification might be obese women may have thickened soft tissue in the airway, which can lead to obstructive sleep apnea, a sleep disorder that causes the airway to be partially or fully blocked [53] and they also have an increased risk of eye problems, which led to poor sleep quality [54]. Weight increases pressure on the abdomen and the extra fat around the belly squeezes the stomach, so more fluid travels upward into the esophagus. This makes it more likely to experience stomach acid leakage and GERD. It can cause heartburn, including at night, which can disrupt sleep [55]. Obesity also causes osteoarthritis is a joint disorder because of the strain additional weight places on the joints and affects sleep with pain [56].

This study found that women who experienced hot flashes were more likely to have poor sleep quality than those who did not. This finding was consistent with previous research [8,16,17,54,57-59]. The possible explanation might be hot flushes are thought to be caused by a disruption in the hypothalamic temperature-regulating system or a decrease in opioid tone in the hypothalamus and pituitary, which might lead to a loss of functioning in the ovaries' female hormones. Hot flushes are brief bouts of generalized heat, most notably in the chest, face, head, and neck, accompanied by profuse sweating. This happened most often at night, resulting in poor sleep quality [16,59].

Findings from this study revealed that Diabetes mellitus is one of those risk factors for poor sleep quality, and previous studies supported this finding [16,44,60,61]. Possible explanations include diabetes neuropathy, restless legs syndrome, and nocturnal polyuria have been proposed to contribute to DM-related sleep problems [48,62]. Diabetes caused nocturia, which is defined as waking up at night to urinate and causes poor sleep quality [63]. Nocturia in diabetics can occur in conjunction with obstructive sleep apnea. The negative intra-thoracic pressure and stretching of the myocardium in patients with obstructive sleep apnea

are thought to release atrial natriuretic peptide (ANP). As a result, vasodilation occurs and aldosterone is inhibited, resulting in sodium and water excretion [64]. Diabetics who experience nocturnal hypoglycemia may have poor sleep quality. Longer intervals between self-monitoring glycaemia are generally seen during the night, and this period is associated with the highest insulin sensitivity. When blood glucose levels fall, hormones that regulate glucose levels are released. These compounds stimulate the brain and serve as a natural signal that it is time to eat. During the night, the brain may interpret this as a signal to wake up and eat. This phenomenon can disrupt sleep and lower overall sleep quality [65]. For people with diabetes, fear of hypoglycemia is a significant psychological burden that may impair sleep [66,67]. Additionally, different insulin regimens can put a diabetic patient at risk for nocturnal hypoglycemia [68]. Restless leg syndrome is a common condition that affects the nervous system, as seen in diabetic patients [69]. Poor sleep quality in restless leg syndrome is a result of symptoms such as the urge to move the legs and an unpleasant sensation that is relieved by movement, symptoms that are made worse by rest (i.e., sleeping), and symptoms that worsen in the evening or at night [70].

Finally, perceived stress was significantly associated with poor sleep quality among midlife women. This finding was supported by the findings of other studies [16,44,71,72]. The possible reason might be stress may cause the HPA axis and autonomic nervous system to release hormones such as adrenaline and cortisol to maintain a heightened state of arousal for extended periods. Being constantly on high alert can cause poor sleep quality [73,74].

Limitation of the Study

Due to the cross-sectional nature of the study design, it is difficult to show a cause-and-effect relationship. Recall bias might be existed due to the subjective nature of the questionnaire.

Conclusion

More than half of the participant had poor sleep quality. Lack of formal education, khat chewing, obesity, diabetes, hot flashes, and stress were significantly associated with poor sleep quality. It is recommended to avoid modifiable risk factors like khat chewing.

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