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Predictive effect of insomnia on quality of life in last trimester pregnant women: A cross-sectional study

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Abstract

This study was conducted to determine the predictive effect of insomnia on quality of life in last trimester pregnant women. This study is a cross-sectional study. The sample of the study consisted of 309 women who were pregnant in the last trimester and were followed up in the university hospital. The data was collected using Women's Health Initiative Insomnia Rating Scale(WHIIRS), World Health Organization Quality of Life Scale Short Form(WHOQOL-BREF). The Kolmogorov-Smirnov test was used to evaluate compliance with the normal distribution. Pearson correlation test used to examine the relationships between life quality subscales, discomforts during pregnancy, chronic disease, psychiatric disease, working status and insomnia. Hierarchical multiple linear regression analysis was used to determine the predictive factors of quality of life. There was a negative relationship between having problems in pregnancy and the physical domain and the psychological domain of quality of life. When working status and discomforts during pregnancy were controlled, it was determined that insomnia was an important predictor of physical, psychological, social relations and environmental areas of quality of life (respectively 21%, 6%, 5%, 4%,). As a result, it can be said that insomnia is one of the important areas that should be intervened to improve the quality of life in pregnant women. *(Afr J Reprod Health 2024; 28 [8]: 14-21).*

Keywords: Insomnia; quality of life; pregnancy; last trimester

Résumé

Cette étude a été menée pour déterminer l'effet prédictif de l'insomnie sur la qualité de vie des femmes enceintes au dernier trimestre. Il s'agit d'une étude transversale. L'échantillon de l'étude était composé de 309 femmes enceintes au dernier trimestre et suivies à l'hôpital universitaire. Les données ont été recueillies à l'aide de l'échelle d'évaluation de l'insomnie de la Women's Health Initiative (WHIIRS), de l'échelle abrégée de la qualité de vie de l'Organisation mondiale de la santé (WHOQOL-BREF). Le test de Kolmogorov-Smirnov a été utilisé pour évaluer la conformité à la distribution normale. Le test de corrélation de Pearson a été utilisé pour examiner les relations entre les sous-échelles de qualité de vie, les désagréments pendant la grossesse, les maladies chroniques, les maladies psychiatriques, le statut professionnel et l'insomnie. Une analyse de régression linéaire multiple hiérarchique a été utilisée pour déterminer les facteurs prédictifs de la qualité de vie. Il y avait une relation négative entre le fait d'avoir des problèmes pendant la grossesse et le domaine physique et le domaine psychologique de la qualité de vie. En prenant en compte le statut professionnel et les désagréments pendant la grossesse, il a été déterminé que l'insomnie était un prédicteur important de la qualité de vie physique, psychologique, sociale et environnementale (respectivement 21 %, 6 %, 5 %, 4 %). Par conséquent, on peut dire que l'insomnie est l'un des domaines importants sur lesquels il faut intervenir pour améliorer la qualité de vie des femmes enceintes. *(Afr J Reprod Health 2024; 28 [8]: 14-21).*

Mots-clés: Insomnie, qualité de vie, grossesse, dernier trimestre

Introduction

Pregnancy is a physiological process in which physiological, psychological and social changes occur in women[1]. Many discomforts occur in pregnant women, especially in the last trimester, such as back pain, foetal movements, inability to take a comfortable position related to the growth of the foetus, frequent urination, leg cramps, restless legs syndrome, difficulty in breathing due to the pressure of the growing uterus on the diaphragm. These disorders cause frequent interruption of sleep in pregnant women[2,3]. Sleep is an important physiological requirement for all humans. Quality sleep helps maintain both mental and physical health and quality of life[4]. Sleep disorders are common

during pregnancy[5]. Sleep disorders in pregnancy start from the first trimester and reach the highest value in the third trimester[6-8]. In a meta-analysis, it was determined that the overall prevalence of insomnia in the third trimester of pregnancy was 42.4%[9].

Sleep disturbance during pregnancy has many negative consequences. It is stated that there is a positive relationship between the sleep quality of pregnant women and the level of stress they perceive[10]. In addition, it is reported that as sleep disturbance increases, fatigue level[11] and depression level increase[8,12]. Both insomnia and the problems caused by insomnia can negatively affect the quality of life. In the literature, there are studies showing that insomnia during pregnancy negatively affects the quality of life[4,13-16]. However, these studies do not examine the predictive effect of insomnia on quality of life. In the literature, a study has been found on the prediction of insomnia's quality of life[17]. Therefore, more studies are needed to support the literature. This study aimed to determine the predictive effect of insomnia on the quality of life of women in the last trimester of pregnancy.

Methods

Research design and participants

This study is a cross-sectional study. The study was conducted in the obstetrics and gynaecology outpatient clinic of a university hospital. The study was conducted with pregnant women who applied to a university hospital for routine pregnancy control and were in the last trimester of their pregnancy. The population of the study consisted of the number of births(2649 births) in a year. For the sample of the study, the sample selection formula with a known universe from probability sampling methods with a significance level of 95% and a margin of error of 0.05[n=Nt2pq/d2(N-1)+t2pq](N=2843p=0.5,q=0.5,t=1.96(α=0.05), d=0.05), it was calculated as 336 women.

Data collection tools

The data was collected using a Descriptive Information Form, Women's Health Initiative Insomnia Rating Scale (WHIIRS), WHOQOL-BREF Quality of Life Scale Short Form. The data was collected face to face by researcher. The forms took 5-10 minutes to fill.

Descriptive information form

The Descriptive Information Form was developed by the authors following a review of the literature[2-8]. This form consisted of 24 questions and the questions were about the sociodemographic and obstetric characteristics of the pregnant women, the problems they experienced during pregnancy and sleep problems and the factors causing sleep problems.

Women's health initiative insomnia rating scale (WHIIRS)

The Women's Health Initiative Insomnia Rating Scale was developed by Levine et al. (2003), and Timur and Şahin (2009) studied the validity and reliability of the Turkish version with women in the menopausal period[18,19]. WHIIRS examines insomnia severity using a 5-point Likert-type scale. The first 4 questions focus on the onset of insomnia, inability to maintain sleep and waking up early in the morning, while the last question is on sleep quality. Each question is answered based on the individuals' experiences over the past 4 weeks, considering the frequency in each week with each item scored between 0 and 4. Higher scores indicate higher levels of insomnia symptoms, with minimum and maximum total scores for the scale of 0 and 20, respectively. A score of 10 or higher on the WHIIRS indicates insomnia in women[19]. The Cronbach's alpha coefficient of the scale was 0.86 and is 0.77 in the present study. The Cronbach's alpha value of the scale in this study was 0.81.

World health organization quality of life scale short (WHOQOL-BREF)

The WHOQOL-BREF Quality of Life Scale was developed by the World Health Organization in 1996 to measure the quality of life in adults in a comprehensive way. Its validity and reliability study were conducted in 1999 by Eser et al. in our country. It consists of 27 questions, and as the score received from the scale rises, so does the quality-of-life score. The scale consists of 4 sub-dimensions: physical domain, psychological domain, social relations domain, and

environmental domain. The Cronbach Alpha values of the scale were found as physical domain 0.83, psychological domain 0.66, social domain 0.53 and environmental domain 0.73[20,21]. In this study, the Cronbach Alpha values of the scale were found as physical area 0.79, psychological area 0.73, social area 0.65 and environmental area 0.78.

Data collection

The data of the study were collected by the researcher by face-to-face interview method. Women who did not have any communication problems (speech, hearing, and language), volunteered to participate in the study, and were in the last trimester of pregnancy were included in the study. Between April 2019 and March 2020 dates, 320 pregnant women were reached. With the detection of the Covid 19 case in the country on March 11, 2020, the data collection process was terminated. The data of 11 pregnant women were not evaluated because they did not answer some questions of the scales used to collect data. As a result, the sample of the study consisted of 309 pregnant women.

Data analysis

The data was analyzed using IBM SPSS AMOS V24 Software. Number, percentage, mean, standard deviation was used as descriptive statistics. Pearson correlation test used to examine the relationships between life quality subscales, discomforts during pregnancy, chronic disease, psychiatric disease, working status and insomnia. Hierarchical multiple linear regression analysis was used to determine the predictive factors of quality of life.

Preliminary data analyses were conducted to ensure that the basic assumptions of multiple regression analysis were met. Firstly, bivariate scatterplots of the variables are examined. It was observed that relationships among variables are linear. In addition, review of residual scatter plots for each model revealed that errors are normally distributed. Moreover, scatter plots of predicted value and residuals were checked to test heterosdasticity. No systematic pattern or clustering of the residuals was seen. Therefore, the variance of error term was constant across each value of predictors. To test multicollinearity, variance inflation factor coefficients (VIF) and tolerance values were calculated. Results indicated that the data have no multicollinearity problem since VIF coefficients ranged from 1.00 and 1.026(below 4) and tolerance values ranged from .975 to 1.00(higher than .20). Independence of errors assumption was met by Durbin-Watson value as ranged between 1.75 and 1.916 for the predictors. Since the value was between 1.5 and 2.5, the error term was seen to be independent of the predictors[22]. Outliers were examined by Leverage value. No problematic cases were detected.

Ethical considerations

Ethics committee approval was received from the Non-invasive Research Ethics Committee (Date:19.03.2019, Number:19-KAEK-084). Institutional permission was obtained from the hospital where the study was conducted. The purpose of the study was explained to the pregnant women and their consent was obtained.

Results

It was determined that the mean age of the pregnant women was 27.63±5.16 and the gestational week was 35.65 ±2.97. In addition, it was determined that 23.0% of the pregnant women are working, 67.3% have a moderate income, 43.4% have a first pregnancy, 10.4% have a chronic disease and 2.6% have a mental illness 29.8% have discomforts during pregnancy. Average daily sleep of the pregnant women in the last 4 weeks was 7.39± 2.15 hours. Moreover, it was determined that 42.4% of the pregnant women slept less than before pregnancy, and 34.6% of them had frequent sleep interruptions. The pregnant women had sleep problems due to frequent use of the toilet at night 35.6%, unable to take a comfortable position at night 35.9%, movements of the baby 18.4% and leg cramps 13.6%. Table 1

Table 1: WHIIRS scale and WHOQOL-BREF scale scores of last trimester pregnant women

Scale Score	Mean± SD
WHOQOL-BREF scale scores	
Physical	13.42±2.51
Psychological	14.45±2.39
Social relationships	14.78±2.80
Environment	15.19±2.21
WHIIRS scale scores	10.20±4.92

Table 2: Correlation between quality-of-life domains and insomnia and some variables

Variables	*Discomforts in pregnancy*		*Chronic disease*		*Psychiatric disease*		*Working status*		*Insomnia*	
	r	*P*	*r*	*P*	*r*	*p*	*r*	*p*	*r*	*p*
Physical domain	-.166**	.003	-.083	.147	-.092	.105	.113*	047	-.442**	.000
Psychological domain	-.119*	.037	-.030	.603	-.108	.058	.085	.137	-.219**	.000
Social relationships domain	-.019	.745	.007	.903	-.038	.500	.143*	.012	-.165**	.004
Environment domain	-.074	.193	.032	.574	-.107	.061	.164**	.004	-.124*	.029

** Correlation is significant at the 0.05 level [2-tailed).*
*** Correlation is significant at the 0.01 level [2-tailed)*

WHIIRS scale score and WHOQOL-BREF scale scores of last trimester pregnant women are given in Table 1. The physical domain scores of the quality of life were 13.42±2.51, the psychological domain scores were 14.45±2.39, the social relations scores were 14.78±2.80 and the environmental scores were 15.19±2.21. The WHIIRS score of the pregnant women was determined as 10.20 ± 4.92 Table 1.

In the study, there was negative weak correlation between experiencing problems during pregnancy and the physical domain and psychological domain of quality of life. It was determined that there was a weak positive correlation between the working status of the pregnant women and the physical domain, social relationships domain and domain environment. In addition, it was determined that there was a significant negative relationship between insomnia and physical domain, psychological domain, social relationships domain environment domain($p<0.05$) (Table 2).

Hierarchical regression analysis predicting quality of life is given in Table 3. The results of the regression analysis of the sub-dimensions of insomnia quality of life are shown in this table.

Physical domain

The first model showed that discomforts during pregnancy[t(305) -2.833, p<.05] was a statistically significant predictor of physical domain of quality of life. İllness during pregnancy explains about 4% of the variance in the physical domain of quality of life. R^2=*.038*, *F* (2.306) =*6.047, p*<.05 (Table 3). In the second model, when working status and discomforts during pregnancy were controlled, insomnia [t (304) =-8.254, p<.05] was a statistically significant predictor of the physical domain of quality of life. This model explained 21% of the variance. R^2=.214, F(3.305)=*27.624, p*<.05. When the working status and discomforts during pregnancy were controlled in the last trimester of pregnancy, it was determined that insomnia significantly predicted the physical domain of quality of life. (Table 3)

Psychological domain

The first model showed that discomforts during pregnancy[*t*(305),-2.004*, *p*<.05], was a statistically significant predictor of *psychological* domain of quality of life. İllness during pregnancy explains about 2% of the variance in the physical domain of quality of life. R^2=*.020, F(2.306)=3.128,* p<.05 (Table 3).

In the second model, when working status and discomforts during pregnancy were controlled, insomnia[t(304)=-3.627, p<.05] was a statistically significant predictor of the psychological domain of quality of life. This model explained 6 % of the variance. R^2 =.061, F(3.305) =6.552, p<.05. When working status during pregnancy and discomfort experienced during pregnancy were controlled, it was determined that insomnia experienced in the last trimester of pregnancy was a significant predictor of the psychological domain of quality of life (Table 3).

Social relationships domain

The first model showed that discomforts during pregnancy[t(305) -2.515, p<.05], was a statistically significant predictor of social relationships domain of quality of life. İllness during pregnancy explains

Table 3: Hierarchical regression analysis predicting quality of life

Quality of Life	Model 1					Model 2				
	B	***SE B***	***β***	***t***	***part***	***B***	***SE B***	***β***	***t***	***part***
Physical domain										
Working status	.609	.335	.102	1.814	.102	.554	.304	,093	1.825	.093
Discomforts in pregnancy	-.874	.309	-.159	-2.833*	-.159	-.506	.283	-.092	-1.787	-.091
Insomnia						-.217	.026	-.425	-8.254*	-.419
R^2	0.038					.214				
F	6.047*					27.624*				
F change	6.047*					68.125*				
Psychological domain										
Working status	.437	.323	,077	1.354	.077	.412	.317	.072	1.302	.072
Discomforts in pregnancy	-.595	.297	-.114	-2.004*	-.113	-.427	.295	-.081	-1.445	-.080
Insomnia						-.099	.027	-.204	-3.627*	-.201
R^2	.020					.061				
F	3,128*					6.552*				
F change	3,128*					13.152*				
Social relationships domain										
Working status	.950	.378	.143	2.515*	.142	.927	.373	.139	2.482*	.139
Discomforts in pregnancy	-.053	.348	-.009	-.152	-.009	.106	.348	.017	.304	.017
Insomnia						-.093	.032	-.164	-2.888*	-.161
R^2	.021					.047				
F	3.216*					4.976*				
F change	3.216*					8,341*				
Environment domain										
Working status	.836	.296	.159	2.823*	,159	.824	.295	.157	2.793*	.156
Discomforts in pregnancy	-.305	.272	-.063	-1.119	-,063	-.220	.275	-.045	-.800	-.045
Insomnia						-.050	.025	-.112	-1.969*	-.110
R^2	.031					.043				
F	4.855*					4.559*				
F change	4.855*					3.878*				

*$p < .05$

about 2% of the variance in the social relationships domain of quality of life. R^2 =.021, F(2.306) =3.216, p<.05(Table 3). In the second model, when working status and discomforts during pregnancy were controlled, insomnia[t(304)=-2.888, p<.05] was a statistically significant predictor of the social relationship's domain of quality of life. This model explained 5 % of the variance. R^2=.047, F(3.305)=4.976, p<.05. When working status and discomfort experienced during pregnancy were controlled, it was determined that insomnia experienced in the last trimester of pregnancy significantly predicted the social relations domain of quality of life (Table 3).

Environment domain

The first model showed that discomforts during pregnancy [t(305) 2.823, p<.05], was a statistically significant predictor of environment domain of quality of life. İllness during pregnancy explains about 3% of the variance in the environment domain of quality of life. R^2 =.031, F(2.306)=4.855, p<.05 (Table 3). In the second model, when working status and discomforts during pregnancy were controlled, insomnia [t(304)=2.793, p<.05] was a statistically significant predictor of the environment domain of quality of life. This model explained 4 % of the variance. R^2=.043, F(3.306)=4.855, p<.05.

When working status and discomfort experienced during pregnancy were controlled, insomnia experienced in the last trimester of pregnancy was determined to be a significant predictor of the environmental domain of quality of life (Table 3).

Discussion

Insomnia is common in the last trimester of pregnancy[9]. During the third trimester, sleep is interrupted because of frequent urination, back pain, shortness of breath and leg cramps[23]. This study WHIIRS score of the pregnant women was determined as 10.20 ± 4.92. In the study of Çoban and Yanıkkerem, the mean Pittsburgh Sleep Quality Index (PSQI) score of the pregnant women was determined as 6.38±3.46[11]. In the study of Köybaşı and Uy, the PSQI score of the 3rd trimester pregnant women was found as 7.11±3.55. In the same study, the rate of pregnant women with a PSQI score of 5 or higher was 72%[6]. In the study of Çelik and Köse, it was determined that the score PSQI of the pregnant women was 7.38±4.91 and according to the Berlin Sleep Questionnaire, 44.07% of the pregnant women had poor sleep quality[7]. Although different scales were used in studies evaluating sleep during pregnancy, the common result in all of them is that sleep problems are seen during pregnancy and sleep problems increase especially in the 3rd trimester. There are studies in the literature evaluating sleep and quality of life during pregnancy. In a recent study, those who had insomnia during pregnancy had a significantly lower health-related quality of life than those who did not[13]. In another study, there were significant associations between quality of life and sleep quality total score, habitual sleep activity subdomains, sleep disturbance, and daytime dysfunction[14]. In the study of Özhüner and Çelik, it was determined that as sleep quality decreases, quality of life decreases[4]. In a study conducted with pregnant women in the 2nd trimester of their pregnancy, it was determined that there was a relationship between sleep quality and physical and psychological health sub-dimensions of quality of life[15]. Another study found that sleep problems were an important predictor of poorer quality of life in all domains except emotional role[17]. In Davoud and Abazari's study, insomnia had a negative correlation with overall quality of life, general health, physical health, and psychological health. However, insomnia was not significantly associated with social relationships and environmental health[16]. In the study of Altıparmak *et al*., it was determined that the quality of life of pregnant women who had insomnia problems was low in all domains except the mental domain[24]. Results of a systematic review study also found that poor sleep quality was associated with poorer overall quality of life during pregnancy, with effect sizes being low to moderate[25]. In this study, it was determined that there was a negative significant relationship between insomnia and all domain of quality of life (p<.05).

In the study, discomforts during pregnancy were negatively correlated with the physical domain and psychological domain. In other words, the physical domain and psychological domains of the quality of life of women who had a disorder during pregnancy were negatively affected. In the study conducted by Can *et al*., it was determined that the physical and psychological problems of pregnant women reduce their quality of life[26]. In Olsson and Lena's study, factors affecting the quality of life of women with back pain during pregnancy were mostly related to physical ability[27]. It is reported that it significantly affects the quality of life in women who have vomiting during pregnancy[28]. Pregnant specific health problems, especially the risk for preterm delivery is associated with more depressive symptoms and decreased Health-Related Quality of Life (HRQL) in pregnancy[29-]. The results of the study are similar to the literature. In the study, there was a positive relationship between working status and physical domain, social relationships domain and environment domain. In other words, it was observed that working in a job positively affected the quality of life of pregnant women in the physical domain, social relationships domain and environment domain. No study was found in the literature examining the relationship between working status and quality of life. Therefore, the results of this study are discussed with the results of studies examining the relationship between activity level during pregnancy and quality of life, considering that working women have a more active life. In the studies evaluating the effect of activity level on quality of life, it was determined that active pregnant women had higher quality of life than low active pregnant women[30,31]. This result of the study is like the literature and can be interpreted as an active life during pregnancy is associated with increased quality of life.

In the study, the effect of insomnia on the quality of life was examined by controlling the working status of pregnant women and discomfort during pregnancy, which are related to quality of life. In the analyses conducted by controlling the variables related to quality of life, it was determined that quality of life was a significant predictor of physical, psychological, social relations and environmental areas (21%, 6%, 5%, 4%, respectively). The study by Da Costa et al. showed that the identified predictors explained 16–58% of the variance in various domains of quality of life. In the same study, sleep problems were a significant predictor of lower quality of life in all dimensions except role emotion[17]. It can be said that insomnia mostly affects the quality of life related to the physical area. In a study conducted to determine the riskiest areas of quality of life during pregnancy, physical changes causing restrictions and physical activity restrictions were expressed as the riskiest areas of quality of life[32]. The results of our study are like the literature. Insomnia is an important predictor of all areas of quality of life, especially the physical area of quality of life. Interventions to prevent insomnia during pregnancy will be effective in increasing the quality of life in pregnant women

Conclusion

There was a negative relationship between having problems in pregnancy and the physical domain and the psychological domain of quality of life. There was a positive relationship between working status and physical domain, social relationships domain and environment domain. In addition, it was determined that there was a significant negative relationship between insomnia and physical domain, psychological domain, social relationships domain, and environment domain. When working status and discomforts during pregnancy were controlled, it was determined that insomnia was an important predictor of physical, psychological, social relations and environmental areas of quality of life. Insomnia explained 21% of poor quality of life in the physical domain and 6% of poor quality of life in the psychological domain in pregnant women in the last trimester of pregnancy. As a result, it can be said that insomnia is one of the important areas that should be intervened to improve the quality of life in pregnant women. To improve the quality of life of pregnant women, it may be recommended that healthcare personnel evaluate insomnia and provide counselling to help pregnant women gain skills to cope with insomnia**.**

Limitations

In this study, the predictive power of insomnia in quality of life was examined by excluding variables that were determined to affect quality of life. This is the strength of our study. One of the limitations of our study is the length of the data collection process. Another limitation is that, since too many variables can affect quality of life, the predictive power was examined by excluding some variables limited to this study.

Conflict of Interest

The author has no relevant financial or non-financial interests to disclose

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