Original Research

Sleep Quality Components as Predictors of Health-Related Quality of Life Domains among Primigravida in Ibadan, Nigeria

Funmilola Bosede Olutola[*], Grace A. Adejuwon

Department of Psychology, School of the Social Sciences, University of Ibadan, Ibadan, Nigeria

Abstract

Background and Objective: Pregnancy and childbirth are periods of great joy and delicate, interesting, and exciting aspects of women's life. The study investigates whether sleep quality components will predict health-related quality of life (HRQOL) domains among primigravidas.

Materials and Methods: The study employed descriptive research design. 768 primigravidas, attending antenatal care in nine purposively-selected government hospitals in Ibadan, Nigeria, which fulfilled the inclusion criteria participated in the study. A questionnaire consisting of demographic information of primigravidas, World Health Organization Quality of Life-BREF (WHOQOL-BREF), and Pittsburgh Sleep Quality Index (PSQI) with reliability coefficient of 0.89 and 0.85, respectively, were used to collect data. Six hypotheses were tested using multiple regression analysis (MRA) and analysis of variance (ANOVA).

Results: Sleep quality components had a statistical, joint influence on HRQOL domains (physical health domain, $F = 4.526$, $P < 0.01$; psychological domain, $F = 2.931$, $P < 0.05$; and environment domain, $F = 2.788$, $P < 0.05$) of primigravidas in Ibadan. In addition, domains of HRQOL were significantly influenced by primigravidas' marital status ($F = 3.591$, $P < 0.05$).

Conclusion: Effective management of sleep quality components during pregnancy can improve HRQOL domains of primigravidas. Researchers recommended that antenatal care lectures for primigravidas should be reinforced with emphasis on the sleep quality and its influence on their HRQOL domains for better wellness of the primigravidas.

Keywords: Health; Pregnancy; Pregnancy trimesters; Public hospital; Quality of life; Sleep quality

---

Introduction

Health-related quality of life (HRQOL) is a complex term used in public health to address a person or group perceiving mental and physical health condition over time. Health as more than the presence or absence of disease or sicknesses includes a complete condition of having physical, mental, and social well-being (1). In addition, health can be viewed as a relative state in which an individual is able to perform adequately physically, socially, mentally, and spiritually, so as to convey the full range of one's unique potentialities within one's environment (2). Thus, the state of one's health will determine one's HRQOL. Carr et al. (3) explained HRQOL as a broad-ranging construct that is affected in diverse ways by the individuals' psychological state, physical health, state of independence, social relationships, and their connections to important characteristics of their environment. Quality of life (QOL) plays an important function in the pregnant women's health, because it evaluates aspects of psychological well-being, physical functioning (the capacity to carry out physical activities), subjective symptoms (bodily fatigue and pain), and cognitive and social functioning (4).

Pregnancy is a dynamic condition that can alter a woman's health status at any time. It is essential

* *Corresponding author*: *FB. Olutola, Department of Psychology, School of the Social Sciences, University of Ibadan, Ibadan, Nigeria*
Tel: +234 803 809 4141, Fax: +234 803 809 4141
Email: funmilolatola@gmail.com

for women to have healthy pregnancies, which will result in healthy children. First pregnancy has been observed as a significant transition in a woman's life (5).

Pregnancy (mostly the first one) involves various adjustments that include physiological, occupational, financial, and other areas. The required adjustment during pregnancy may evoke psychological, social, and behavioral distress for women, especially those with poor QOL (6). Primigravidas may be anxious about the health of their babies, imminent childbirth, and future responsibilities as mothers (7). Pregnancy involves two major changes which are physical and psychological changes. The understanding of these changes and their connections is important when offering any assistance relating to the pregnant woman's health, because it creates varying clinical outcomes in different people (8, 9). The physiological changes that take place during pregnancy and affect the biochemistry, anatomy of organs, and systems should be considered. They may affect sleep quality and HRQOL.

According to Raphael et al. (10), physical health QOL encompasses exercise, physical health, nutrition, clothing, personal hygiene, and overall appearance. It is commonly identified as physical HRQOL. Kane (11) examined the importance of physical health status features in QOL. Physical health status deals with physical well-being and absence of pain, illness, disease, injury, discomfort, and disability. Social health of QOL examines the way individuals viewed their personal experiences in terms of personal relationships, sexual activities, social supports, and the meaning that their situations have for them at a particular time in their lives. Having a responsibility in a society with connections to a social system is essential for individual's QOL (12).

Considering such things as social environment, material resources, and most importantly, the meanings that individuals attached to circumstances and occurrences in their lives, are important factors in social domain of HRQOL (12, 13). However, Forger et al. studied how pregnancy affected HRQOL of pregnant women having rheumatic diseases. The study reported more bodily pain and impaired physical domain in healthy women in the third trimester of pregnancy (14).

Sleep is an essential and unavoidable daily activity with different dimensions such as physiological, psychological, and social dimensions,

which influence QOL and wellness of individuals. Sleep quality refers to how well one sleeps (15). A good sleep pattern is essential in the preparation for childbirth and keeps the fetus from the psychological strains and pressures of pregnancy (16).

Complaints by majority of pregnant women during pregnancy indicated declined sleep duration and poor sleep quality (17), that is mainly due to the influences of hormonal variations (18), frequent urination, backache, and other factors during pregnancy (19, 20).

Moreover, hormones are somewhat responsible for sleep-wake pattern. Variations in progesterone and estrogen level during pregnancy may cause sleep difficulties (21).

Sleep quality affects pregnant women's health and HRQOL, because they are prone to encounter sleep disorders during pregnancy. Sleep deprivation and disturbances have many reactions on the human body and psychological health (22). As pregnancy progresses, pregnant women experience more restless and fragmentary sleep which reduces sleep quality. Poor sleep quality is a crucial issue for pregnant women, because it affects physiological, cognitive/behavioral, social, and emotional health and total HRQOL (23, 24). During the first trimester of conception, time spent sleeping increases; however, sleep quality decreases. The duration of sleep reported by pregnant women starts to reduce from second trimester, and sleep disturbances get to the highest levels in the third trimester (25). In the first and third trimesters, most pregnant women report extreme tiredness.

Poor sleep continuity is common in pregnancy. Sleep is also measured by examining the duration of sleep attained during the night. Sleep duration changes across pregnancy trimesters, usually declining by term. It can add to poor sleep continuity and quality (26). Disturbances in sleep pattern and quality during pregnancy are generally grouped as disrupted sleep quality, short or long sleep duration, poor sleep continuity (fragmentation), sleep efficiency, sleep latency, and lack of sleep as daytime dysfunction. Sleep quality declines as pregnancy progresses, particularly as characterized by poor sleep continuity (27, 28). Sleep disruption affects QOL in a significant way. hose with poor sleep experience the daytime effects such as extreme daytime drowsiness (29).

However, issues regarding maternal health have become global issues requiring urgent em-

pirical attention. It is important to note that maternal mortality is concentrated in Sub-Saharan Africa (where Nigeria is located) and Southern Asia, which jointly reported 86% of such deaths globally in 2013 (30, 31). Nigeria has been ranked high among the list of countries with high maternal mortality rate in the world. Nigeria's maternal mortality ratio of 814 per 100000 live births and under-five mortality ratio of 109 per 1000 live births make the country rated as the second highest contributor to the maternal and under-five mortality rate of the world (32).

Primigravidas experience more discomfort compared to multigravidas (33). Empirical studies have shown that primigravidas are in a high-risk group (34). Studies revealed that poor sleep quality increased complications like prolonged labor, cesarean section, and depression in the course of pregnancy and after childbirth (postpartum blues), which have adverse influence on families, the community, and QOL (35, 36). Moreover, 78% of expectant mothers reported having increased sleep disturbances in pregnancy compared with other periods of their lives (37).

Thus, the individual stages in the context of pregnant women can be related to intrapersonal concepts which may include developmental, demographic, biological, or psychological variables. Borcherding conducted a descriptive survey research to examine coping in healthy primigravidas and described socio-demographic variables related with coping styles. The study concluded that healthy primigravidas utilized different types of coping strategies, which are affected by socio-demographic factors (38).

Therefore, it is worthwhile to note that the importance of sleep quality in the HRQOL of pregnant women cannot be underestimated. This will assist them to maintain their well-being and deliver without complications. Hence, this study investigated the influence of sleep quality components on HRQOL domains among primigravidas in Ibadan, Nigeria.

However, six hypotheses were formulated in the study:
1. Sleep quality components will significantly, independently, and jointly influence physical health domain of HRQOL among primigravidas in Ibadan.
2. Sleep quality components will significantly, independently, and jointly influence psycho-

logical domain of HRQOL among primigravidas in Ibadan.
3. Sleep quality components will significantly, independently, and jointly influence social relationship domain of HRQOL among primigravidas in Ibadan.
4. Sleep quality components will significantly, independently, and jointly influence environment domain of HRQOL among primigravidas in Ibadan.
5. Primigravidas' marital status will have a significant influence on their HRQOL.
6. There will be a significant difference in HRQOL across the trimester stage of pregnancy (pregnancy duration) among primigravidas.

Materials and Methods

In this study, the researchers adopted a descriptive research design of survey type. This study took place in Ibadan, from February to July, 2019. Purposive sampling technique was used to select nine public (government-owned) hospitals. The population consisted of all the primigravidas in public hospitals in Ibadan, while the target population consisted of primigravidas who were attending antenatal care in the public hospitals in Ibadan. 768 primigravidas attending antenatal care in 9 public hospitals in Ibadan that were purposively selected, participated in the study. These selected respondents fulfilled the inclusion criteria.

Relevant data were collected through a self-report questionnaire consisting of three sections: A, B, and C.

Section A consisted of demographic characteristics of primigravidas. It contained information on age, marital status, and months of pregnancy.

Section B consisted of the World Health Organization Quality of Life-BREF (WHOQOL-BREF) scale. It is a 26-item questionnaire designed by WHOQOL Group to be a cross-cultural relevant scale for the subjective assessment of HRQOL. It was utilized to assess respondents' HRQOL. The items are graded on a 5-point Likert scale. The scores were transformed on a scale from 0 to100, with a score above 50 representing good health and below 50 representing poor health for each domain (39). Researchers recorded excellent internal reliability Cronbach's alpha of 0.86 for WHOQOL-BREF (40). Moreover, Cronbach's alpha of 0.89 was recorded during revalidation of the instrument in the course of this study.

Section C consisted of self-report Pittsburgh Sleep Quality Index (PSQI) using Likert and open-ended response formats and was developed by Buysse et al. (41). It was used to measure sleep quality of the participants. The PSQI yields scores of seven components (i.e., subscales): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of medication, and daytime dysfunction. Each component is rated on a scale of 0-3; thus, the score range is between 0 and 21. The sum of these seven subscales results in overall score of subjective sleep quality. PSQI scores less than 5 were classified as good sleepers, while scores above or equal to 5 were categorized as poor sleepers. The scale had Cronbach's alpha reliability of 0.80 (42). Cronbach's alpha of 0.85 was recorded during revalidation of the instrument.

Ethical approval: The researchers collected relevant data after the approval of the Social Sciences and Humanities Ethics Committee (SSHEC), Oyo State Ethics Review Committee (OSRERC), and University of Ibadan/University College Hospital Ethics Committee (UI/UCHEC). The researchers sought the cooperation of the health workers in the antenatal section (doctors, nurses, and health record officers) and questionnaire was administered on the participants that met the inclusion criteria during the antenatal clinic days.

Criteria for inclusion: Participants were primigravidas who were 18 years and above, primigravidas who were attending antenatal care in public hospitals only in Ibadan, and primigravidas who indicated willingness to participate in the study.

Criteria for exclusion: Women who have been pregnant more than once, primigravidas who were below 18 years, primigravidas who did not seek for health care (attending antenatal care) in public hospitals in Ibadan, and primigravida who were not willing to take part in the study.

Statistical tools: The data collected for the study were analyzed using frequency and percentage for the demographic characteristics of the respondents. Hypotheses one to four were analyzed using multiple regression analysis (MRA), while hypotheses five and six were analyzed using analysis of variance (ANOVA). All the hypotheses were tested at 0.01 and 0.05 alpha level.

Results

The researchers presented the demographic characteristics of the respondents and the results of six hypotheses were formulated for the study.

Table 1 revealed that out of the 768 participants, 150 (19.4%) were single, 601 (78.3%) were married, 10 (1.3%) were divorced, and 7 (0.7%) were living apart. In addition, table 1 presents the duration of pregnancy among the participants in three trimesters, in which it was observed that 123 (16.0%) of the respondents were between 1-3 months of pregnancy, 321 (42.6%) were between 4-6 months, while the remaining 318 (41.4%) were between 7-9 months.

Table 1. Socio-demographic characteristics of the respondents

Characteristics	Level	n (%)
Marital status	Single	150 (19.5)
	Married	601 (78.3)
	Divorced	10 (1.3)
	Living apart	7 (0.9)
Total		768 (100)
	1-3	123 (16.0)
Pregnancy duration (month)	4-6	327 (42.6)
	7-9	318 (41.4)

Hypothesis One: Sleep quality components will significantly, independently, and jointly influence physical health domain of HRQOL among primigravidas in Ibadan.

The results of the hypothesis are presented in table 2.

The results in table 2 show that sleep quality components jointly predicted physical health domain of HRQOL among primigravidas in Ibadan [R = 0.200, R^2 = 0.040, $F_{(7,759)}$ = 4.526, P < 0.010].

Table 2. Multiple regression analysis (MRA) showing the influence of sleep quality components on physical health domain of health-related quality of life (HRQOL)

Variable	β	t-value	P-value	R	R^2	F	P-value
Subjective sleep quality	-0.084	-2.186	0.029	0.200	0.040	4.526	< 0.010
Sleep latency	-0.052	-1.390	0.165				
Sleep duration	-0.001	-0.020	0.984				
Habitual sleep efficiency	-0.110	-3.045	0.002				
Sleep disturbance	0.148	3.843	< 0.001				
Use of medication	-0.027	-0.687	0.493				
Daytime dysfunction	-0.072	-1.767	0.078				

Degree of freedom (df) = 7, 759

Table 3. Summary of multiple regression showing the influence of sleep quality components on psychological domain of health-related quality of life (HRQOL)

Variable	β	t-value	P-value	R	R^2	F	P-value
Subjective sleep quality	-0.060	-1.538	0.125	0.162	0.026	2.931	< 0.050
Sleep latency	0.063	1.685	0.092				
Sleep duration	0.029	0.787	0.431				
Habitual sleep efficiency	-0.024	-0.670	0.503				
Sleep disturbance	0.075	1.924	0.055				
Use of medication	-0.049	-1.257	0.209				
Daytime dysfunction	-0.094	-2.290	0.022				

Degree of freedom (df) = 7, 759

This implies that sleep quality components jointly accounted for 4.0% variance in physical health domain of HRQOL.

Moreover, the analysis of independent predictions indicated that habitual sleep efficiency (β = -.110, t = -3.045, P < 0.010) and sleep disturbance (β = 0.148, t = 3.843, P < 0.010) independently and significantly predicted physical health domain of HRQOL among primigravidas in Ibadan. Therefore, hypothesis one was partially supported by the results obtained in this study.

Hypothesis Two: Sleep quality components will significantly, independently, and jointly influence psychological domain of HRQOL among primigravidas in Ibadan.

The hypothesis was tested using MRA and the results are presented in table 3.

The results in table 3 show that sleep quality components jointly predicted psychological domain of HRQOL among primigravidas in Ibadan [R = 0.162, R^2 = 0.026, $F_{(7,759)}$ = 2.931, P < 0.050]. This implies that sleep quality domains jointly accounted for 2.6% variance in physical health domain of HRQOL.

Though the predictive influence of sleep quality components on psychological domain of HRQOL was very low, it was statistically significant. This means that sleep quality components still have influence on psychological domain of HRQOL.

In addition, the analysis of independent predictions indicated that daytime dysfunction (β = -0.094, t = -2.290, P < 0.050) independently

and significantly predicted psychological domain of HRQOL among primigravidas in Ibadan. Therefore, the stated hypothesis two was partially accepted based on the results obtained in this study.

Hypothesis Three: Sleep quality components will significantly, independently, and jointly influence social relationship domain of HRQOL among primigravidas in Ibadan.

The hypothesis was tested using MRA and the results are presented in table 4.

The results in table 4 show that sleep quality components did not have a joint influence on social relationship domain of HRQOL among primigravidas in Ibadan [R = 0.078, R^2 = 0.006, $F_{(7,759)}$ = 0.672, P > 0.050]. In addition, sleep quality domains did not independently and significantly predict the social relationship domain of HRQOL among primigravidas in Ibadan. Therefore, the stated hypothesis three was not accepted based on the results obtained in this study.

Hypothesis Four: Sleep quality components will significantly, independently, and jointly influence environment domain of HRQOL among primigravidas in Ibadan.

The hypothesis was tested using MRA and the results are presented in table 5. The results in table 5 show that sleep quality components jointly predicted environment domain of HRQOL among primigravidas in Ibadan [R = 0.158, R^2 = 0.025, $F_{(7,759)}$ = 2.788, P < 0.050]. This implies that sleep quality components jointly accounted for 2.5% variance in environment domain of HRQOL.

Table 4. Summary of multiple regression showing the influence of sleep quality components on social relationship domain of health-related quality of life (HRQOL)

Variable	β	t-value	P-value	R	R^2	F	P-value
Subjective sleep quality	-0.004	-0.104	0.917	0.078	0.006	0.672	> 0.050
Sleep latency	-0.022	-0.581	0.561				
Sleep duration	0.028	0.764	0.445				
Habitual sleep efficiency	-0.033	-0.898	0.370				
Sleep disturbance	0.031	0.789	0.431				
Use of medication	-0.063	-1.596	0.111				
Daytime dysfunction	0.004	0.090	0.929				

Degree of freedom (df) = 7, 759

Table 5. Summary of multiple regression showing the influence of sleep quality components on environment domain of health-related quality of life (HRQOL)

Variable	β	t-value	P-value	R	R^2	F	P-value
Subjective sleep quality	-0.037	-0.954	0.340	0.158	0.025	2.788	< 0.050
Sleep latency	-0.016	-0.435	0.664				
Sleep duration	-0.054	-1.492	0.136				
Habitual sleep efficiency	0.007	0.195	0.846				
Sleep disturbance	0.153	3.948	< 0.001				
Use of medication	0.003	0.083	0.934				
Daytime dysfunction	-0.053	-1.280	0.201				

Moreover, the analysis of independent predictions indicated that sleep disturbance (β = 0.153, t = 3.948, P < 0.050) independently and significantly predicted the environment domain of HRQOL among primigravidas in Ibadan. Therefore, the stated hypothesis four was partially accepted based on the results obtained in the study.

Hypothesis Five: Primigravidas' marital status will have a significant influence on their HRQOL.

This hypothesis was tested using one-way ANOVA. Outcomes are revealed in table 6a.

Table 6a. Summary of one-way analysis of variance (ANOVA) showing the influence of marital status on health-related quality of life (HRQOL) of primigravidas

Variable	β	t-value	P-value	F	P-value
Between groups	2155.173	4	538.793	3.591	0.007
Within groups	114491.656	763	150.055		
Total	116646.828	767			

df: Degree of freedom

Outcomes from table 6a indicate that there was a significant, statistical influence of marital status on HRQOL among primigravidas [$F_{(3,763)}$ = 3.591, P < 0.050]. The result implies that the HRQOL varied significantly across the marital status of primigravidas. Thus, a post-hoc analysis was carried out to ascertain the order of influence across the various marital statuses of the participants. Outcomes of the post-hoc analysis are shown in table 6b.

Results of mean ranking from table 6b show that primigravidas who were living apart reported the highest level of HRQOL (x̄ = 100.20). Primigravidas who were married (x̄ = 96.31) and single (x̄ = 92.40) ranked 2nd and 3rd, respectively, in

their levels of HRQOL. Primigravidas who were divorced reported the lowest level of HRQOL (x̄ = 92.00). Furthermore, least significant difference (LSD) results on HRQOL revealed that mean differences that were greater than (or equal to) 7.79 were significant at P < 0.050. The hypothesis stated was therefore supported.

Table 6b. Multiple comparison showing least significant difference (LSD) of health-related quality of life (HRQOL) across marital status

Marital status	1	2	3	4	Mean
Single		-3.91	0.40	-7.79*	92.40
Married			4.31	-3.88	96.31
Divorced				-8.20*	92.00
Living apart					100.20

The mean difference is significant at the 0.05 level

Hypothesis Six: There will be a significant difference in HRQOL across the trimester stage of pregnancy among primigravidas.

The stated hypothesis was analyzed utilizing one-way ANOVA. Outcomes are shown in table 7.

Results from table 7 show that there was no significant statistical difference in HRQOL across the trimester stage of pregnancy among primigravidas [$F_{(2,765)}$ = 2.756, P > 0.050]. The results imply that the trimester stage of pregnancy among the participants had no significant influence on their HRQOL. The hypothesis stated was therefore rejected.

Discussion

Hypothesis one which states that sleep quality components will significantly, independently, and jointly influence physical health domain of HRQOL among primigravidas in Ibadan was partially accepted.

Table 7. Summary of one-way analysis of variance (ANOVA) showing influence of trimester stage of pregnancy on health-related quality of life (HRQOL)

	Sum of squares	df	Mean square	F	P-value
Between groups	834.424	2	417.212	2.756	0.064
Within groups	115812.404	765	151.389		
Total	116646.828	767			

df: Degree of freedom

The results show that sleep quality components jointly accounted for 4.0% variance in physical health domain of HRQOL. Moreover, habitual sleep efficiency and sleep disturbance independently and significantly predicted physical health domain of HRQOL among primigravidas in Ibadan.

Calou et al. (43) supported the results obtained in hypothesis one. They reported that practicing physical activity during pregnancy favored a better QOL. This finding aligned with the outcome of the study undertaken by Sut et al. (44) on pregnant women. Their report revealed that a significant association existed between sleep quality and HRQOL among pregnant women. Mourady et al. (45) also reported a similar result during their cross-sectional study on correlates of QOL among 141 sampled pregnant women. They reported that a remarkable relationship existed between sleep and QOL among pregnant women.

Hypothesis two which assumes that sleep quality components will significantly, independently, and jointly influence psychological domain of HRQOL among primigravidas in Ibadan was partially accepted. From the results, sleep quality domains jointly accounted for 2.6% variance in physical health domain of HRQOL, while daytime dysfunction independently and significantly predicted psychological domain of HRQOL among primigravidas in Ibadan. This finding also aligned with the outcome of the study undertaken by Rezaei et al. (46). Their study on QOL in expectant mothers with sleep challenges showed that in the second trimester, the mean of sleep quality was 8.62 ± 2.81 in those having sleep problems or unfavorable sleep quality. QOL and psychological health domain related to sleep quality.

The 3rd hypothesis states that sleep quality components will significantly, independently, and jointly influence social relationship domain of HRQOL among primigravidas in Ibadan. The stated hypothesis three was rejected, because sleep quality components did not significantly, independently, and jointly influence social relationship domain of HRQOL among primigravidas in Ibadan. The findings of this study were supported by Lee (23) and Lee et al. (24). They observed that poor sleep quality was a crucial issue for expectant mothers, because it affected physiological, cognitive/behavioral, social, as well as emotional health.

The fourth hypothesis which suggests that sleep quality components will significantly, independently, and jointly influence environment domain of HRQOL among primigravidas in Ibadan was partially accepted, because sleep quality components jointly accounted for 2.5% variance in environment domain of HRQOL. Thus, sleep disturbance independently and significantly predicted the environment domain of HRQOL among primigravidas in Ibadan. In addition, the result of this study aligned with the result of a study by Tsai et al. (47) which investigated the relationship between sleep and HRQOL among pregnant women using a cross-sectional and longitudinal method. They reported that of all the components of sleep quality, sleep disturbances were prominent and persistent issues in pregnant women.

Hypothesis five in this study which stated that primigravidas' marital status would have a significant influence on their HRQOL was confirmed. The result of post-hoc analysis revealed that respondents who were living apart and those who were married had higher mean of HRQOL than those who were single and those who were divorced. The study is supported by the work of Calou et al. (48) on maternal determinants of QOL among Brazilian women who were pregnant. Their study was a cross-sectional research undertaken in one private unit and two public units that provided prenatal care services. Their finding showed that marital status and significant others were the determinants that positively interfered in the pregnant women's QOL.

Hypothesis six which states that there will be a significant influence of pregnancy trimesters on HRQOL was not confirmed and thus not accepted. This means that pregnancy trimester of primigravidas does not have significant predictive capacity of their HRQOL. It is good to note that the insignificant statistical difference obtained in hypothesis six may be as a result of the respondents used in the study; they were all primigravidas which made the respondents to be homogeneous in nature. The result is not in agreement with Fernandes and Vido (49) who examined expectant mothers' QOL at each trimester of pregnancy. They observed that gravid women in the first trimester reported better QOL than those in the second trimester. Moreover, no disparity in QOL was found between those in the first, second, and third trimester of pregnancy. In addition, re-

searchers also discovered that the last trimester of pregnancy had the lowest QOL scores, while the second trimester had the highest scores (50, 51).

Conclusion

HRQOL is a complex concept that involves components associated with mental, physical, social, and emotional functioning. From the results, the researchers concluded that sleep quality components (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of medication, and daytime dysfunction) of primigravidas were very important to their physical, psychological, social relationship, and environment domains of HRQOL. This means that sleep quality components are important variables when considering primigravidas' HRQOL, because they could play some level of roles in explaining how poor or good primigravidas' HRQOL will be.

The following recommendations were made based on the results of this study:
1. Health-care workers should lay more emphasis on how sleep quality components influence the HRQOL domains of primigravidas. This will assist them to live a healthy life and maintain their well-being.
2. Antenatal care lectures for primigravidas should be reinforced with emphasis on the sleep quality components and their influence on primigravidas' HRQOL.

Limitations: Prominent among the limitations are study area, scope, and population. The study participants were limited to primigravidas attending public hospitals in Ibadan. Thus, findings cannot be generalized to other healthcare providers such as private, mission, and trado-medical hospitals. These should be covered in future studies for wider generalization and comparison of findings. Moreover, the location of the study can be extended to other states or regions in Nigeria.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

References

1. World Health Organization. Population Reports: Issues in World Health: 9, Geneva. 2020.
2. The Free Dictionary by Farlex. Holistic health [Online]. [cited 2018 Oct 23]; Available from: URL: https://medical-dictionary.thefreedictionary.com/ holistic+health
3. Carr AJ, Higginson IJ, Robinson PG. Quality of life. London, IK: BMJ Books, 2003.
4. Ware JEJ, Kosinski, M, Bjorner, JB, et al. User's Manual for the SF-36v2TM Health Survey. 2nd ed. Lincoln, RI: Quality Metric Incorporated; 2007.
5. Hofberg K, Ward MR. Fear of pregnancy and childbirth. Postgrad Med J 2003; 79: 505-10.
6. Ritter C, Hobfoll SE, Lavin J, et al. Stress, psychosocial resources, and depressive symptomatology during pregnancy in low-income, inner-city women. Health Psychol 2000; 19: 576-85.
7. Lobel M, Hamilton J, Cannella D. Psychosocial perspectives on pregnancy: prenatal maternal stress and coping. Soc Personal Psychol Compass 2008; 2: 1600-23.
8. Davis-Floyd R. Birth as an American rite of passage. 2nd. Berkeley, CA: University of California Press; 2004.
9. Gottlieb DJ. Does obstructive sleep apnea treatment reduce cardiovascular risk?: It is far too soon to say. JAMA 2017; 318: 128-30.
10. Raphael D, Brown I, Renwick P, et al. Quality of life: What are the implications for health promotion? Am J Health Behav 1997; 21(2): 118-28.
11. Kane RL. Assuring quality in nursing home care. J Am Geriatr Soc 1998; 46: 232-7.
12. Bond J. Quality of life for people with dementia: Approaches to the challenge of measurement. Ageing Soc 1999: 5; 561-79.
13. Baxter J, Shetterly SM, Eby C, et al. Social network factors associated with perceived quality of life. The San Luis Valley Health and Aging Study. J Aging Health 1998; 10: 287-310.
14. Forger F, Ostensen M, Schumacher A, et al. Impact of pregnancy on health related quality of life evaluated prospectively in pregnant women with rheumatic diseases by the SF-36 health survey. Ann Rheum Dis 2005; 64: 1494.
15. National Sleep Foundation. Why do we need Sleep? [Online]. [cited 2020]; Available from: URL: https://http://www.sleepfoundation.org//www.sleepfoundation.org/articles/why-do-we-need-sleep
16. Evy Baby. The importance of sleep during pregnancy [Online]. [cited 2015 Oct]; Available from: URL: https://www.evybaby.com/en-eg/moms-land/articles/2015/october/the-importance-of-sleep-during-pregnancy
17. Okun ML, Tolge M, Hall M. Low socioeconomic status negatively affects sleep in pregnant women. J Obstet Gynecol Neonatal Nurs 2014; 43: 160-7.
18. Mehta N, Shafi F, Bhat A. Unique aspects of sleep in women. Mo Med 2015; 112: 430-4.

19. Chen CK, Pei YC, Chen NH, et al. Sedative music facilitates deep sleep in young adults. J Altern Complement Med 2014; 20: 312-7.

20. Shobeiri F, Khaledi S, Masoumi SZ, et al. The prevalence of sleep disorders in pregnancy and some of the associated factors in Hamadan, Iran. Research Journal of Pharmaceutical, Biological and Chemical Sciences 2016; 7: 885-92.

21. Teran-Perez G, Arana-Lechuga Y, Esqueda-Leon E, et al. Steroid hormones and sleep regulation. Mini Rev Med Chem 2012; 12: 1040-8.

22. Topf M. Hospital noise pollution: An environmental stress model to guide research and clinical interventions. J Adv Nurs 2000; 31: 520-8.

23. Lee KA. Sleep and pregnancy/postpartum. J Perinat Neonatal Nurs 2007; 21: 91.

24. Lee KA, Landis C, Chasens ER, et al. Sleep and chronobiology: Recommendations for nursing education. Nurs Outlook 2004; 52: 126-33.

25. Hedman C, Pohjasvaara T, Tolonen U, et al. Effects of pregnancy on mothers' sleep. Sleep Med 2002; 3: 37-42.

26. Tauman R. Maternal sleep and fetal outcome. The Open Sleep Journal 2013; 6: 63-7.

27. Ayrim A, Keskin EA, Ozol D, et al. Influence of self-reported snoring and witnessed sleep apnea on gestational hypertension and fetal outcome in pregnancy. Arch Gynecol Obstet 2011; 283: 195-9.

28. Chang JJ, Pien GW, Duntley SP, et al. Sleep deprivation during pregnancy and maternal and fetal outcomes: is there a relationship? Sleep Med Rev 2010; 14: 107-14.

29. Kohn M, Murray BJ. Sleep and quality of life in pregnancy and postpartum. In: Verster JC, Pandi-Perumal SR, Streiner DL, editors. Sleep and quality of life in clinical medicine. Totowa, NJ: Humana Press; 2008. p. 497-504.

30. World Health Organization: Maternal mortality. [Cited May 2020]. Available from: URL: https://www.who.int/en/news-room/fact-sheets/detail/maternal-mortality

31. World Health Organization. Maternal health in Nigeria: generating information for action. Available from: URL:https://www.who.int/reproductivehealth/maternal-health-nigeria/en/.

32. UNICEF. UNICEF Annual Report 2016. Available from: URL: https://www.unicef.org/reports/unicef-annual-report-2016

33. Ayoub G, Awed H. Comparative study between primigravida and multigravida regarding women's self-care practices for management of selected minor discomforts. Madridge J Case Rep Stud 2018; 2: 41-9.

34. Danish N, Fawad A, Abbasi N. Assessment of pregnancy outcome in primigravida: Comparison between booked and un-booked patients. J Ayub Med Coll Abbottabad 2010; 22: 23-5.

35. Lee KA, Gay CL. Sleep in late pregnancy predicts length of labor and type of delivery. Am J Obstet Gynecol 2004; 191: 2041-6.

36. Kamysheva E, Skouteris H, Wertheim EH, et al. A prospective investigation of the relationships among sleep quality, physical symptoms, and depressive symptoms during pregnancy. J Affect Disord 2010; 123: 317-20.

37. National Sleep Foundation. Pregnancy and Sleep. [Online]. [cited 2015 Ag 31]; Available from: URL: http://sleepfoundation.org/sleep-topics/pregnancy-and-sleep

38. Borcherding KE. Coping in healthy primigravidae pregnant women. J Obstet Gynecol Neonatal Nurs 2009; 38: 453-62.

39. The World Health Organization Quality of Life Assessment (WHOQOL): Development and general psychometric properties. Soc Sci Med 1998; 46: 1569-85.

40. Gureje O, Kola L, Afolabi E, et al. Determinants of quality of life of elderly Nigerians: results from the Ibadan study of ageing. Afr J Med Med Sci 2008; 37: 239-47.

41. Buysse DJ, Reynolds CF, III, Monk TH, et al. The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. Psychiatry Res 1989; 28: 193-213.

42. Carpenter JS, Andrykowski MA. Psychometric evaluation of the Pittsburgh Sleep Quality Index. J Psychosom Res 1998; 45: 5-13.

43. Calou C, Pinheiro A, Castro R, de Oliveira M, de Souza Aquino P, Antezana, F. (2014) Health related quality of life of pregnant women and associated factors: An integrative review. Health 2014; 6: 2375-87.

44. Sut HK, Asci O, Topac N. Sleep quality and health-related quality of life in pregnancy. J Perinat Neonatal Nurs 2016; 34: 302-9.

45. Mourady D, Richa S, Karam R, et al. Associations between quality of life, physical activity, worry, depression and insomnia: A cross-sectional designed study in healthy pregnant women. PLoS One 2017; 12: e0178181.

46. Rezaei E, Moghadam ZB, Saraylu K. Quality of life in pregnant women with sleep disorder. J Family Reprod Health 2013; 7: 87-93.

47. Tsai SY, Lee PL, Lin JW, et al. Cross-sectional and longitudinal associations between sleep and health-related quality of life in pregnant women: A prospective observational study. Int J Nurs Stud 2016; 56: 45-53.

48. Calou CGP, de Oliveira MF, Carvalho FHC, et al. Maternal predictors related to quality of life in pregnant women in the Northeast of Brazil. Health Qual Life Outcomes 2018; 16: 109.

49. Fernandes R, Vido M. Pregnancy and quality of life: Assessment during the gestational trimesters. Online Braz J Nurs 2009; 8.

50. Wang P, Liou SR, Cheng CY. Prediction of maternal quality of life on preterm birth and low birthweight: A longitudinal study. BMC Pregnancy Childbirth 2013; 13: 124.

51. Vachkova E, Jezek S, Mares J, et al. The evaluation of the psychometric properties of a specific quality of life questionnaire for physiological pregnancy. Health Qual Life Outcomes 2013; 11: 214.