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Development of Questionnaires for Measuring Pregnancy Anxiety, Sleep Quality, Knowledge Level, and Birth Readiness

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ABSTRACT

Assessing the health of pregnant women with a questionnaire can prevent complications and help health professionals provide appropriate care. Assessment scales such as the pregnancy anxiety rating scale questionnaire (PARSQ), pregnancy sleep quality questionnaire (PSQQ), pregnancy knowledge level questionnaire (PKLQ), and birth readiness questionnaire (BRQ) need to be developed according to current conditions and real-life situations to serve as primary screening tools before proceeding with further treatment for pregnant women. This study aims to develop specific research measurement tools for pregnant women and validate the PARSQ, PSQQ, PKLQ, and BRQ questionnaires. The research method employed a qualitative approach by distributing questionnaires to 20 pregnant women, followed by statistical testing of questionnaire validity and reliability. The results showed that the calculated values (r-value) for the PARSQ, PSQQ, PKLQ, and BRQ questionnaires were greater than the critical value (r-table) of 0.359, indicating that the items in these four questionnaires are valid. The reliability test results used Cronbach's alpha for all four questionnaires, indicating that the questionnaires are reliable. In conclusion, the PARSQ, PSQQ, PKLQ, and BRQ questionnaires can be used to detect the health conditions of pregnant women. This research's contribution, through the use of questionnaires, can offer an effective tool for collecting and analyzing data needed to understand the phenomenon of pregnancy and improve existing theories and practices. Further research is recommended with a larger sample size of pregnant respondents.

Keywords: Anxiety, Sleep Quality, Knowledge Level, Childbirth Readiness

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1. INTRODUCTION

Pregnancy is a period marked by significant changes in a woman's body. According to Li et al. (2021), Konstantakou et al. (2021), and Georgescu et al. (2021), hormonal shifts can affect mood and overall anxiety levels. During pregnancy, physiological changes occur, leading to discomforts such as morning sickness, constipation, frequent urination, dizziness, muscle tension, breast and abdominal size changes, back pain, leg cramps, thermal sensations, and rapid breathing (Bernstein et al., 2021; Fiat et al., 2022; Nazik & Eryilmaz, 2014). These discomforts, stemming from the body's adjustments to pregnancy, can adversely impact maternal health (Weiss & Musana, 2022). Additionally, hormonal shifts during pregnancy lead to psychological changes including sadness, anxiety, depression, stress, mood swings, jealousy, sensitivity, lethargy, insomnia, and worry (Yonezawa et al., 2022). If not managed properly, these emotional states can exacerbate physical symptoms, prolong anxiety and depression, and complicate childbirth (Kurnia Sunazki, 2022).

Quality sleep is crucial for maintaining physical and mental health, especially during pregnancy (Meneo et al., 2024; Tan et al., 2020). For many pregnant women, achieving adequate and restful sleep can be challenging due to various physiological changes (Anasari et al., 2022). Sleep disorders in pregnant women have been a major focus in maternal health research due to their potential impact on the well-being of both mother and fetus (Christian et al., 2019; Peters et al., 2023). These sleep disturbances range from difficulty falling asleep, maintaining sleep, to early morning awakenings (Reardon & Craver, 2021). Causes include physical factors like muscle cramps, back pain, increased gastric acid reflux, and psychological factors such as anxiety related to pregnancy and future parental roles (Bingan, 2021). Hormonal changes, like increased progesterone, also affect maternal sleep patterns (Pires et al., 2021). These sleep disturbances not only disrupt the comfort of pregnant women but can also seriously impact maternal and fetal health (Ardilah, N.W, 2019). Chronic or untreated sleep disturbances can increase the risk of pregnancy complications such as preeclampsia, premature birth, and fetal growth disorders (Ardilah et al., 2019).

Good knowledge of pregnancy, prenatal care, and bodily changes during pregnancy can positively impact the sleep quality of pregnant women (Bacaro et al., 2020; Da Costa et al., 2010). Understanding the birthing process and postpartum care can enhance a mother's preparedness for childbirth (Alizadeh-Dibazari et al., 2024; Mohaghegh et al., 2022). Access to reliable information can instill confidence and thorough preparation in expectant mothers (Çankaya & Şimşek, 2021). High levels of anxiety are often associated with more severe sleep disturbances in pregnant women (Aukia et al., 2020). Uncontrolled anxiety can disrupt sleep patterns, leading to insomnia or uncomfortable sleep (Puspitasari, 2020). High anxiety during pregnancy is often linked to lower preparedness levels in facing childbirth. Anxiety can affect a mother's self-confidence in her ability to face childbirth calmly and confidently (Melo et al., 2021).

Psychometric experts have established several crucial criteria for psychological measurement tools to be considered good, including their ability to generate accurate data and information(Wijsen et al., 2022). These criteria include validity, reliability, objectivity, standardization, economy, and practicality. Measurement tools to assess the knowledge level, anxiety levels, and sleep quality specifically tailored for pregnant women are currently very limited and need to be adjusted to focus on the research variables. The development of measurement tools to assess knowledge, anxiety levels, sleep quality, and childbirth readiness in pregnant women is a critical step in efforts to improve maternal health care. Having appropriate measurement tools can be more effective in planning holistic care that supports pregnant women, bringing significant positive impacts to both mother and baby.

According to Aithal & Aithal (2020), developing a perfect questionnaire efficiently and effectively is relatively tricky. Several researchers have conducted research on developing questionnaires for pregnant women. Brunton et al. (2021) conducted research on 608 pregnant women, the variance observed in the pregnancy anxiety scale reinforces the scale's validity and highlights the unique nature of anxiety specifically related to pregnancy. Mengmei et al. (2022) conducted the development of birth readiness scale with 738 pregnant participants, demonstrating strong construct validity and internal consistency reliability. Smyka et al. (2021) used the pregnancy sleep quality scale for 7000 pregnant women in Poland. Wulandari & Laksono (2020) applied the pregnancy knowledge level scale to examine the factors influencing awareness of pregnancy danger signs in indonesia. Based on the studies related to the four questionnaires (pregnancy anxiety rating, pregnancy sleep quality, pregnancy knowledge level, and birth readiness), one researcher studied one type of scale/questionnaire with details of two researchers directly developing and two researchers applying. Different from the studies, the novelty of this study is that four questionnaires were studied simultaneously. This study aims to develop specific research measurement tools for pregnant women and validate the PARSQ (Pregnancy Anxiety Rating Scale Questionnaire), PSQQ (Pregnancy Sleep Quality Questionnaire), PKLQ (Pregnancy Knowledge Level Questionnaire), and BRQ (Birth Readiness Questionnaire).

2. METHOD

The research method employed was quantitative, using purposive sampling and testing the validity and reliability of questionnaires. Participants were healthy pregnant women in the Ungaran Community Health Center area, Semarang Regency, Central Java Province, who were capable of using a smartphone, reading, and willing to participate in the study. The sample size was 20 participants, with questionnaires distributed via a Google Forms link shared through WhatsApp.

Analysis of the questionnaire based on the results of empirical validity and reliability. Validation analysis compares the r table with the r count. Reliability analysis uses Cronbach's alpha value. The study was conducted from May 17 to May 30, 2024. Four questionnaires (PARSQ, PSQQ, PKLQ, and BRQ) were developed as follows.

2.1. Pregnancy Anxiety Rating Scale Questionnaire (PARSQ).

This questionnaire aims to assess the comprehensive level of anxiety experienced by pregnant women. It consists of 36 questions divided into 5 anxiety assessments, including 1) anxiety assessment in seeking safe ways during pregnancy, childbirth, and delivery, 2) assessing anxiety about baby care and changes in family relationships, 3) assessing anxiety due to the new role as a mother, 4) assessing anxiety in seeking social support, and 5) assessing anxiety about changes in appearance and body function. Responses use a Likert scale ranging from 1 - 5, where 1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always. The total score ranges from 36 - 180, categorized as: 0 - 36 = no anxiety, 37 - 72 = low anxiety level, 73 - 108 = moderate anxiety level, 109 - 144 = high anxiety level, 145 - 180 = Panic.

2.2. Pregnancy Sleep Quality Questionnaire (PSQQ).

This questionnaire aims to assess the sleep quality of pregnant women and factors influencing sleep disturbances. The questionnaire includes 8 questions assessing sleep quality such as sleep duration, frequency of waking up at night, satisfaction with sleep, daytime napping, and self-assessment of sleep quality using a score ranging from 0 - 3, where 0 indicates positive conditions and 3 indicates negative conditions. The total score for sleep quality ranges from 0 - 24, categorized as: 0 - 7 = good sleep quality, 8 - 24 = poor sleep quality. The questionnaire also explores sleep disturbance due to physical conditions (13 questions) and environmental factors (10 questions) using a Likert scale ranging from 1 - 4, where 1 = none, 2 = mild, 3 = moderate, 4 = severe. The final total score for sleep disturbance due to physical or environmental factors ranges from 0 - 23 = no sleep disturbance, 24 - 47 = mild sleep disturbance, 48 - 71 = moderate sleep disturbance, 72 - 92 = severe sleep disturbance.

2.3. Pregnancy Knowledge Level Questionnaire (PKLQ)

This questionnaire aims to assess the knowledge level of pregnant women across 11 question categories: 1) prenatal examinations, 2) physical changes, 3) psychological changes, 4) iron supplements, 5) daily care, 6) things to avoid during pregnancy, 7) problems during pregnancy, 8) danger signs during pregnancy, 9) diet and drinking patterns of pregnant women, 10) physical activity and exercise, and 11) early signs of labor. There are a total of 45 questions with answer choices ranging from 0 - 1, where 0 = correct answer and 1 = incorrect answer. The total score ranges from 0 - 45, categorized as: Good knowledge if score = 31 - 45, Sufficient knowledge if score = 16 - 30, Insufficient knowledge if score = 0 - 15.**

2.4. Birth Readiness Questionnaire (BRQ)

This questionnaire aims to assess the readiness of pregnant women for the childbirth process based on self-readiness, healthcare provider readiness, facility readiness, support readiness, and financial readiness. It consists of 15 questions with answer choices Yes = score 0 and No = score 1. The readiness score ranges from 6 - 15 = Ready, and 0 - 5 = Not ready.

3. RESULTS AND DISCUSSION

3.1. Results

Table 1 shows the results of the questionnaire distribution based on education, occupation, social economics, pregnancy complications, and gestational age.

Table 1
Characteristics Participant

Demographics	Frequencies	Percentage
Education		
> Junior High School	16	80
< Junior High School	4	20
Occupation		
Homemaker	10	50
Employed	10	50
Social Economics		
Adequate	13	65
Low	7	35
Pregnancy Complication		
Yes	2	10
No	18	90
Gestational Age		
TM 1 (1-3 Month)	5	25
TM 2 (4-6 Month)	7	35
TM 3 (7-9 Month)	8	40

Table 1 shows the characteristics of respondents: The majority have education beyond junior high school (80%), 50% are employed, 65% come from families with adequate socioeconomic status, 90% did not experience complications, and during questionnaire completion, the highest number was in the third trimester of pregnancy.

Table 2
Results Validity Test of PKLQ and PARQ

Question Number	R-Table (20 participants)	PKL Questionnaire (45 Questions)		PARS Questionnare (36 Questions)	
		R-Count	Descriptions	R-Count	Descriptions
1	0.359	0.935	Valid	0.777	Valid
2	0.359	0.748	Valid	0.873	Valid
3	0.359	0.961	Valid	0.613	Valid
4	0.359	0.961	Valid	0.830	Valid
5	0.359	0.839	Valid	0.764	Valid
6	0.359	0.748	Valid	0.613	Valid
7	0.359	0.961	Valid	0.777	Valid
8	0.359	0.961	Valid	0.873	Valid
9	0.359	0.935	Valid	0.536	Valid
10	0.359	0.961	Valid	0.830	Valid
11	0.359	0.748	Valid	0.764	Valid
12	0.359	0.499	Valid	0.882	Valid
13	0.359	0.961	Valid	0.489	Valid
14	0.359	0.839	Valid	0.851	Valid
15	0.359	0.455	Valid	0.799	Valid
16	0.359	0.748	Valid	0.830	Valid
17	0.359	0.499	Valid	0.600	Valid
18	0.359	0.626	Valid	0.882	Valid
19	0.359	0.961	Valid	0.797	Valid
20	0.359	0.935	Valid	0.656	Valid
21	0.359	0.961	Valid	0.634	Valid
22	0.359	0.748	Valid	0.830	Valid
23	0.359	0.961	Valid	0.764	Valid
24	0.359	0.961	Valid	0.882	Valid
25	0.359	0,961	Valid	0.640	Valid
26	0.359	0.935	Valid	0.613	Valid
27	0.359	0.961	Valid	0.659	Valid
28	0.359	0.748	Valid	0.599	Valid
29	0.359	0.499	Valid	0.774	Valid
30	0.359	0.961	Valid	0.882	Valid
31	0.359	0.961	Valid	0.623	Valid
32	0.359	0.784	Valid	0.873	Valid
33	0.359	0,961	Valid	0.610	Valid
34	0.359	0.748	Valid	0.830	Valid
35	0.359	0.961	Valid	0.796	Valid
36	0.359	0.961	Valid	0.882	Valid
37	0.359	0.961	Valid	-	-
38	0.359	0.823	Valid	-	-
39	0.359	0.636	Valid	-	-
40	0.359	0.499	Valid	-	-
41	0.359	0.845	Valid	-	-
42	0.359	0.961	Valid	-	-
43	0.359	0.961	Valid	-	-
44	0.359	0.845	Valid	-	-
45	0.359	0.961	Valid	-	-

From Table 2, it can be seen that the item scores in the PKLQ questionnaire and PARSQ questionnaire all yielded results where the r-value is greater than the critical r-value (0.359). This means that the items in the questionnaires are valid and can be disseminated.

Table 3
Results Validity Test of PSQQ and BRQ

Question Number	R-Table (20 participants)	PSQ Questionnaire (31 Questions)		BR Questionnare (15 Questions)	
		R-Count	Descriptions	R-Count	Descriptions
1	0.359	0.585	Valid	0.577	Valid
2	0.359	0.770	Valid	0.723	Valid
3	0.359	0.538	Valid	0.925	Valid
4	0.359	0.583	Valid	0.542	Valid
5	0.359	0.888	Valid	0.925	Valid
6	0.359	0.583	Valid	0.616	Valid
7	0.359	0.675	Valid	0.929	Valid
8	0.359	0.783	Valid	0.641	Valid
9	0.359	0.813	Valid	0.929	Valid
10	0.359	0.647	Valid	0.618	Valid
11	0.359	0.679	Valid	0.700	Valid
12	0.359	0.780	Valid	0.638	Valid
13	0.359	0.855	Valid	0.828	Valid
14	0.359	0.739	Valid	0.882	Valid
15	0.359	0.594	Valid	0.761	Valid
16	0.359	0.737	Valid	-	-
17	0.359	0.755	Valid	-	-
18	0.359	0.786	Valid	-	-
19	0.359	0.702	Valid	-	-
20	0.359	0.647	Valid	-	-
21	0.359	0.652	Valid	-	-
22	0.359	0.590	Valid	-	-
23	0.359	0.716	Valid	-	-
24	0.359	0.514	Valid	-	-
25	0.359	0.648	Valid	-	-
26	0.359	0.774	Valid	-	-
27	0.359	0.654	Valid	-	-
28	0.359	0.722	Valid	-	-
29	0.359	0.602	Valid	-	-
30	0.359	0.700	Valid	-	-
31	0.359	0.666	Valid	-	-

From Table 3, it can be seen that the item scores in the PSQ questionnaire, and BR questionnaire all yielded results where the r-value is greater than the critical r-value (0.359). This means that the items in the questionnaires are valid and can be disseminated.

Table 4
Questionnaire Reliability Test Results

No	Questionnaire	Cronbach's alpha	Description
1	Pregnancy Anxiety Rating Scale Questionnaire (PARSQ)	0.914	Reliable
2	Pregnancy Sleep Quality Questionnaire (PSQQ)		
	Sleep Quality	0.805	Reliable
	Physical factors sleep disorders	0.886	Reliable
	Environmental factors sleep disorders	0.821	Reliable
3	Pregnancy Knowledge Level Questionnaire (PKLQ)	0.972	Reliable
4	Birth Readiness Questionnaire (BRQ)	0.898	Reliable

From Table 4, it can be seen that the reliability test scores for the PARSQ, PSQQ, PKLQ, and BRQ questionnaires show that all four questionnaires are reliable for use.

3.2. Discussion

Measurement instruments are tools used to generate accurate data and information, encompassing stages of validity and reliability (Mijnarends et al., 2013; Petri et al., 2015). Validity is a crucial aspect in the development of research instruments, especially when the instrument is intended to measure abstract concepts that cannot be directly observed (Tavakol & Wetzel, 2020). Rönkkö & Cho (2022) defines validity as the extent to which an instrument accurately measures what it is intended to measure. Establishing the validity of a test or instrument is challenging, particularly because psychological variables often involve abstract concepts such as intelligence, anxiety, and personality (Anglim et al., 2022; Lissitz & Samuelsen, 2007).

Based on the results in Tables 2, Table 3, and Table 4, the development of the pregnancy anxiety rating scale questionnaire (PARSQ), pregnancy sleep quality questionnaire (PSQQ), pregnancy knowledge level questionnaire (PKLQ), and Birth Readiness Questionnaire (BRQ), an essential step in research or evaluation in the context of maternal health and pregnancy. Panuccio et al. (2022) developed a pregnancy and motherhood questionnaire for 35 women into a valid, reliable, and rapid administrative valuable tool for investigating and measuring the impact of physical disabilities on pregnancy management and maternal roles. This is in line with the research of Ibrahim & Lobel (2020), who stated that the ability of the questionnaire to carry out assessments is essential to improve maternal and child health. These four research questionnaires are expected to help identify factors that influence the experience of pregnancy and childbirth and provide valuable insights for better intervention or support.

Pregnancy anxiety includes concerns about fetal health, the birth process, and life changes (Davis & Narayan, 2020; Dunkel Schetter et al., 2022; Özdemir et al., 2020). Sleep quality includes sleep duration, disturbances, and factors that affect sleep during pregnancy (Du et al., 2021; Lu et al., 2021). The pregnancy knowledge level includes identifying knowledge such as understanding the pregnancy process, childbirth, and others (Wulandari & Laksono, 2020). Birth Readiness includes physical, emotional, and other readiness (Mengmei et al., 2022; Özer & Yilar Erkek, 2021). These four critical factors can be identified maximally through valid and reliable PARSQ, PSQQ, PKLQ, and BRQ, and they can provide valuable insights and support improvements in pregnancy health services.

When developing a new scale, researchers follow standardized procedures to ensure the scale provides comprehensive information about the reliability and validity of measurement outcomes. Criteria-related validity and construct validity are considered important, and information about content validity is also crucial in drawing conclusions about the quality of the measurement scale (Polit & Beck, 2006). Developing measurement tools to assess knowledge, anxiety levels, sleep quality, and birth readiness in pregnant women is a crucial step in enhancing maternal health care. Accurately assessing the health conditions of pregnant women using questionnaires can help prevent complications and assist healthcare professionals in providing appropriate and timely care management.

4. CONCLUSION

Considering the established psychometric criteria, the development of appropriate measurement tools to assess knowledge, anxiety levels, sleep quality, and childbirth readiness in pregnant women is crucial in enhancing comprehensive maternal health care. The results of the feasibility testing of instruments assessing knowledge, anxiety levels, sleep quality, and childbirth readiness in pregnant women have been valid and reliable, thus serving as a guide for early screening of maternal health before further services are provided. The results of evaluations using valid and reliable questionnaires can provide valuable suggestions for improving the quality of pregnancy and childbirth experiences. Well-designed questionnaires offer important insights that can improve these experiences and support improvements in health services and more targeted support. This research's contribution, through the use of questionnaires, can offer an effective tool for collecting and analyzing data needed to understand the phenomenon of pregnancy and improve existing theories and practices. The limitation of this study is the small number of respondents. The researchers suggest that the next study use more respondents so that the results are more convincing.

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