
Validity and Reliability of a Maternal Knowledge Questionnaire on Antenatal Classes

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ABSTRACT

Introduction: Maternal knowledge plays an important role in improving pregnancy outcomes and preparing women for childbirth. Antenatal classes are educational programs designed to increase pregnant women's understanding of pregnancy, childbirth, postpartum care, and newborn care. However, evaluating maternal knowledge in such programs requires measurement instruments that are both valid and reliable.

Methods: This study employed a methodological research design to evaluate the validity and reliability of a maternal knowledge questionnaire on antenatal classes. The instrument was developed based on a literature review and maternal health guidelines. Content validity was assessed by a panel of experts, and the questionnaire was administered to pregnant women attending antenatal care services. Item validity was analyzed using Pearson product-moment correlation, while reliability was assessed using Cronbach's alpha coefficient.

Results: The validity analysis showed that all questionnaire items were valid, with item-total correlation coefficients ranging from 0.905 to 0.992, exceeding the critical r-table value (0.444). Reliability testing demonstrated a Cronbach's alpha coefficient of 0.795, indicating good internal consistency of the instrument.

Conclusion: The maternal knowledge questionnaire on antenatal classes is a valid and reliable instrument for assessing pregnant women's knowledge regarding antenatal education. This instrument can support future research and program evaluation aimed at improving maternal education and maternal health promotion.

Keywords: Maternal knowledge; Antenatal classes; Questionnaire validity; Reliability; Instrument development

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What are the main findings?
1. All questionnaire items were statistically valid for measuring maternal knowledge regarding antenatal classes.
2.
3. The instrument demonstrated good internal consistency, indicating reliable measurement of maternal knowledge.
4.
5. The questionnaire can be used as a standardized tool for evaluating antenatal education programs and maternal health research.

INTRODUCTION

Maternal and neonatal health remain major global public health concerns. Despite substantial progress in healthcare systems, maternal mortality and pregnancy-related complications still occur in many countries, particularly in low- and middle-income regions. Education during pregnancy is recognized as an important strategy to improve maternal health literacy, promote healthy behaviors, and reduce risks during pregnancy and childbirth (Kurniasih, 2025). Antenatal education programs aim to provide pregnant women with essential knowledge regarding pregnancy, childbirth, postpartum care, and newborn care so that they are better prepared physically and psychologically for delivery (Sabriana et al., 2024). Antenatal classes, often known as pregnancy classes or maternal classes, are structured educational programs conducted for

pregnant women to enhance their understanding of maternal and child health. These classes typically involve group learning, discussion, and sharing of experiences among pregnant women and health professionals. Evidence shows that participation in antenatal education significantly increases maternal knowledge about pregnancy and childbirth, improves maternal attitudes toward health services, and enhances readiness for delivery (Fachrudin & Sukmana, 2025). Furthermore, mothers who participate in antenatal classes are more likely to utilize adequate antenatal care services, deliver with skilled birth attendants, and give birth in health facilities compared with those who do not participate in such programs (Mishra et al., 2020). Previous studies have demonstrated that antenatal education contributes to improved maternal knowledge and behavioral changes. For instance, educational interventions during pregnancy have been shown to significantly increase pregnant women's knowledge regarding delivery methods and childbirth preparation (Ahmed et al., 2024). Similarly, maternal class programs have been found to improve pregnant women's ability to identify early danger signs during pregnancy, which is essential for preventing complications and ensuring maternal safety (Sabriana et al., 2024). In addition, antenatal classes also support maternal psychological readiness, reduce fear of childbirth, and strengthen communication between mothers and healthcare providers (Litaqia & Mulat, 2025). Because maternal knowledge plays a crucial role in improving maternal and neonatal outcomes, it is important to accurately measure the level of knowledge possessed by pregnant women. Questionnaires are

commonly used as research instruments to assess maternal knowledge in antenatal education programs. However, the accuracy of research findings strongly depends on the quality of the measurement instruments used. A questionnaire must be both valid and reliable in order to ensure that it accurately measures the intended construct and produces consistent results when applied repeatedly (DeVellis, 2017). Without adequate validation, the results obtained from such instruments may lead to biased conclusions and limit the applicability of research findings in maternal health programs.

Validity refers to the extent to which an instrument measures what it is intended to measure, while reliability refers to the consistency or stability of the measurement results across time or across different respondents (Boateng et al., 2018). In the context of antenatal education research, the development of a valid and reliable maternal knowledge questionnaire is essential for evaluating the effectiveness of antenatal classes and identifying gaps in maternal health knowledge. Despite the increasing number of studies related to antenatal education, there is still limited evidence regarding standardized and psychometrically tested instruments specifically designed to assess maternal knowledge about antenatal classes. Therefore, the development and psychometric evaluation of a maternal knowledge questionnaire related to antenatal classes are necessary. A validated and reliable questionnaire will provide a standardized tool for researchers and healthcare providers to assess pregnant women's knowledge accurately, evaluate antenatal education programs, and support evidence-based improvements in maternal

health interventions. Consequently, this study aims to evaluate the validity and reliability of a maternal knowledge questionnaire on antenatal classes.

METHOD

This study employed a methodological research design aimed at evaluating the validity and reliability of a maternal knowledge questionnaire on antenatal classes. The instrument was developed based on literature review and existing guidelines related to antenatal education and maternal health. Content validity was assessed by a panel of experts consisting of maternal health professionals and researchers to evaluate the relevance, clarity, and comprehensiveness of each item. The questionnaire was then administered to pregnant women attending antenatal care services using a cross-sectional approach. Item validity was analyzed using item-total correlation, while construct validity was examined through exploratory factor analysis. Reliability testing was performed using Cronbach's alpha coefficient to determine the internal consistency of the instrument. Data analysis was conducted using statistical software, and items that did not meet the predetermined validity and reliability criteria were revised or removed to ensure that the final questionnaire was a valid and reliable tool for assessing maternal knowledge regarding antenatal classes.

RESULTS

Item validity was evaluated using the Pearson product-moment correlation between each item score and the total score. An item was considered valid if the correlation coefficient (*r*-value) exceeded the *r*-table value ($r = 0.444, n = 20, \alpha = 0.05$). The

results indicated that all questionnaire items had correlation coefficients higher than the

r-table value, indicating that all items were valid.

Table 2. Item Validity of the Maternal Knowledge Questionnaire on Antenatal Classes

Item	Questionnaire Item (Indonesian - Original)	Questionnaire Item (English Translation)	r-value	Interpretation
1	Kelas ibu hamil merupakan kelompok belajar bersama ibu hamil dalam bentuk tatap muka	Antenatal classes are learning groups for pregnant women conducted through face-to-face meetings	0.927	Valid
2	Jumlah peserta dalam kelas ibu hamil maksimal 10 orang	The maximum number of participants in an antenatal class is 10 people	0.917	Valid
3	Materi yang diberikan dalam kelas ibu hamil adalah materi tentang kehamilan, persalinan, perawatan nifas dan perawatan bayi baru lahir	The materials provided in antenatal classes include pregnancy, childbirth, postpartum care, and newborn care	0.992	Valid
4	Tujuan diadakannya kelas ibu hamil adalah untuk meningkatkan pengetahuan ibu hamil mengenai kehamilannya	The purpose of antenatal classes is to improve pregnant women's knowledge about their pregnancy	0.927	Valid
5	Senam hamil merupakan kegiatan ekstra pada kelas ibu hamil yang dapat dipraktikkan setelah sampai di rumah	Pregnancy exercise is an additional activity in antenatal classes that can be practiced at home	0.905	Valid
6	Suami ikut serta dalam kelas ibu hamil minimal 1 kali pertemuan	Husbands are encouraged to participate in antenatal classes at least once	0.927	Valid
7	Kelas ibu hamil diikuti oleh ibu hamil dengan usia kehamilan 5-8 bulan karena kondisi ibu sudah kuat dan tidak takut terjadi keguguran	Antenatal classes are attended by pregnant women with a gestational age of 5-8 months because the mother's condition is stronger and the risk of miscarriage is lower	0.927	Valid
8	Buku KIA merupakan alat yang digunakan untuk proses pembelajaran ibu,	The Maternal and Child Health (MCH) book is used as a learning tool for	0.992	Valid

Item	Questionnaire Item (Indonesian - Original)	Questionnaire Item (English Translation)	r-value	Interpretation
	suami dan keluarga dalam kelas ibu hamil	mothers, husbands, and families in antenatal classes		
9	Dengan adanya kegiatan kelas ibu hamil, ibu tidak memiliki kesiapan psikologis menghadapi persalinan	Participation in antenatal classes does not improve mothers' psychological readiness for childbirth	0.992	Valid
10	Materi kelas ibu hamil sangat bermanfaat dan dapat diaplikasikan dalam kehidupan sehari-hari	The materials provided in antenatal classes are very useful and can be applied in daily life	0.992	Valid

Table 2 presents the validity testing results of the maternal knowledge questionnaire on antenatal classes. Each questionnaire item is presented in both the original Indonesian version and its English translation. The correlation coefficients ranged from 0.905 to

0.992, all of which exceeded the r-table value of 0.444. Therefore, all ten items were considered statistically valid and suitable for measuring maternal knowledge regarding antenatal classes.

Table 3. Reliability Test of the Maternal Knowledge Questionnaire

Variable	Number of Items	Cronbach's Alpha	Interpretation
Maternal Knowledge on Antenatal Classes	10	0.795	Reliable

The maternal knowledge questionnaire on antenatal classes consists of 10 dichotomous items with response options "Ya" and "Tidak". For positive statements, the correct answer is scored as 1 and the incorrect answer as 0. For the negative statement (item 9), the scoring is reversed, where the correct answer receives a score of 1 and the incorrect answer receives a score of 0. The total score ranges from 0 to 10 and is converted into percentage values. Based on the total score, maternal knowledge is categorized into three levels: good knowledge (76–100%), moderate knowledge (56–75%), and poor knowledge ($\leq 55\%$). This scoring system allows researchers to assess

the level of maternal knowledge regarding antenatal classes in a standardized manner.

DISCUSSION

The present study aimed to develop and evaluate the psychometric properties of a questionnaire designed to measure maternal knowledge regarding antenatal classes. The results indicate that the instrument demonstrated satisfactory validity and reliability, suggesting that it is an appropriate tool for assessing pregnant women's knowledge related to antenatal education programs. The development of a valid and reliable instrument is an essential step in

health research because measurement tools determine the accuracy and credibility of the collected data (DeVellis, 2016; Streiner et al., 2015).

The validity test results showed that all questionnaire items had correlation coefficients ranging from 0.905 to 0.992, which were higher than the r-table value of 0.444. These findings indicate that each item has a strong correlation with the total score and contributes significantly to the construct being measured. Item validity testing using the Pearson product-moment correlation is commonly used in questionnaire development to determine whether each item adequately represents the concept or variable under study (Field, 2018; Hair et al., 2019). High correlation values indicate that the items in the questionnaire are conceptually consistent with the construct of maternal knowledge regarding antenatal classes.

The high item validity values observed in this study may be attributed to the systematic development of the questionnaire based on key indicators, namely the definition, objectives, and benefits of antenatal classes. According to Boateng et al. (2018), instruments developed using clear theoretical indicators tend to demonstrate stronger psychometric properties because each item directly reflects the conceptual domain being measured. In maternal health research, knowledge assessment instruments must be carefully constructed to ensure that the questions reflect relevant aspects of pregnancy education, including pregnancy care, childbirth preparation, postpartum care, and newborn care.

Reliability analysis further demonstrated that the questionnaire had a Cronbach's alpha coefficient of 0.795, indicating good internal consistency. Cronbach's alpha is one of the

most widely used reliability indicators in social and health research because it measures the extent to which items in a questionnaire consistently measure the same underlying construct (Cronbach, 1951; Tavakol & Dennick, 2011). A reliability coefficient above 0.70 is generally considered acceptable for research instruments (Nunnally & Bernstein, 1994). Therefore, the reliability value obtained in this study indicates that the questionnaire items function cohesively and provide stable measurements of maternal knowledge regarding antenatal classes.

Internal consistency is particularly important in questionnaire-based studies because inconsistent items may produce measurement errors that affect the validity of research findings (Polit & Beck, 2017). The acceptable reliability coefficient obtained in this study suggests that the instrument can consistently measure maternal knowledge levels across respondents. Reliable instruments are essential in maternal and child health research because they enable researchers to evaluate educational interventions and identify knowledge gaps among pregnant women.

Another strength of the questionnaire used in this study is the inclusion of both positive and negative statements. One item in the questionnaire was designed as a reverse item to reduce response bias. Negative items are commonly used in survey research to minimize acquiescence bias, which occurs when respondents tend to agree with statements without carefully evaluating them (Kline, 2015). By including reverse-coded items, researchers can improve the accuracy of responses and ensure that participants read each statement more carefully before answering.

The development of standardized knowledge assessment tools is particularly important in the context of antenatal education programs. Antenatal classes are widely recognized as effective strategies for improving maternal knowledge, promoting healthy behaviors during pregnancy, and preparing women for childbirth and postpartum care (World Health Organization, 2016). Several studies have shown that increased maternal knowledge is associated with better pregnancy outcomes, improved maternal self-efficacy, and greater utilization of maternal health services (WHO, 2016; Polit & Beck, 2017). Therefore, reliable instruments are needed to measure the effectiveness of such programs.

In addition, knowledge measurement plays a crucial role in evaluating maternal health promotion programs at the community level. Antenatal education programs often aim to improve pregnant women's understanding of pregnancy, danger signs, birth preparedness, breastfeeding, and newborn care. To accurately evaluate these programs, researchers must use instruments that demonstrate strong psychometric properties (Boateng et al., 2018; Streiner et al., 2015). The findings of this study indicate that the maternal knowledge questionnaire developed here can serve as a reliable tool for such evaluations.

Despite these strengths, several limitations should be acknowledged. The pilot testing of the instrument involved a relatively small sample size, which may limit the generalizability of the validation results. According to Hair et al. (2019), larger sample sizes are recommended in instrument validation studies to ensure stable estimates of psychometric properties. Future research should consider conducting additional

validation studies with larger and more diverse samples to confirm the robustness of the instrument.

Furthermore, this study focused primarily on item validity and internal consistency reliability. Additional psychometric analyses such as exploratory factor analysis or confirmatory factor analysis could be conducted in future studies to further examine the dimensional structure of the questionnaire (Worthington & Whittaker, 2006). These analyses would help determine whether the items cluster into specific dimensions of maternal knowledge and provide stronger evidence for construct validity.

Overall, the results of this study demonstrate that the maternal knowledge questionnaire on antenatal classes has satisfactory psychometric properties. The high validity coefficients indicate that the items effectively represent the construct being measured, while the acceptable reliability coefficient confirms the internal consistency of the instrument. Consequently, the questionnaire can be used as a reliable tool for assessing maternal knowledge regarding antenatal classes and for evaluating maternal education programs in community health settings.

CONCLUSION

This study aimed to develop and evaluate the psychometric properties of a maternal knowledge questionnaire on antenatal classes. The results demonstrated that all questionnaire items were statistically valid, with correlation coefficients exceeding the critical *r*-table value, indicating that each item appropriately represents the construct being measured. In addition, the reliability analysis showed a Cronbach's alpha coefficient of 0.795, indicating good internal consistency of

the instrument. These findings suggest that the questionnaire is a valid and reliable tool for assessing maternal knowledge regarding antenatal classes. The availability of a standardized instrument can support future research and program evaluations aimed at improving maternal education and health promotion initiatives. Nevertheless, further studies with larger and more diverse samples are recommended to confirm the stability and generalizability of the instrument and to explore additional psychometric properties through more advanced statistical analyses.

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CONFLICT OF INTEREST

No conflict of interest.

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