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Enhancing spiritual literacy during pregnancy through whatsapp-based telenursing support: Evidence from a quasi-experimental study

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ABSTRACT

Background*: Pregnancy is a transitional period that involves physical, psychological, and spiritual changes, making spiritual health, as reflected through spiritual literacy,an essential component of holistic maternal nursing care. However, maternal health services often emphasize physical aspects, while spiritual interventions remain underintegrated. Limited access to continuous spiritual support during pregnancy may affect maternal well-being and coping ability and limit the development of spiritual literacy among pregnant women. The use of digital communication technology, particularly whatsapp-based telenursing, offers an alternative approach to provide accessible and continuous spiritual assistance to strengthen spiritual literacy among pregnant women.*

Objectives: *This study aimed to analyze the effect of telenursing assistance via whatsapp on optimizing the spiritual literacy among pregnant women.*

Methods: *This study used a quantitative quasi-experimental design with a one-group pretest–posttest approach conducted at Public Health Center, Makassar, Indonesia, from March to August 2025. A total of 64 pregnant women were recruited through purposive sampling. The intervention consisted of whatsapp-based telenursing providing spiritual education and supportive guidance. Spiritual literacy was measured using the 10-item Spiritual Perspective Scale before and after the intervention. Data were analyzed using the Wilcoxon Signed Rank Test to determine differences in spiritual literacy scores before and after the intervention.*

Results:*. The Wilcoxon Signed-Rank Test demonstrated a significant improvement in spiritual health following the intervention ($Z = -6.961$, $p < 0.001$), with a large effect size ($r = 0.87$). These findings indicate that whatsapp-based telenursing was effective in improving the spiritual literacy among pregnant women.*

Conclusions: *These findings support the clinical relevance of whatsapp-based telenursing as a practical and holistic maternal nursing intervention that can be integrated into routine antenatal care to address spiritual well-being and improve the quality of maternal nursing services.*

KEYWORD: *maternal nursing; pregnant women; spiritual literacy; telenursing; whatsapp*

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INTRODUCTION

Maternal health is one of the main indicators within the Sustainable Development Goals (SDGs), which has become a global concern and a national target in Indonesia to reduce the Maternal Mortality Rate (MMR) (1). Maternal deaths in Indonesia were still recorded at 4,129 cases, indicating that efforts to improve the quality of maternal health services must continue to be comprehensively optimized (2). Pregnancy itself is a dynamic and unique life phase that involves simultaneous physical, emotional, and spiritual changes (3). However, in practice, maternal health services still tend to focus primarily on physical and psychological aspects, while the spiritual dimension is often neglected. This creates a gap in maternity care, as many antenatal programs have not yet integrated spiritual dimensions into routine services (4).

This condition is exacerbated by the low level of spiritual literacy among pregnant women in Indonesia. Many pregnant women are not fully aware of the importance of fulfilling spiritual needs and tend to prioritize nutritional or physical aspects alone (5)(6). In fact, spirituality plays a crucial role as an effective coping mechanism in managing stress and enhancing mental readiness for childbirth (7) (8). Low spiritual literacy has significant negative impacts, including increased anxiety, emotional instability, and non-adherence to Antenatal Care (ANC) visits and self-care during pregnancy (7). Furthermore, inadequate spiritual well-being is closely associated with poor maternal–fetal attachment and an increased risk of medical complications, abnormal births, and higher rates of cesarean delivery. Prolonged and severe prenatal anxiety may even trigger prolonged labor and negatively affect neonatal health outcomes (9,10).

To address these challenges, appropriate and easily accessible promotive interventions are required through digital health innovations such as telenursing. Telenursing enables the delivery of nursing care and health education remotely in an effective and efficient manner without requiring pregnant women to visit healthcare facilities directly (11,12). One of the most promising platforms for this purpose is whatsapp, given that it is the most widely used social media application in Indonesia, utilized by approximately 83% of the population (13,14). Whatsapp facilitates accurate, comprehensive, and clear communication through various

features, including text messages, digital posters, and voice messages, which can be accessed anytime and anywhere (15).

Previous studies have indicated that telenursing and digital interventions may support spiritual literacy and well-being among pregnant women (16,17,18). Through the educational group, pregnant women receive informational support, motivation, and spiritual guidance such as prayer practices, meditation, and self-reflection that help them feel calmer, more grateful, and more confident (19,20). Thus, integrating spiritual literacy through whatsapp-based telenursing represents a strategic approach to delivering holistic, patient-centered maternal healthcare services aimed at improving the overall health of both mothers and fetuses.

MATERIALS AND METHODS

This study employed a quantitative approach using a quasi-experimental design with a one-group pretest–posttest design. The study was conducted at Public Health Center, Makassar, Indonesia, from March to August 2025. The study population consisted of all pregnant women registered for antenatal care at the study site during the research period. A total of 64 pregnant women were recruited using purposive sampling based on predefined inclusion and exclusion criteria. The inclusion criteria were pregnant women who owned a mobile phone with whatsapp access, had an active internet connection, and were willing to participate in the study. Pregnant women with pregnancy related complications were excluded. The research procedure began with providing eligible pregnant women with an informed consent form to obtain their voluntary participation in the study. After consent was obtained, participants were asked to complete a pre-test questionnaire to assess baseline levels of spiritual literacy.

Subsequently, participants received a whatsapp-based telenursing intervention delivered through a dedicated whatsapp group for three consecutive days. Before the intervention, all participants completed a pre-test using the Spiritual Perspective Scale (SPS) to assess their baseline spiritual literacy. Following the pre-test, participants were enrolled in the whatsapp group, where spiritual education was provided by the research team. On the first day, participants received educational materials introducing the concept and importance of spiritual literacy during pregnancy, including the essential aspects of spiritual literacy that should be understood by pregnant women.

On the second and third days, the educational sessions focused on meeting spiritual needs during pregnancy, practical strategies to fulfill these needs, and the benefits of spiritual fulfillment for maternal well-being throughout pregnancy. At the end of each daily session, an interactive question-and-answer discussion was conducted through the whatsapp group to encourage participant engagement, clarify

misunderstandings, and reinforce the educational content. Upon completion of the three-day intervention, participants completed the same questionnaire as a post-test to evaluate changes in spiritual literacy following the whatsapp-based telenursing program.

The Spiritual Perspective Scale (SPS) developed by Reed was used in its Indonesian version, which has previously been applied in Indonesian studies. The SPS assesses individuals' spiritual perspectives through two domains: spiritual beliefs and spiritually related behaviors. Prior to its use in this study, the Indonesian version of the instrument was evaluated for its psychometric properties. Item validity coefficients ranged from 0.352 to 0.562, indicating that all items met the acceptable validity criterion. The instrument also demonstrated satisfactory internal consistency, with a Cronbach's alpha coefficient of 0.78, indicating acceptable reliability for measuring spiritual literacy among pregnant women. The questionnaire was administered before and after the whatsapp-based telenursing intervention to evaluate changes in participants' spiritual literacy.

This study received ethical approval from the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Universitas Islam Negeri Alauddin Makassar (No.B-1026/Un.06/FKIK/ PP.00.9/ 02/2025). Written informed consent was obtained from all participants prior to data collection, and confidentiality of participant data was maintained throughout the study.

RESULTS AND DISCUSSION

A total of 64 pregnant women who met the eligibility criteria completed the study and were included in the final analysis. **Table 1** summarizes the sociodemographic and obstetric characteristics of the study participants, including age, educational level, ethnicity, gestational trimester, parity, and gravida status. These characteristics provide an overview of the study population prior to evaluating the effectiveness of the whatsapp-based telenursing intervention.

Table 1. Characteristics of respondents (n=64)

Respondent Characteristics	Category	Frequency	Percentage
Age	< 20 years	2	3.1%
	20–35 years	57	89.1%
	> 35 years	5	7.8%
Education	Elementary/Junior High School	8	12.5%
	Senior High School/Equivalent	32	50.0%
	Bachelor's Degree	24	37.5%
Ethnicity	Bugis	14	21.9%
	Makassar	43	67.2%
	Toraja	3	4.7%
	Javanese	2	3.1%
	Bima	2	3.1%
Trimester	First trimester	15	23.4%
	Second trimester	31	48.4%
	Third trimester	18	28.1%
Parity	Primiparous	18	28.1%
	Multiparous	33	51.6%
	Grand multiparous	6	9.4%
	Never given birth	7	10.9%
Gravida	Primigravida	13	20.3%
	Multigravida	51	79.7%
Total		64	100%

Table 1 shows the baseline demographic and obstetric characteristics of the participants. Most respondents were aged 20–35 years (89.1%), which is considered the optimal reproductive age because it is associated with lower maternal and fetal risks. Women in this age group generally demonstrate better physical readiness, emotional adaptation, and health-seeking behavior during pregnancy, which may facilitate their participation in whatsapp-based telenursing interventions and the adoption of spiritual literacy practices (3,7). In terms of educational background, most respondents had completed senior high school or its equivalent (50.0%). Educational level may influence the ability of pregnant women to receive, understand, and apply health information delivered through whatsapp-based telenursing. Higher educational attainment is often associated with improved health literacy, including the ability to comprehend spiritual messages, engage in reflective practices, and utilize digital communication effectively during pregnancy.

The predominance of Makassar ethnicity reflects the demographic characteristics of the study setting in Makassar City (67.2%). Cultural background may influence spiritual beliefs,

coping mechanisms, and perceptions toward pregnancy and maternal care. In maternal nursing, cultural and spiritual values are closely interconnected, as pregnant women often rely on religious beliefs and family traditions to maintain emotional stability and psychological comfort during pregnancy. Previous studies have highlighted that spiritual aspects and sociocultural values play an important role in shaping maternal experiences during pregnancy and childbirth (10,21).

Regarding gestational age, nearly half of the respondents were in the second trimester (48.4%). Based on parity, most pregnant women were multiparous (51.6%). Furthermore, the majority of respondents were multigravida, accounting for 79.7% of the study population. Previous pregnancy and childbirth experiences may contribute to greater maternal confidence, emotional maturity, and coping abilities during subsequent pregnancies. Women who have experienced pregnancy before are generally more familiar with the physical, psychological, and spiritual changes that occur throughout the maternal period, enabling them to adapt more effectively to pregnancy-related challenges. Prior maternal experience may also strengthen self-efficacy in managing stress, anxiety, and uncertainty during pregnancy.

In addition, multiparous and multigravida women tend to have broader experience in accessing maternal health services and utilizing social or spiritual support systems to maintain their well-being. These experiences may facilitate greater acceptance and engagement in holistic interventions, including whatsapp-based spiritual telenursing support, because the mothers are more accustomed to seeking guidance, health information, and emotional reassurance during pregnancy. Previous studies have demonstrated that social support, spiritual well-being, and digital-based maternal support interventions can positively influence maternal psychological adaptation and coping during pregnancy (7,19,20).

Table 2. The wilcoxon signed rank test on spiritual literacy scores before and after the whatsapp-based telenursing intervention

Variable	Z	p-value
Spiritual literacy (Pre-test Post-test)	-6.961	< 0.001

Based on **Table 2** the Wilcoxon Signed Rank Test demonstrated a statistically significant differences between pre-test and post-test spiritual literacy scores following the intervention ($Z = -6.961$, $p < 0.001$), with a large effect size ($r = 0.87$) indicating an overall improvement in spiritual literacy after the whatsapp-based telenursing program.

Pregnancy represents a transitional period in a woman's life that involves not only physical changes but also emotional

and spiritual transformations (21). During this period, pregnant women frequently experience feelings of anxiety, uncertainty, and a need to attain inner peace and meaning throughout the pregnancy journey (22). Spiritual literacy therefore becomes a crucial aspect, as it supports the development of inner calm, gratitude, and preparedness for pregnancy and childbirth (23). Consequently, continuous and easily accessible support is an essential component of maternal health services.

In this study, the effectiveness of whatsapp-based telenursing assistance was reflected in an increase in spiritual literacy scores following the intervention. All participants demonstrated improved spiritual literacy scores, indicating that the intervention contributed positively to strengthening the spiritual dimension among pregnant women. The Wilcoxon Signed Rank Test revealed a statistically significant difference between pre-intervention and post-intervention spiritual literacy scores, with a $Z = -6.961$, $p < 0.001$.

The absence of negative ranks and ties indicates that the observed changes were consistent a Beyond demonstrating statistical significance, these findings highlight the role of spiritual literacy as a critical mechanism in maternal health. Spiritual literacy refers to the ability to access, understand, and apply spiritual and health-related information to support spiritual well-being during pregnancy. In this context, spiritual literacy enables pregnant women to seek meaning, regulate emotional responses, and engage in spiritually informed coping strategies throughout pregnancy. Despite its importance, spiritual literacy remains underexplored in maternal health research, as most studies have primarily focused on physical, psychological, or psychosocial outcomes (21). The present findings therefore reinforce the importance of addressing spiritual dimensions as an integral component of holistic maternal care, given that spiritual well-being contributes to maternal emotional stability, stress reduction, and positive health behaviors that may indirectly influence fetal health outcomes (8,9) cross all respondents.

Building on previous community-based evidence, the present study provides further quantitative evidence of the potential contribution of WhatsApp-based telenursing to improving spiritual literacy among pregnant women. Unlike the previous community-based program, the present study employed a structured quasi-experimental design and a standardized instrument to assess changes in spiritual literacy. From a clinical perspective, the observed improvement in spiritual literacy indicates that whatsapp-based telenursing may serve as a practical approach for nurses to address spiritual needs during routine antenatal care, particularly in settings with limited face to face interaction

(21,22). Whatsapp-based telenursing provides an avenue for pregnant women to receive such continuous support (23,19). This digital platform enables flexible two-way communication between healthcare providers and pregnant women without limitations of time and distance (24,25,11). Through regular interactions, pregnant women can express their emotions, concerns, and spiritual needs, while healthcare providers deliver educational and supportive responses (26). This approach aligns with holistic nursing principles that emphasize the integrated fulfillment of biological, psychological, social, and spiritual need (27,28).

These findings are consistent with previous studies which reported that telehealth interventions during pregnancy contribute to improved psychosocial well-being by reducing stress and anxiety, enhancing social support, and increasing satisfaction with prenatal healthcare services compared to conventional face-to-face care (18,30). Similarly, a study conducted in Iran demonstrated that telemedicine significantly reduced health anxiety and pregnancy-related anxiety compared with routine care, indicating that remote interactions with healthcare providers can promote a sense of security and reduce anxiety among pregnant women This evidence is further supported that spiritual well-being is closely associated with psychological well-being and positively influences emotional experiences by reducing anxiety and stress and promoting health-related behaviors. Their study highlights that spirituality directly affects anxiety and stress levels in pregnant women, which subsequently influences healthy behaviors (8). Furthermore, the use of digital media such as whatsapp in maternal healthcare has been shown to enhance engagement with health services. The use of whatsapp by healthcare providers during the COVID-19 pandemic was associated with increased maternal service utilization, including increase in antenatal care visits and increase in facility-based deliveries compared to the pre-pandemic period (17) (30).

These findings indicate that whatsapp-based communication can encourage more active involvement of pregnant women in healthcare processes. The ease of access and personalized nature of digital communication also enable pregnant women to feel more emotionally and spiritually supported (29,30). Collectively, these findings support the results of the present study, demonstrating that whatsapp-based telenursing is a relevant and beneficial approach for improving the spiritual literacy of pregnant women. Overall, this study indicates that whatsapp-based telenursing has the potential to serve as an alternative nursing service that supports the spiritual literacy of pregnant women. This approach is consistent with the principles of holistic nursing care and may be considered as part

of an adaptive maternal healthcare strategy that responds to technological advancements and the evolving needs of the community.

CONCLUSION AND RECOMMENDATION

This study demonstrates that whatsapp-based telenursing has a significant impact on improving the spiritual literacy of pregnant women ($p < 0.001$). The findings support the incorporation of digital telenursing strategies into maternal health services as an accessible and sustainable approach to providing ongoing spiritual support during pregnancy. Integrating whatsapp-based telenursing into antenatal care programs may strengthen holistic maternal healthcare delivery and enhance the quality of spiritual support for pregnant women.

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