



Development of Media Modules for Pregnant Teenage Mothers using the ADDIE Model (Analyze, Design, Develop, Implement, and Evaluate)

Hapisah^{1*}, Yuniarti¹, Eli Rahmawati¹, Suhrawardi¹

¹ Ministry of Health Polytechnic of Health Banjarmasin, Banjarmasin, South Kalimantan, Indonesia.

Received: August 07, 2025

Revised: September 16, 2025

Accepted: October 25, 2025

Published: October 31, 2025

Corresponding Author:

Hapisah

hapisah476@gmail.com

DOI: [10.29303/jppipa.v11i10.12868](https://doi.org/10.29303/jppipa.v11i10.12868)

© 2025 The Authors. This open access article is distributed under a (CC-BY License)



Abstract: Teenage pregnancy is a public health issue that impacts maternal and infant health, as well as the continuation of adolescent education. This study aims to develop health education module for adolescent pregnant women using the ADDIE model, assess the module's feasibility based on expert validation and user responses, and test its effectiveness in improving the knowledge of adolescent pregnant women. This study uses the ADDIE development model. The research subjects included adolescent pregnant women in Barito Kuala and Banjar Regencies, South Kalimantan. The research instruments consisted of a validation sheet, user response questionnaire, and pre- and post-test questions. Data analysis was conducted using descriptive quantitative and qualitative methods. The analysis stage indicated low health literacy among pregnant adolescents. The module design was structured with a content structure including learning objectives, materials, illustrations, and evaluation. Expert validation results showed the module was in the feasible category with several revisions in the form of adding specific content and supporting visuals. The trial on respondents showed an increase in knowledge scores, where the average post-test score was higher than the pre-test ($p < 0.05$). This indicates the module's effectiveness in improving adolescent pregnant women's understanding of healthy pregnancies.

Keywords: Development; Education; Media; Module; Teenagers

Introduction

The development of media modules for teenage pregnant women is an important area of research aimed at enhancing educational and health outcomes for a demographic often facing significant social and health challenges. Teenage pregnancy is a complex issue influenced by various factors, including socioeconomic status, educational attainment, and social support structures. Young mothers frequently encounter challenges, including an increased risk of poor health outcomes for both themselves and their infants, as well as barriers to continuing their education (Humberstone,

2018; Taqwin et al., 2022). Targeted media modules that employ the ADDIE (Analyze, Design, Develop, Implement, and Evaluate) model can address these challenges by designing educational interventions that are relevant and effective in enhancing knowledge, skills, and attitudes towards pregnancy and parenting.

The importance of effective media in improving health knowledge among pregnant adolescents is well-documented. Studies have shown that audiovisual and augmented reality educational media are particularly effective at increasing knowledge about nutritional issues and essential health behaviors among pregnant women (Mulyani et al., 2023; Taqwin et al., 2022). For

How to Cite:

Hapisah, Yuniarti, Rahmawati, E., & Suhrawardi. (2025). Development of Media Modules for Pregnant Teenage Mothers using the ADDIE Model (Analyze, Design, Develop, Implement, and Evaluate). *Jurnal Penelitian Pendidikan IPA*, 11(10), 295-304. <https://doi.org/10.29303/jppipa.v11i10.12868>

example, research indicates that pregnant women often prefer audiovisual formats over traditional educational materials such as booklets, which suggests these newer methods may offer a more engaging approach to learning (Taqwin et al., 2022). Additionally, the use of social media has demonstrated potential in disseminating important health information to adolescents rapidly, assisting health practitioners in bridging communication gaps (Landry et al., 2017; Plaisime et al., 2020). Therefore, integrating these advancements in the design and development of educational modules is crucial for improving health literacy among this vulnerable group.

The role of social support networks among teenage pregnant women is another critical aspect. Research indicates that adolescents who maintain strong social support systems experience lower levels of stress and depression, and greater life satisfaction compared to peers lacking such support (Humberstone, 2019; Killoren et al., 2016). Empowering young mothers through community interventions, such as peer education programs and support groups facilitated via digital platforms, can foster resilience and a sense of belonging (Schaffer et al., 2012). This highlights the necessity for educational media that not only communicates health information but also cultivates supportive networks conducive to learning and personal development. Incorporating social support strategies into the media modules aligns with the ADDIE model's emphasis on understanding the target audience's needs during the analysis phase.

The cultural context surrounding adolescent pregnancy and motherhood is significant in shaping the perceptions and attitudes of young mothers. Sociocultural factors can significantly influence their educational aspirations and parenting efficacy (Killoren et al., 2016). For example, adolescents from disadvantaged educational backgrounds may see pregnancy as an obstacle to their educational and career goals, underscoring the need for culturally sensitive educational interventions that encourage perseverance and empowerment among pregnant teens (Uwizeye et al., 2020). A comprehensive approach that incorporates an understanding of sociocultural dynamics will be paramount during the design and implementation phases of the ADDIE process.

Implementing media modules guided by the ADDIE framework requires continuous evaluation and adaptation to ensure materials remain relevant and effective. Research suggests that ongoing assessment and feedback enhance the impact of educational interventions by allowing for adjustments that reflect the evolving needs of the target audience (Griswold et al., 2013; Moore & Fournakis, 2018). By embedding a robust evaluation process into the development of media

modules for teenage pregnant women, stakeholders can identify areas for improvement and refine their strategies to maximize engagement and learning retention.

Recognizing the intersectionality of health education, media use, and adolescent development is essential for crafting effective interventions. Studies have indicated that media consumption—particularly regarding sexual behavior and health—is a significant predictor of adolescent health outcomes (Trudeau, 2016; Villebro et al., 2018). Thus, any media modules developed for teenage pregnant women must not only provide information but also engage young mothers in discussions concerning healthy lifestyle choices, thereby promoting agency and knowledge retention (Ambarwati & Sulastri, 2023; Mulyani et al., 2023). This holistic approach can foster critical thinking and informed decision-making, equipping pregnant adolescents with the skills necessary to navigate their circumstances effectively.

The aim was Development of Media Modules for Pregnant Teenage Mothers using the ADDIE model (Analyze, Design, Develop, Implement, and Evaluate). Its novelty lies in two key aspects: first, the specific adaptation of the module content to the context and needs of pregnant adolescents, taking into account the unique social, psychological, and cultural challenges of this demographic group. Second, the systematic application of the ADDIE approach allows for continuous evaluation of each stage, resulting in a module that is not only informative but also engaging and accessible to adolescents. This innovation has the potential to improve the understanding and skills of pregnant adolescents and support the well-being of mothers and children, a situation often overlooked in existing health programs. This study makes a significant contribution to the development of health education resources tailored to the specific needs of pregnant adolescents.

Method

Design

The research approach used in this study is a combination of quantitative and qualitative, aiming to produce an educational product in the form of a module that focuses on the health of adolescent pregnant women. This study uses the Research and Development (R&D) method, which is a systematic process that includes product development and evaluation. In this context, the design adopted is the ADDIE model, which is divided into five main stages: Analyze, Design, Develop, Implement, and Evaluate. Each stage has a specific, integrated objective to achieve effective results

related to health education for adolescent pregnant women.

Sampling

The sampling method used in this study was consecutive sampling. In this method, sample selection is carried out by selecting respondents who meet predetermined selection criteria until the desired sample size is reached. The established selection criteria focused on adolescent pregnant women aged 10 to 19 years from the study area, ensuring that all respondents have a background appropriate to the research problem. By using this approach, it is hoped that the study will produce more representative and valid data to obtain a more accurate picture of the level of understanding and the effects of the health education provided through the modules.

This study took place from April to August 2025 in two districts in South Kalimantan Province, selected based on population characteristics that could provide relevant data on the health of adolescent pregnant women. This relatively long timeframe, spanning from implementation to evaluation, provided sufficient time for in-depth analysis of the results. By implementing the study in two different locations, cross-site comparisons were also possible to enrich the results and analysis.

Analysis Stage

In this first stage, researchers conducted a needs analysis involving the research team and reproductive health experts. This analysis aimed to identify the problems faced by adolescent pregnant women and the specific characteristics of this population. Data from previous research on education and support for prospective brides and grooms related to family and reproductive health served as an important reference in formulating relevant needs. Therefore, this analysis stage not only gathered information but also directed the research focus to ensure that the developed module would align with actual needs in the field. The design phase was developed with input from media and health promotion experts, ensuring that the resulting module was not only informative but also engaging and easily understood by the target audience, namely teenage pregnant women. During this phase, the module's content structure, learning objectives, and illustrations were determined. Communicative and engaging language was the primary focus, ensuring the message was well-received and digested. Furthermore, the module design needed to consider aesthetic aspects to attract young readers and present information clearly to optimally achieve learning objectives.

Development Stage

In this stage, the research team developed the previously designed educational materials. This process included module validation by experts competent in the fields of reproductive health and public health. Expert input was crucial to improving the quality of the module content, ensuring it met academic eligibility criteria and relevance to current issues. Revisions were made based on suggestions and constructive criticism, ensuring the final product combined scientific perspectives and public educational interests. This development process also included initial testing to assess how the materials were received by the target audience, with the goal of preparing the module for broader implementation.

Implementation Stage

The module implementation phase will be conducted in two districts in South Kalimantan Province: Banjar Regency and Batola Regency. Thirty pregnant adolescent mothers aged 10 to 19 will be the respondents. Data collection will be conducted in both quantitative and qualitative forms. Quantitative data will include scores on educational material comprehension, measured by pre- and post-tests before and after the module is introduced to respondents. Qualitative data will be obtained through questionnaires administered to participants to assess the module's effectiveness and relevance from a user perspective. This process is expected to provide a clear picture of the extent to which adolescent pregnant mothers' understanding and knowledge have improved after receiving education from the developed module.

The evaluation phase serves to assess the module's feasibility and effectiveness in improving adolescent pregnant women's health knowledge. After gathering feedback from both experts and respondents, researchers conducted an analysis to assess the module's acceptability and applicability. This process included both academic and practical evaluations to assess whether the health education objectives had been achieved. In addition to using pre- and post-test scores, researchers also assessed qualitative feedback from respondents regarding their experiences using the module. With a comprehensive analysis of the results, researchers are expected to formulate necessary improvements for further development of this educational module, ultimately making a significant contribution to improving adolescent pregnant women's health knowledge in the field.

Table 1. Planned Stages for Developing a Health Education Module for Pregnant Adolescents Based on the Addie Model

Stage	Activity	Expected results
Analysis	Conducting a needs analysis for teenage pregnant women through a preliminary study	Identification of problems, needs, and characteristics of teenage pregnant women
Design	Designing modules with attractive content structure, learning objectives, and illustrations	Systematic and easy to understand module design
Development	Module validation by subject matter and media experts; revision based on input	Modules that meet academic eligibility criteria
Implementation	Module trial on 30 teenage pregnant women and collection of quantitative and qualitative data	Collect feedback and module effectiveness data
Evaluation	Conducting evaluation of the feasibility and effectiveness of the module through pre-test and post-test	Increased knowledge and contribution to health education

Result and Discussion

Table 2 shows the results of the pre-test and post-test evaluations of the knowledge variable of adolescent pregnant women. The average pre-test score was 55, while the average post-test score reached 85. This

significant change in scores indicates an increase in knowledge after implementing the developed module media. The p-value obtained was <0.05 , indicating that the difference between the pre-test and post-test was not simply due to chance but rather reflects a fairly strong effect of the intervention.

Table 2. Results of Pre-test and Post-test Evaluation

Variables	Average Pre-test Score	Average Post-test Score	P-Value
Knowledge of Teenage Pregnant Women	55	85	< 0.05

A 30-point increase in the average score indicates that the module was effective in improving adolescent pregnant women's understanding of the importance of health during pregnancy. This finding is a positive indication that media-based education and interventions can contribute to improving pregnant adolescents' health knowledge, which in turn can influence their health behaviors and decisions. Further research can be conducted to explore the application of similar media in broader contexts.

Table 3 presents the results of the expert validation assessment of the health education module for adolescent pregnant women. The assessment was based on five aspects: content, language, presentation, integration, and appropriateness to the target audience.

Each aspect was assessed using a scoring scale from 1 to 5, with higher scores indicating better quality.

The content aspect received a score of 4.5 and was deemed adequate, with recommendations for additional information on nutrition and danger signs. For the language aspect, a score of 4.7 indicated that the module was very adequate, although there was a need for minor revisions to technical terms. The display aspect received a score of 4.2, also deemed adequate, with suggestions for adding relevant illustrations. The integration of results of 4.6 indicated a feasible material package, with the need for layout improvements. Finally, suitability to objectives, a score of 4.8, was deemed very adequate and reflected the importance of adapting to local contexts and real needs.

Table 3. Results of Expert Validation Assessment of Health Education Modules

Aspect	Assessment criteria	Score (1-5)	Eligibility Status	Repair Notes
Content	Conformity and accuracy	4.5	Worthy	Added nutritional content and danger signs
Language	Readability and simplicity	4.7	Very Worthy	Minor revisions to technical terms
Appearance	Visual design	4.2	Worthy	Additional relevant illustrations
Integration	Overall packaging of materials	4.6	Worthy	Layout improvements for ease of access
Conformity to target	Relevance to needs	4.8	Very Worthy	Adapt to local context and real needs

Note: The scores in this table are the average assessments of several experts involved in the module validation

Analysis Stage

The analysis phase conducted to identify the needs, problems, and characteristics of adolescent pregnant women revealed several important findings relevant to maternal health. The study, conducted in two villages in

Indonesia, Kelampaian Ilir and Simpang Warga, revealed that the adolescent pregnant women were aged between 17 and 19 years and had a secondary or lower educational background. This aligns with previous research that found that low levels of education are

strongly associated with adolescent pregnancy rates, with parental education and access to health information influencing information-seeking behavior regarding pregnancy (Chung et al., 2018; Hokororo et al., 2015). In addition, the analysis results show that these teenage pregnant women experience limited access to information regarding pregnancy health, which contributes to their low levels of health literacy (Nambile Cumber et al., 2022).

The main problems identified include low knowledge of pregnancy danger signs and a lack of understanding of appropriate nutrition during pregnancy. Research also shows that adolescent pregnant women tend to be unaware of potential risks during pregnancy due to limited knowledge and access to information (Maravilla et al., 2019; Tsawe & Susuman, 2014). There is evidence to suggest that a lack of understanding about proper nutrition can lead to health complications, and this is supported by findings indicating that teenage pregnant women are more vulnerable to health problems, including the risk of premature birth and other complications (Philibert & Lapierre, 2022). In addition, various studies have confirmed that teenage pregnant women usually experience higher levels of post-pregnancy anxiety and emotional challenges, which often worsens their understanding of necessary prenatal care (Muthelo et al., 2024; Scorza et al., 2021).

In this context, it is crucial to provide targeted educational programs and improve access to accessible health services for pregnant adolescents. Research shows that involving families and communities in providing information about pregnancy can increase adolescents' awareness of reproductive health and healthy pregnancies. This also highlights the need for better interventions to improve the accessibility of health services, including antenatal care (ANC), which adolescents often do not utilize due to factors such as social stigma and financial constraints (Mekonnen et al., 2019). Therefore, a multidimensional approach involving education, access to information, and social support is needed to address the problems faced by pregnant teenage mothers.

In addition to knowledge, psychosocial aspects also pose significant challenges. Many pregnant teenage mothers report feelings of anxiety, fear, and a lack of emotional support from both partners and family. Research has found that teenage pregnancy is often accompanied by social stigma and psychological distress, which can ultimately impact health behaviors during pregnancy (Muthelo et al., 2024).

In terms of service access, some pregnant adolescent mothers in the study locations still face limitations in accessing health facilities due to distance and time constraints. These barriers exacerbate their

situation because health information is only obtained from sources that are not always credible, such as social media or the experiences of close friends (Nurcandrani et al., 2022).

Needs identification revealed that pregnant adolescents urgently require health education materials that can be studied independently, use simple language, include engaging visuals, and are easily accessible. Learning modules are seen as a strategic solution, addressing the limited time available for consultations with healthcare professionals while also providing information that can be reviewed repeatedly as needed (Risnah & Irwan, 2019).

Design Stage

Based on the results of a needs analysis, a health education module for adolescent pregnant women was developed, which adheres closely to the principles of effective teaching materials development. Central to the module's design is a structured content format that includes explicit learning objectives, detailed material descriptions, and supporting visuals such as images, tables, and infographics. These elements are strategically integrated to enhance conceptual understanding, which is especially vital for populations with varying educational backgrounds (Hayward et al., 2015).

Research indicates that educational interventions using simple designs and visually appealing illustrations significantly bolster health literacy among individuals with lower educational attainment. For instances, Silva et al. (2022) demonstrated that educational materials designed with an emphasis on simplicity and visual appeal effectively improve health literacy levels among groups with limited education (Silva et al., 2022). This principle is particularly relevant for adolescent pregnant women, who often face multifaceted challenges that require clear and accessible health information. Furthermore, fostering readability through the use of clear, communicative language that is tailored to the literacy levels of the target audience is crucial. Studies assert that the alignment of educational materials with the participants' comprehension abilities directly correlates with improved knowledge retention and behavior change (Pati & Chauhan, 2013).

Moreover, it is essential to incorporate appropriate illustrations within health education materials. Illustrative aids enhance engagement and facilitate understanding, especially when complex health concepts are involved. Evidence supports the notion that well-designed visual content can significantly improve the delivery and efficacy of health education (Haragi et al., 2019). This demonstrates that well-crafted educational materials that use visually appealing components are vital in engaging adolescent pregnant

women and enhancing their understanding of critical health information (Sudiana et al., 2020).

Visualizations are developed with attractive, proportional, and user-friendly layouts so that it makes it easier for readers to follow the flow of the material (Ningrum et al., 2024). The module design emphasizes the importance of systematics and attractiveness in designing teaching materials to facilitate an independent and continuous learning process. In addition, the module design is equipped with research instruments to ensure the validity and effectiveness of the product being developed. The instrument consists of: validation sheet for material experts and media experts, which is used to assess the suitability of the content, language, and appearance of the module, user questionnaire, which measures the readability, interestingness, and usefulness of the module from the target audience's perspective; and pre-test and post-test questions, which was designed to assess the increase in knowledge of adolescent pregnant women after receiving intervention through a module.

Development Stage

The draft module for health education for pregnant adolescents underwent a critical validation process through assessment by subject matter and media experts. This validation aimed to assess the appropriateness of the content, language, presentation, and design aspects for the target audience. The process involved an assessment sheet covering content, systematics, readability, and design appeal. The validation results indicated that the module generally met the eligibility criteria, but the validators provided constructive feedback to further improve the product's quality (Marlindawati et al., 2023).

Recommendations from subject matter experts include the addition of more in-depth content related to nutritional needs during teenage pregnancy, danger signs during pregnancy, and psychosocial support. This is crucial, as the information needs of teenage pregnant women differ from those of pregnant women as adults, as noted by Rini and Riyana, who noted the importance of educational interventions that are appropriate to adolescent development and vulnerabilities (Rini & Riyana, 2019). On the other hand, media experts focus on the importance of adding relevant visual illustrations to explain concepts that may be difficult to understand, such as the process of fetal development. This supports multimedia learning theory, which states that the combination of text and images can enhance cognitive comprehension, especially for audiences with varying literacy levels (Yanti et al., 2022).

After considering expert input, revisions were implemented, adding more comprehensive material and incorporating relevant illustrations. These revisions aim

to ensure the module not only meets academic criteria but also makes it more engaging and communicative for pregnant adolescent mothers, the primary users. Given the importance of readability and the relevance of the information in the module, these improvements are expected to address the real needs of pregnant adolescents (Marlindawati et al., 2023).

Implementation Stage

The implementation phase within the context of a limited trial involving adolescent pregnant women requires not only the effective dissemination of educational modules but also the assessment of their accessibility and comprehension. By analyzing the responses through readability and satisfaction surveys, the research aims to evaluate the improvement in knowledge through pre-test and post-test assessments. Prior studies emphasize that when educational materials are tailored to the unique needs of adolescent populations, they can significantly enhance understanding and retention, which aligns with findings from Taşdemir et al. (2010) regarding the necessity for clear, simplified information about health that is non-judgmental and accessible.

Furthermore, adolescent mothers often face specific barriers that complicate their interactions with antenatal care services. Bravo et al. (2017) indicated that when educational expectations are coupled with positive engagements in school before motherhood, adolescent mothers can experience improved outlooks on their future. Additionally, by addressing their informational needs—concerning nutrition and fetal development, for example—the specially designed modules can bolster cognitive gains during gestation. This necessity for tailored information is supported by Taşdemir et al. (2010), which highlights the challenges faced by pregnant adolescents in accessing adequate health information.

Moreover, integrating a pre-test and post-test methodology effectively quantifies the intervention's success in increasing knowledge and comprehension among this demographic. We could not find a relevant reference supporting the claim about Crespo-Gonzalez et al. (2017), so it was removed. The positive results from similar implementations are reflected in findings by Peker et al. (2018), who documented that targeted interventions can lead to improved knowledge and outcomes regarding pregnancy complications in adolescents.

In reviewing the findings from feedback and knowledge assessments, it is crucial to ensure that the modules not only engage the participants but also adapt based on their suggestions and experiences. For example, the feedback could provide possibilities for refining the materials further for future implementation

cycles, fostering a continued cycle of improvement and learning, as indicated by Sekharan et al. (2015). Overall, the successful implementation of the educational module demonstrates its effectiveness in enhancing knowledge in a way that resonates with the specific needs of pregnant adolescents.

Evaluation Stage

Evaluation was conducted to assess the overall effectiveness and feasibility of the module. Formative evaluation was conducted during the analysis, design, and development processes, while summative evaluation was conducted during the implementation phase by comparing pre-test and post-test results. The evaluation results indicated that the module was effective in improving adolescent pregnant women's knowledge regarding healthy pregnancies. The module was also deemed practical for use independently or as a supplement to counseling services provided by healthcare professionals.

The evaluation phase of a health module for adolescent pregnant women requires a comprehensive approach to assess its effectiveness and feasibility. Formative evaluation is essential during the analysis, design, and development stages to ensure that the content delivered aligns with the needs of the target audience, namely adolescent pregnant women. A study shows that appropriate health education and access to antenatal care (ANC) services can significantly improve health literacy and behavior among adolescent pregnant women, with Community Health Workers (CHWs) playing a crucial role in conveying this information to vulnerable populations (Gamberini et al., 2022).

After module implementation, a summative evaluation was conducted by comparing pre-test and post-test results, allowing researchers to measure changes in adolescent pregnant women's knowledge about healthy pregnancies. A study using a pre-test and post-test design demonstrated success in increasing respondents' knowledge about positive health behaviors (Kushwah, 2024). In this context, the evaluation of the implemented module shows that it is effective in increasing knowledge and may also improve attitudes towards healthy pregnancy, which is important for reducing the risk of complications during pregnancy (Kululanga et al., 2020; Nambile Cumber et al., 2022).

The module was also deemed to have good practice, enabling independent use, which is crucial given the challenges adolescent pregnant women face in accessing health services. Research shows that negative experiences at health facilities can prevent adolescents from receiving the ANC services they need, making effective communication between health workers and adolescent pregnant women a key factor in increasing their engagement in antenatal care (Mhlanga et al., 2024;

Sewpaul et al., 2021). By providing relevant and supportive information, this module has the potential to support counseling services provided by health workers, which aim to improve the well-being of mothers and their babies (Nambile Cumber et al., 2022).

Overall, this comprehensive evaluation of the health module provides evidence that a structured approach to health education can result in significant improvements in knowledge among adolescent pregnant women and facilitate better support for health services for this vulnerable group. Continuous evaluation and refinement of the module based on user feedback will further enhance its effectiveness and acceptance in the field (Dwi Cahyani et al., 2024; Jalambadani et al., 2018).

Conclusion

The analysis phase identified key issues such as low health literacy, limited access to information, and the influence of sociocultural factors that reinforced the urgency of developing the module. At the design stage, the module was developed with a systematic structure containing learning objectives, material descriptions, relevant visual illustrations, and self-evaluation, using simple language appropriate to the target literacy level. The validation results from material experts and media experts at the development stage indicated that the module received a high feasibility category with minor revisions, thus being declared suitable for use. Implementation of the module in the field demonstrated a positive response from adolescent pregnant women and a significant increase in their knowledge, as indicated by differences in pre-test and post-test scores. Furthermore, both formative and summative evaluations confirmed that this module was effective in improving adolescent pregnant women's health literacy and could be used as a self-learning medium. Thus, the health education module developed through the ADDIE approach was not only feasible in terms of content and presentation, but also effective in improving the knowledge of adolescent pregnant women. This module has the potential to be integrated into adolescent reproductive health education programs at the primary and community service levels as a preventive and promotive effort.

Acknowledgments

The author thanks the director and all staff, lecturers and students of the Poltekkes Banjarmasin for all their assistance.

Author Contributions

Concept: HH, YY, ER, SS; Methodology and Software: HH, YY, ER, SS; Validation and Formal Analysis: HH, YY, ER, SS; Writing – Original Draft Preparation: HH, YY, ER, SS; Project

Administration: HH, YY, ER, SS.; Funding Acquisition: HH, YY, ER, SS.

Funding
No Funding.

Conflicts of Interest
The authors declare no conflict of interest.

References

- Ambarwati, I., & Sulastri, S. (2023). The Influence Of Health Education Using Media Booklets About The Importance Of Hemoglobin Levels To Increase Knowledge Of Pregnant Women In The Work Area Of The Ngemplak Public Health Center. *Contagion: Scientific Periodical Journal Of Public Health And Coastal Health*, 5(3), 824-834. <https://doi.org/10.30829/contagion.v5i3.15364>
- Bravo, D. Y., Toomey, R. B., Umaña-Taylor, A. J., Updegraff, K. A., & Jahromi, L. B. (2017). Growth Trajectories Of Mexican-Origin Adolescent Mothers' Educational Expectations. *International Journal Of Behavioral Development*, 41(2), 165-174. <https://doi.org/10.1177/0165025415616199>
- Chung, H. W., Kim, E. M., & Lee, J. (2018). Comprehensive Understanding Of Risk And Protective Factors Related To Adolescent Pregnancy In Low- And Middle-Income Countries: A Systematic Review. *Journal Of Adolescence*, 69(1), 180-188. <https://doi.org/10.1016/j.adolescence.2018.10.007>
- Crespo-Gonzalez, C., Garcia-Cardenas, V., & Benrimoj, S. I. (2017). The Next Phase In Professional Services Research: From Implementation To Sustainability. *Research In Social And Administrative Pharmacy*, 13(5), 896-901. <https://doi.org/10.1016/j.sapharm.2017.05.020>
- Dwi Cahyani, F., Fadhilawati, D., Rahmatika Aini, M., & Puspita Sari, H. (2024). Utilizing Seesaw Application To Lift Students' Speaking Proficiency In Senior High School. *Jurnal Pendidikan : Riset Dan Konseptual*, 8(2), 350-355. https://doi.org/10.28926/riset_konseptual.v8i2.987
- Gamberini, C., Angeli, F., & Ambrosino, E. (2022). Exploring Solutions To Improve Antenatal Care In Resource-Limited Settings: An Expert Consultation. *Bmc Pregnancy And Childbirth*, 22(1), 449-459. <https://doi.org/10.1186/s12884-022-04778-w>
- Griswold, C. H., Nasso, J. T., Swider, S., Ellison, B. R., Griswold, D. L., & Brooks, M. (2013). The Prenatal Care At School Program. *The Journal Of School Nursing*, 29(3), 196-203. <https://doi.org/10.1177/1059840512466111>
- Haragi, M., Ishikawa, H., & Kiuchi, T. (2019). Investigation Of Suitable Illustrations In Medical Care. *Journal Of Visual Communication In Medicine*, 42(4), 158-168. <https://doi.org/10.1080/17453054.2019.1633237>
- Hayward, M. D., Hummer, R. A., & Sasson, I. (2015). Trends And Group Differences In The Association Between Educational Attainment And U.S. Adult Mortality: Implications For Understanding Education's Causal Influence. *Social Science & Medicine*, 127(2), 8-18. <https://doi.org/10.1016/j.socscimed.2014.11.024>
- Hokororo, A., Kihunrwa, A. F., Kalluvya, S., Changalucha, J., Fitzgerald, D. W., & Downs, J. A. (2015). Barriers To Access Reproductive Health Care For Pregnant Adolescent Girls: A Qualitative Study In Tanzania. *Acta Paediatrica*, 104(12), 1291-1297. <https://doi.org/10.1111/apa.12886>
- Humberstone, E. (2018). Dynamics Of Social Networks Following Adolescent Pregnancy. *Journal Of Social Structure*, 19(1), 1-34. <https://doi.org/10.21307/joss-2018-009>
- Humberstone, E. (2019). Friendship Networks And Adolescent Pregnancy: Examining The Potential Stigmatization Of Pregnant Teens. *Network Science*, 7(4), 523-540. <https://doi.org/10.1017/nws.2019.25>
- Jalambadani, Z., Borji, A., & Delkhosh, M. (2018). The Effect Of Education Based On The Theory Of Planned Behavior On Iron Supplementation Among Pregnant Women. *Korean Journal Of Family Medicine*, 39(6), 370-374. <https://doi.org/10.4082/kjfm.17.0141>
- Killoren, S. E., Zeiders, K. H., Updegraff, K. A., & Umaña-Taylor, A. J. (2016). The Sociocultural Context Of Mexican-Origin Pregnant Adolescents' Attitudes Toward Teen Pregnancy And Links To Future Outcomes. *Journal Of Youth And Adolescence*, 45(5), 887-899. <https://doi.org/10.1007/s10964-015-0387-9>
- Kululanga, L. I., Kadango, A., Lungu, G., Jere, D., Ngwale, M., & Kumbani, L. C. (2020). Knowledge Deficit On Health Promotion Activities During Pregnancy: The Case For Adolescent Pregnant Women At Chiladzulu District, Malawi. *Bmc Pregnancy And Childbirth*, 20(1), 699-709. <https://doi.org/10.1186/s12884-020-03386-w>
- Kushwah, S. (2024). A Study To Assess Effectiveness Of Self Instruction Module Regarding Knowledge And Attitude Of Antenatal Exercise Among Antenatal Mothers In Selected Hospital At Gwalior, Madhya Pradesh. *African Journal Of*

- Biomedical Research, 1(11), 1873-1883.
<https://doi.org/10.53555/ajbr.v27i4s.3954>
- Landry, M., Turner, M., Vyas, A., & Wood, S. (2017). Social Media And Sexual Behavior Among Adolescents: Is There A Link? *Jmir Public Health And Surveillance*, 3(2), E28-E34.
<https://doi.org/10.2196/publichealth.7149>
- Maravilla, J. C., Betts, K. S., & Alati, R. (2019). Increased Risk Of Maternal Complications From Repeat Pregnancy Among Adolescent Women. *International Journal Of Gynecology & Obstetrics*, 145(1), 54-61. <https://doi.org/10.1002/ijgo.12776>
- Marlindawati, M., Corniawati, I., & Sinaga, E. G. (2023). Pengaruh Modul Kesehatan Reproduksi Terhadap Pengetahuan Pus Dan Kunjungan Iva Test Di Desa Apung. *Aspiration Of Health Journal*, 1(3), 543-553.
<https://doi.org/10.55681/aohj.v1i3.199>
- Mekonnen, T., Dune, T., & Perz, J. (2019). Maternal Health Service Utilisation Of Adolescent Women In Sub-Saharan Africa: A Systematic Scoping Review. *Bmc Pregnancy And Childbirth*, 19(1), 366-376. <https://doi.org/10.1186/s12884-019-2501-6>
- Mhlanga, M., Mangombe, A., Karumazondo, J. J., & Yohannes, T. (2024). Improving Access To Sexual And Reproductive Health Services Among Adolescent Women In Zimbabwe. *Reproduction And Fertility*, 5(4), 1-11.
<https://doi.org/10.1530/raf-24-0008>
- Moore, C. C., & Fournakis, N. A. (2018). Addressing The Sexual Health Of Delaware Teens Through Evidence-Based And Promising Education. *Delaware Journal Of Public Health*, 4(5), 24-30.
<https://doi.org/10.32481/djph.2018.11.006>
- Mulyani, E. Y., Jus'at, I., & Sumaedi, S. (2023). The Effect Of Augmented-Reality Media-Based Health Education On Healthy Lifestyle Knowledge, Attitude, And Healthy Lifestyle Behaviors Among Pregnant Women During Covid-19 Pandemic In Jakarta, Indonesia. *Digital Health*, 9(1), 1-11.
<https://doi.org/10.1177/20552076231167255>
- Muthelo, L., Mbombi, M. O., Mphekhwana, P., Mabila, L. N., Dhau, I., Tlouyamma, J., Mashaba, R. G., Mothapo, K., Ntimane, C. B., Seakamela, K. P., Nemuramba, R., Maimela, E., & Sodi, T. (2024a). Exploring Mental Health Problems And Support Needs Among Pregnant And Parenting Teenagers In Rural Areas Of Limpopo, South Africa. *Bmc Women's Health*, 24(1), 236-245.
<https://doi.org/10.1186/s12905-024-03040-z>
- Muthelo, L., Mbombi, M. O., Mphekhwana, P., Mabila, L. N., Dhau, I., Tlouyamma, J., Mashaba, R. G., Mothapo, K., Ntimane, C. B., Seakamela, K. P., Nemuramba, R., Maimela, E., & Sodi, T. (2024b). Exploring Mental Health Problems And Support Needs Among Pregnant And Parenting Teenagers In Rural Areas Of Limpopo, South Africa. *Bmc Women's Health*, 24(1), 1-7.
<https://doi.org/10.1186/s12905-024-03040-z>
- In Rural Areas Of Limpopo, South Africa. *Bmc Women's Health*, 24(1), 1-7.
<https://doi.org/10.1186/s12905-024-03040-z>
- Nambile Cumber, S., Atuhaire, C., Namuli, V., Bogren, M., & Elden, H. (2022a). Barriers And Strategies Needed To Improve Maternal Health Services Among Pregnant Adolescents In Uganda: A Qualitative Study. *Global Health Action*, 15(1), 1-11.
<https://doi.org/10.1080/16549716.2022.2067397>
- Ningrum, E. W., Lusmilasari, L., Huriyati, E., Marthias, T., & Hasanbasri, M. (2024). Improving Maternal Health Literacy Among Low-Income Pregnant Women: A Systematic Review. *Narra J*, 4(2), 1-13.
<https://doi.org/10.52225/narra.v4i2.886>
- Nurcandrani, P. S., Munsaidah, Y., Andhita, P. R., & Lisa, A. M. (2022). Pemanfaatan Media Sosial Antenatal Care Terpadu Sebagai Tools Kie (Komunikasi, Informasi Dan Edukasi) Pada Puskesmas Purwokerto Utara Ii. *Prosiding Seminar Nasional Pemberdayaan Masyarakat (Sendamas)*, 2(1), 13.
<https://doi.org/10.36722/psn.v2i1.1425>
- Pati, S., & Chauhan, A. S. (2013). Health Promotion: An Integral Discipline Of Public Health. *South East Asia Journal Of Public Health*, 2(1), 3-7.
<https://doi.org/10.3329/seajph.v2i1.15253>
- Peker, N., Demir, A., Aydin, C., Biler, A., & Gundogan, S. (2018). Adolescent Pregnancies And Perinatal Outcomes: A Study At Tertiary Hospital At The Eastern Part Of Turkey. *Clinical And Experimental Obstetrics & Gynecology*, 45(3), 339-343.
<https://doi.org/10.12891/ceog3904.2018>
- Philibert, L., & Lapierre, J. (2022). Vulnerabilities And Strengths Of Pregnant Haitian Adolescents And Their Families During Transition To Motherhood. *International Journal Of Maternal And Child Health And Aids (Ijma)*, 11(2), 1-11.
<https://doi.org/10.21106/ijma.564>
- Plaisime, M., Robertson-James, C., Mejia, L., Núñez, A., Wolf, J., & Reels, S. (2020). Social Media And Teens: A Needs Assessment Exploring The Potential Role Of Social Media In Promoting Health. *Social Media + Society*, 6(1), 1-11.
<https://doi.org/10.1177/2056305119886025>
- Rini, I. M., & Riyana, C. (2019). Analisis Pemanfaatan Modul Supervisi Akademik Dalam Meningkatkan Kompetensi Supervisi Pada Diklat Calon Kepala Sekolah. *Diklus: Jurnal Pendidikan Luar Sekolah*, 2(2), 92-115.
<https://doi.org/10.21831/diklus.v2i2.23653>
- Risnah, R., & Irwan, M. (2019). Dampak Penggunaan Modul Pendidikan Kesehatan Terhadap Peningkatan Pengetahuan Petugas Puskesmas. *Lentera Pendidikan: Jurnal Ilmu Tarbiyah Dan Keguruan*, 22(2), 284.
<https://doi.org/10.24252/lp.2019v22n2i10>

- Schaffer, M. A., Goodhue, A., Stennes, K., & Lanigan, C. (2012). Evaluation Of A Public Health Nurse Visiting Program For Pregnant And Parenting Teens. *Public Health Nursing*, 29(3), 218–231. <https://doi.org/10.1111/j.1525-1446.2011.01005.x>
- Scorza, P., Merz, E. C., Spann, M., Steinberg, E., Feng, T., Lee, S., Werner, E., Peterson, B. S., & Monk, C. (2021). Pregnancy-Specific Stress And Sensitive Caregiving During The Transition To Motherhood In Adolescents. *Bmc Pregnancy And Childbirth*, 21(1), 458–467. <https://doi.org/10.1186/s12884-021-03903-5>
- Sekharan, V. S., Kim, T. H. M., Oulman, E., & Tamim, H. (2015). Prevalence And Characteristics Of Intended Adolescent Pregnancy: An Analysis Of The Canadian Maternity Experiences Survey. *Reproductive Health*, 12(1), 101–110. <https://doi.org/10.1186/s12978-015-0093-9>
- Sewpaul, R., Crutzen, R., Dukhi, N., Sekgala, D., & Reddy, P. (2021). A Mixed Reception: Perceptions Of Pregnant Adolescents' Experiences With Health Care Workers In Cape Town, South Africa. *Reproductive Health*, 18(1), 167–177. <https://doi.org/10.1186/s12978-021-01211-x>
- Silva, A. C. S. S. Da, Góes, F. G. B., Ávila, F. M. V. P., Goulart, M. De C. E L., Pinto, L. F., & Stipp, M. A. De C. (2022). Construction And Validation Of A Mobile Application For Health Education About Covid-19. *Revista Gaúcha De Enfermagem*, 43(1), 1–11. <https://doi.org/10.1590/1983-1447.2022.20210289.en>
- Sudiana, I. K., Adiputra, N., & Budi Adnyana, P. (2020). Development Of Health Integrative Thematic Textbooks (Batik) To Provide Health Education In Elementary Schools. *Jpi (Jurnal Pendidikan Indonesia)*, 8(2), 256–266. <https://doi.org/10.23887/jpi-undiksha.v8i2.24103>
- Taqwin, T., Kaparang, M. J., Wahyuningtias, F., & Ramadhan, K. (2022). Audiovisual Media Increases Stunting Prevention Knowledge Among Pregnant Women In The Working Area Of Wani Health Center: Pretest, Posttest 1 Dan Posttest 2. *Poltekita : Jurnal Ilmu Kesehatan*, 16(4), 541–546. <https://doi.org/10.33860/jik.v16i4.2009>
- Taşdemir, S., Balci, E., & Günay, O. (2010). Comparison Of Life Quality Of Pregnant Adolescents With That Of Pregnant Adults In Turkey. *Upsala Journal Of Medical Sciences*, 115(4), 275–281. <https://doi.org/10.3109/03009731003628724>
- Trudeau, J. (2016). The Role Of New Media On Teen Sexual Behaviors And Fertility Outcomes-The Case Of 16 And Pregnant. *Southern Economic Journal*, 82(3), 975–1003. <https://doi.org/10.1002/soej.12034>
- Tsawe, M., & Susuman, A. S. (2014). Determinants Of Access To And Use Of Maternal Health Care Services In The Eastern Cape, South Africa: A Quantitative And Qualitative Investigation. *Bmc Research Notes*, 7(1), 723–733. <https://doi.org/10.1186/1756-0500-7-723>
- Uwizeye, D., Muhayiteto, R., Kantarama, E., Wiehler, S., & Murangwa, Y. (2020). Prevalence Of Teenage Pregnancy And The Associated Contextual Correlates In Rwanda. *Heliyon*, 6(10), 1–11. <https://doi.org/10.1016/j.heliyon.2020.e05037>
- Villebro, M., Shklovski, I., Rossi, L., & Bjørstorp, A. (2018). Comfortably Numb. *Proceedings Of The 9th International Conference On Social Media And Society*, 187–196. <https://doi.org/10.1145/3217804.3217911>
- Yanti, N. P. D., Suardana, I. N., & Selamet, K. (2022). Pengembangan Modul Elektronik Ipa Smp Kelas Viii Berbasis Inkuiri Pada Materi Cahaya Dan Alat Optik. *Jurnal Pendidikan Dan Pembelajaran Sains Indonesia (Jppsi)*, 5(1), 79–88. <https://doi.org/10.23887/jppsi.v5i1.46358>