Ann PUBLISHER Journal of Medicine and Health Sciences (Medisci)
e-ISSN 3046-7322
p-ISSN 3032-7326

# The Effect Of Health Education Using Leaflet Media And Lecture Methods On Increasing Pregnant Women's Knowledge About Gestational Diabetes Mellitus In The Working Area Of The North Aceh District Community Health Center

**Elizar[1], Jasmiati[2], Nova Sumaini Prihatin[3], Yusnaini[4], Elit Pebryatie[5], Endang Nurrochmi[6]**
[1]Poltekkes Kemenkes Aceh, Aceh, Indonesia, Email(elizar@poltekkesaceh.ac.id
[2]Poltekkes Kemenkes Aceh, Aceh, Indonesia, Email Jasmiatif.1@gmail.com
[3]Poltekkes Kemenkes Aceh, Aceh, Indonesia, Email(novakia2015@gmail.com
[4]Poltekkes Kemenkes Aceh, Aceh, Indonesia, Email yusnaini@poltekkesaceh.ac.id
[5]Poltekkes Kemenkes Tasikmalaya, Cirebon, Indonesia, Email doula.elit@gmail.com
[6]Poltekkes Kemenkes Tasikmalaya, Cirebon, Indonesia, Email endangnurrochmi72@gmail.com
**Corresponding Author** : elizar@poltekkesaceh.ac.id

**Abstract:**
**Background:** Gestational diabetes mellitus (GDM) is a growing global health concern with increasing maternal-fetal morbidity and long-term health risks, and poor knowledge of GDM among pregnant women raises the potential for serious complications.
**Aim:** This study aims to analyze the effect of health education using leaflets and lectures on pregnant women's knowledge about gestational diabetes mellitus in the community health center (Puskesmas) in North Aceh Regency.
**Methods.** The study used a quasi-experimental design with a non-equivalent control group. The sample was drawn from pregnant women undergoing antenatal care at the community health center (Puskesmas) in North Aceh Regency, with a total of 64 respondents from the intervention and control groups. Respondents were selected using purposive sampling according to predetermined criteria.
**Results:** The Wilcoxon signed-rank test showed a significant difference in knowledge before and after health education using lectures and leaflets on pregnant women's knowledge.
Conclusions: Health education using lectures and leaflets has a greater impact on improving pregnant women's knowledge than lectures alone.
**Implications:** Healthcare providers should develop health education programs that combine several simple and clear educational methods about gestational diabetes mellitus for pregnant women and their families.

**Keywords:** Gestational Diabetes Mellitus, Method Lectures , Leaflets, Health Education, Knowledge of Pregnant Women

## INTRODUCTION

Gestational Diabetes Mellitus (GDM) is a global health problem and one of the most common conditions causing complications during pregnancy. It is defined as any degree of glucose intolerance that develops during pregnancy and is associated with increased maternal-fetal morbidity as well as long-term complications for both the mother and her offspring (Kautzky-Willer et al., 2023). The global prevalence of gestational diabetes mellitus is rising at an alarming rate. The International Diabetes Federation (IDF) reported that in 2021, approximately 21.1 million live births were affected by hyperglycemia in pregnancy, accounting for 16.7% of women aged 20–49 years, with a higher burden observed in low-income countries (International Diabetes Federation (IDF), 2021).

Women with gestational diabetes mellitus (GDM) generally do not experience specific symptoms, which often leads to unawareness of the risks associated with the condition. Studies conducted in several countries have also indicated low levels of awareness and knowledge regarding GDM among pregnant women (Dissassa et al., 2023; Thomas et al., 2020). Several risk factors for gestational diabetes mellitus include overweight or obesity, a family history of diabetes, maternal age over 35 years, and a previous history of gestational diabetes. If left untreated, gestational diabetes can lead to complications such as macrosomia, preterm birth, preeclampsia, and an increased risk of developing type 2 diabetes later in life (Feldman et al., 2020). Factors such as socioeconomic status, educational level, access to healthcare, and cultural beliefs also influence pregnant women's knowledge of gestational diabetes. Educational programs should take these factors into account to enhance maternal understanding of gestational diabetes (Hagrass, 2019). In addition, factors such as socioeconomic status, educational level, access to healthcare, and cultural beliefs also influence pregnant women's knowledge of gestational diabetes. Consequently, many expectant mothers tend not to adopt preventive measures such as maintaining a healthy diet and engaging in physical activity during pregnancy (Dissassa et al., 2023; Thomas et al., 2020)

One of the educational media used to improve maternal knowledge is the leaflet. The development of educational media in the form of leaflets has shown a significant positive effect on increasing knowledge and attitudes regarding pregnancy and childbirth complications among pregnant women. This approach is considered effective and practical in enhancing maternal knowledge and empowering them to make informed decisions about

their health and well-being (Baity & Rahayuningsih, 2023; Stang et al., 2020). The effectiveness of leaflet-based educational media in educating pregnant women about gestational diabetes has been proven to yield positive effects in improving knowledge and attitudes regarding pregnancy and childbirth complications (Shuhaimi et al., 2023). Moreover, the impact of using the lecture method to complement this information and reinforce key points should not be overlooked. By combining these two educational tools, pregnant women can gain a more comprehensive understanding of gestational diabetes mellitus and how to manage it effectively.

## LITERATURE REVIEW

Gestational diabetes mellitus (GDM) is the main endocrine disorder of pregnancy, with several confirmed risk factors that have been associated with adverse pregnancy outcomes (Kouhkan et al., 2021). Evidence indicates that risk factors for GDM include maternal age, obesity, family history of diabetes, previous history of GDM, and a history of macrosomia. The rising prevalence of GDM highlights the importance of early screening and appropriate management, particularly in Asia and low- and middle-income countries. Health education programs using simple and clear media can improve pregnant women's knowledge and behaviors in preventing and managing GDM

Knowledge is the outcome of what an individual understands and learns. Comprehensive knowledge requires an understanding of all factors related to a condition, while inadequate knowledge can compromise health strategies. To reduce the prevalence of GDM, it is essential to strengthen awareness of prevention and early detection (Jishy et al., 2023; Thomas et al., 2020). A study by (Dissassa et al., 2023) recommended that to improve maternal knowledge of GDM, health education programs in both community and healthcare facility settings should target identified risk factors. Mixed-method approaches to health education are strongly needed. Moreover, sources of knowledge regarding GDM should be further explored in future studies to identify specific areas that require additional interventions.

Health education plays a critical role in improving public health, yet it is often overlooked due to factors such as limited understanding and insufficient awareness of health promotion strategies. The importance of health education within healthcare systems cannot be overstated, as it holds significant potential to improve community health outcomes. Through health education programs, mothers can be empowered to actively participate in

making informed choices about their care (Rizvi, 2022). Attractive and persuasive health education media facilitate the delivery of health messages effectively. Leaflets are one form of printed media, which may consist of text, images, or a combination of both, and are widely used in health promotion (Yuhandini & Widiyastuti, 2017). Lectures remain a popular method of health education; however, communication in this approach is typically one-way, with the community serving as passive listeners. The effectiveness of lectures largely depends on the speaker. While lectures provide essential basic information, they may not always result in behavioral change, yet they remain important for health education in small group settings (Education, 2019)

## METHOD

This quantitative study employed a quasi-experimental design with a non-equivalent control group to assess the effect of health education using leaflets and lectures on pregnant women's knowledge of gestational diabetes mellitus in the working area of the Public Health Center (Puskesmas) of North Aceh District. The study population consisted of all pregnant women attending antenatal care, with samples selected using purposive sampling based on predetermined criteria. The sample size was calculated using the Lameshow formula, yielding 29 respondents per group. After applying a 10% correction to anticipate potential dropout and loss to follow-up, the final sample size was 32 participants per group, resulting in a total of 64 pregnant women.

Data collection was conducted through a pre-test assessing knowledge of gestational diabetes mellitus, followed by the intervention. The intervention group received a combination of leaflet-based and lecture-based education, while the control group received lecture-based education only. A post-test was administered 15 minutes and two weeks after the intervention using a modified questionnaire adopted from Dissassa et al. (2023). Data analysis employed the independent t-test for normally distributed data, while the Mann–Whitney and Wilcoxon tests were applied if normality assumptions were not met. All analyses were performed using SPSS software.

The research activities are illustrated in Figure 1 below

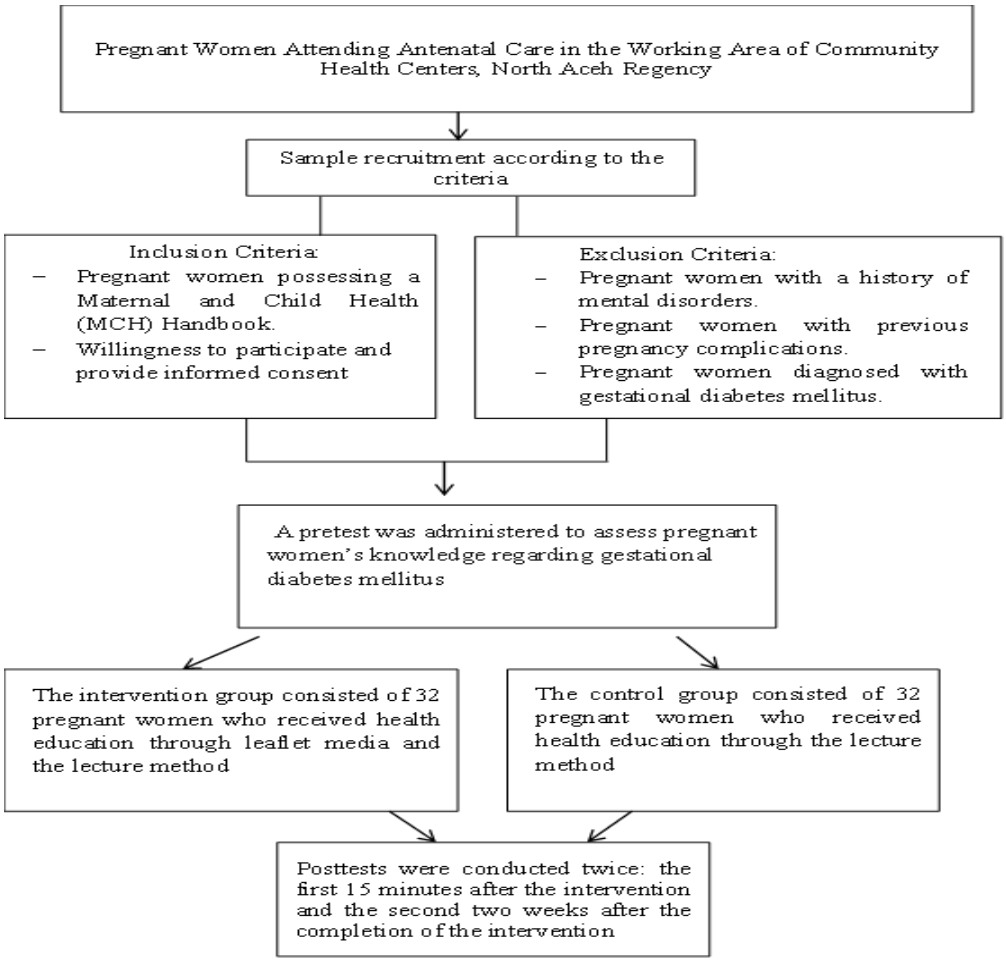


Figure 1. Research Process

## DISCUSSION

### Demographic Characteristics of Pregnant Women

The characteristics of pregnant women in the intervention and control groups were relatively similar, indicating comparability between the study populations. As presented in Table 1, the majority of respondents were within the healthy reproductive age range, had secondary education, were primarily housewives, and their husbands generally worked in the informal sector.

**Table 1. Demographic Characteristics of Pregnant Women Attending Antenatal Care**

| Characteristics | The Lecture Method with Leaflet Group | The Lecture Method Group |
|---|---|---|
| | n (%) | n (%) |
| **Mother's Age** | | |
| 20-35 years old | 22 (68.8) | 17 (53) |
| <20 years or > 35 year old | 10 (31.2) | 15 (47) |
| **Mother's Education** | | |
| Higher education | 12 (37.5) | 8 (25) |
| Secondary education | 17 (53.1) | 14 (43.8) |
| Primary education | 3 (9.4) | 10 (31.2) |
| **Husband's Education** | | |
| Higher education | 10 (31.2) | 5 (15.6) |
| Secondary education | 21 (65.6) | 16 (50) |
| Primary education | 1 (3.1) | 11 (34.4) |
| **Mother's Job** | | |
| housewife ladder | 28 (87.4) | 25 (78) |
| civil servant | 2 (6.3) | 3 (9.4) |
| Employee Private | 2 (6.3) | 2 (6.3) |
| Farmers / traders / fishermen | 0 | 2 (6.3) |
| **Husband' Job** | | |
| Self-employed | 14 (43.8) | 8 (25) |
| civil servant | 3 (9.4) | 4 (12.5) |
| Employee Private | 1(3.1) | 1 (3.1) |
| Farmers / traders / fishermen | 14(43.8) | 19 (59.4) |
| **Gravida** | | |
| Primigravida | 14 (43.8) | 6 (18.7) |
| Multigravida | 18 (56.2) | 20 (62.5) |
| Grandemultigravida | 0 (0) | 6 (18.7) |
| **Parity** | | |
| Primipara | 11 (34.4) | 5 (15.6) |
| Multipara | 17 (53.1) | 22 (68.8) |
| Grandemultipara | 4 (12.5) | 5 (15.6) |
| **Source information about GDM** | | |
| Health workers | 18 (56.2) | 20 (62.5) |
| Social media | 11 (34.4) | 5 (15.6) |
| Cadre | 3 (9.4) | 7 (21.9) |
| **Mother's history of GDM** | | |
| Yes | 2 (6.3) | 3 (9.4) |
| No | 30 (93.7) | 29 (90.6) |
| **History of DM disease** | | |
| Yes | 3 (9.4) | 3 (9.4) |
| No | 29 (90.6) | 29 (90.6) |
| **Family History of DM** | | |
| Yes | 10 (31.2) | 9 (28.1) |
| No | 22 (68.8) | 23 (71.9) |

| | | |
|---|---|---|
| **Medical History Hypertension** | | |
| Yes | 0 (0) | 4 (12.5) |
| No | 32 (100) | 28 (87.5) |
| **Macrosemia in Babies** | | |
| Yes | 1 (3.1) | 2 (6.3) |
| No | 31 (96.9) | 30 (93.7) |

Most participants were multigravida and multiparous, while primigravida and grand multipara were less represented. Information about gestational diabetes mellitus (GDM) was predominantly obtained from healthcare providers, followed by social media. The prevalence of a personal history of GDM, diabetes, and hypertension was low in both groups, while a family history of diabetes was reported by nearly one-third of respondents. Overall, sociodemographic and obstetric characteristics were comparable between the intervention and control groups.

Subsequently, the normality of data in each group was assessed using the Shapiro-Wilk test. The results indicated that the data in both groups were not normally distributed ($p$=0.000<0.05). Therefore, the effect of health education via leaflets and lectures on pregnant women's knowledge of gestational diabetes mellitus was analyzed using the Wilcoxon Signed Rank test.

**Table 2. Wilcoxon Test Results of Mean Pre-Test and Post-Test Scores on Pregnant Women's Knowledge of Gestational Diabetes Mellitus**

| Group | n | Mean Score | | Difference | *p*-value |
|---|---|---|---|---|---|
| | | Pre-test | Post-test | | |
| Lecture method with leaflet media | 32 | 7,09 | 10,03 | 2,94 | 0,000 |
| Lecture method | 32 | 5,62 | 6,97 | 1,35 | 0,000 |
| Total | 64 | | | | |

Based on Table 2, the Wilcoxon test revealed a significant increase in pregnant women's knowledge of gestational diabetes mellitus in both groups following the intervention. The mean score increase was higher in the lecture plus leaflet group (2.94 points) than in the lecture-only group (1.35 points), with both differences statistically significant ($p < 0.000$)

**Table 2. Results of the Mann-Whitney test for pregnant women receiving health education via educational media combined with lectures and those receiving lectures only**

| Group | n | Mean Rank | *p*-value |
|---|---|---|---|
| Lecture method with leaflet media | 32 | 39.09 | 0.000 |
| Lecture method | 32 | 25.91 | |
| total | 64 | | |

Table 2. The Mann-Whitney test showed a highly significant difference between the intervention group (n = 32) and the control group (n = 32) ($p < 0.001$). The intervention group had a higher mean rank (39.09) compared to the control group (25.91), indicating that the intervention had a significant effect on pregnant women's knowledge of gestational diabetes mellitus.

**Overview of Pregnant Women's Characteristics**

The study findings indicated that the majority of pregnant women were within the reproductive age category (20–35 years) and had experienced more than one pregnancy and childbirth. Most of the mothers and their husbands had attained a secondary level of education. Furthermore, healthcare providers were identified as the primary source of information regarding gestational diabetes mellitus. These findings suggest that the participants generally had healthy reproductive conditions and prior experience with pregnancy. (Subarto et al., 2022)(Heryanti & Mahesa, 2022) reported that both younger maternal age and age above 40 years are associated with a higher risk of pregnancy complications. Previous experience with gestational diabetes mellitus may facilitate safer and more comfortable pregnancy management. Maternal age and prior experiences influence readiness and the ability to cope with challenges. Multiparous women generally possess a better understanding of maternal health. Mothers with multiple childbirth experiences generally have a better understanding of maternal health. According to (Dissassa et al., 2023), maternal age, educational level of both women and their husbands, medical history, parity, and preconception care influence women's understanding of gestational diabetes mellitus. Education regarding danger signs is essential to safeguard both mother and infant. Lack of awareness of pregnancy complication symptoms is a major factor contributing to delays in recognizing problems and seeking necessary medical assistance.

**The Effect of Health Education Through Leaflets and Lectures on Pregnant Women's Knowledge of Gestational Diabetes Mellitus**

In this study, the Wilcoxon and Mann–Whitney tests were employed to evaluate the effect of health education delivered through lectures and supplemented with leaflets on pregnant women's knowledge of gestational diabetes mellitus, before and after the intervention. The Wilcoxon test demonstrated a significant improvement in knowledge among the intervention group compared with the control group, which received lectures only. Furthermore, the Mann–Whitney test revealed a significant difference, with the intervention group achieving a higher mean rank than the control group. These findings indicate that combining lectures with leaflet-based education is more effective in enhancing pregnant women's knowledge of gestational diabetes mellitus than lectures alone.

The findings of this study are consistent with those of (Purnamasari et al., 2020) at Teluk Sentosa Public Health Center, Labuhanbatu, which reported a significant difference in maternal knowledge and attitudes between groups receiving counseling through lectures alone and those receiving lectures supplemented with leaflets. The greatest improvement in knowledge and attitudes was observed in the group provided with both lectures and brochures. Similarly, (El-Ansary & Fouad, 2020) demonstrated that educational sessions effectively enhanced knowledge, attitudes, and self-care practices among women with gestational diabetes. These sessions should therefore be integrated into standard healthcare services, highlighting the critical role of nurses as educators. Taken together, these findings reinforce the importance of combining interactive health education methods with printed materials to optimize maternal knowledge and promote safer pregnancy outcomes

The Wilcoxon signed rank test demonstrated a significant improvement in maternal knowledge after the intervention, indicating the effectiveness of health education. This aligns with (Stang et al., 2020), who found that the use of leaflets significantly improved maternal knowledge of pregnancy and childbirth complications compared to lectures alone. Educational materials such as brochures have been shown to be effective tools in enhancing maternal awareness. Consistent with (Thomas et al., 2020), comprehensive knowledge is essential for effective prevention and management, as limited understanding may hinder optimal maternal care

Improvement in pregnant women's knowledge of gestational diabetes mellitus (GDM) can be achieved through cognitive stimulation via health education. Leaflets, as reported by (Baity & Rahayuningsih, 2023), are effective tools because they are easy to

recall, can be reviewed repeatedly, and may be combined with other media such as videos or booklets to enhance understanding. Consistent with (Yuhandini & Widiyastuti, 2017), the use of such educational media shows a significant correlation with improved maternal knowledge. To optimize outcomes, health education programs should also address knowledge barriers and integrate diverse media strategies (Dissassa et al., 2023)

These findings highlight the need for healthcare providers to integrate diverse educational media, such as leaflets, videos, and booklets, into routine antenatal care. Nurses and midwives play a critical role as educators in reinforcing maternal knowledge of gestational diabetes mellitus, which can support early recognition, prevention, and management of complications. Community-based health education programs should be designed to address barriers to knowledge and promote sustainable maternal health literacy.

## CONCLUSION

This study concludes that lectures combined with leaflet-based education are more effective than lectures alone in improving pregnant women's knowledge of gestational diabetes mellitus. Continuous health education involving families and communities is essential, while further research with larger samples and stronger designs is needed to validate and expand these findings.

## IMPLICATION

Healthcare providers, especially nurses and midwives, should incorporate leaflet-supported lectures into routine antenatal care to enhance maternal knowledge of gestational diabetes mellitus, using simple and accessible materials while involving family and community support. Future studies with larger samples and more rigorous designs, including mixed-method approaches, are needed to validate these findings, explore barriers to knowledge acquisition, and assess how improved maternal knowledge translates into behavioral changes, better pregnancy outcomes, and long-term maternal and child health.

**Acknowledgement:**
The researchers would like to thank the Head of the Diploma III Midwifery Study Program in North Aceh, the Director of the Aceh Health Polytechnic, the Head of the North Aceh District Health Office, the respondents, and other related parties who contributed to the completion of this article.

## BIBLIOGRAPHY

Baity, F. N., & Rahayuningsih, F. B. (2023). The Effect of Maternity Care Health Education Through Leaflet Media on The Level of Knowledge of Pregnant Women. *Jurnal EduHealth*, *14*(04), 392–397.

Dissassa, H. D., Tufa, D. G., Geleta, L. A., Dabalo, Y. A., & Oyato, B. T. (2023). Knowledge on gestational diabetes mellitus and associated factors among pregnant women attending antenatal care clinics of North Shewa zone public hospitals, Oromia region, Central Ethiopia: A cross-sectional study. *BMJ Open*, *13*(9), 1–9. https://doi.org/10.1136/bmjopen-2023-073339

Education, H. (2019). Methods & Approaches of Health Education. *BMC Medical Education*. https://www.brainkart.com/article/Methods---Approaches-of-Health-Education_35531/

El-Ansary, E.-S., & Fouad, S. (2020). Effect of Educational Sessions on Knowledge, Attitude and Self - Care Practices among Pregnant Women with Gestational Diabetes. *Egyptian Journal of Health Care*, *11*(3), 275–291. https://doi.org/10.21608/ejhc.2020.110408

Feldman, E. L., Savelieff, M. G., Hayek, S. S., Pennathur, S., Kretzler, M., & Pop-Busui, R. (2020). Covid-19 and diabetes: A collision and collusion of two diseases. *Diabetes*, *69*(12), 2549–2565. https://doi.org/10.2337/dbi20-0032

Hagrass, S. A. (2019). Educational Protocol to Improve Pregnant Women Practices about Gestational Diabetes Mellitus. *Saudi Journal of Nursing and Health Care*, *02*(12), 449–456. https://doi.org/10.36348/sjnhc.2019.v02i12.013

Heryanti, & Mahesa, C. S. (2022). Hubungan Paritas Dan Pendidikan Dengan Pengetahuan Ibu Hamil Tentang Tanda Bahaya Kehamilan Di Puskesmas Tulung Selapan Tahun 2020. *Jurnal Kesehatan Dan Pembagunan*, *12*(24), 30–39. https://e-jurnal.stikesmitraadiguna.ac.id/index.php/jkp/article/download/165/129

Hou, S. I. (2014). Health Education: Theoretical Concepts, Effective Strategies and Core Competencies. In *Health Promotion Practice* (Vol. 15, Issue 5). https://doi.org/10.1177/1524839914538045

International Diabetes Federation (IDF). (2021). *IDF DIABETES ATLAS 10th edition 2021*. https://diabetesatlas.org/data/en/world/

Jishy, C. P. ., Sheba James, Prithika.P, Ajith Kumar.M, Surya.V, & Radha Krishnan.R. (2023). A Study To Assess the Knowledge and Self-Care Practices on Gestational Diabetes MELLITUS Among Antenatal Women. *International Journal of Nursing Care*, *11*(2), 2–4. https://doi.org/10.37506/ijonc.v11i2.19323

Kautzky-Willer, A., Winhofer, Y., Kiss, H., Falcone, V., Berger, A., Lechleitner, M., Weitgasser, R., & Harreiter, J. (2023). Gestational diabetes mellitus (Update 2023). *Wiener Klinische Wochenschrift*, *135*(Update), 115–128. https://doi.org/10.1007/s00508-023-02181-9

Kouhkan, A., Najafi, L., Malek, M., Baradaran, H. R., Hosseini, R., Khajavi, A., & Khamseh, M. E. (2021). Gestational diabetes mellitus: Major risk factors and pregnancy-related outcomes: A cohort study. *International Journal of Reproductive BioMedicine*, *19*(9), 827–836. https://doi.org/10.18502/ijrm.v19i9.9715

Purnamasari, E., Lubis, N. L., & Ashar, T. (2020). The Effect of Counseling with Lecture and Leaflet Methods on Knowledge and Attitudes of Pregnant Women in Providing Basic Immunization. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, *3*(2), 956–964. https://doi.org/10.33258/birci.v3i2.923

Rizvi, D. S. (2022). SHealth education and global health: Practices, applications, and future research. *Journal of Education and Health Promotion*, *January*, 1–6. https://doi.org/10.4103/jehp.jehp

Shuhaimi, F. A., Bariah, S., & Hamid, A. (2023). *breastfeeding and dietary education package for women with gestational diabetes mellitus*. 1–7. https://doi.org/10.4103/jehp.jehp

Stang, S., Selin, D., Suriah, S., Marwang, S., Mallongi, A., & Ishak, H. (2020). The effect of educational media development in increasing knowledge and attitudes on pregnancy complications at sayang rakyat hospital in makassar. *Open Access Macedonian Journal of Medical Sciences*, *8*(T2), 196–199. https://doi.org/10.3889/oamjms.2020.5227

Subarto, C. B., Matsuzaki, M., Estrade, M., Sundemeir, S., Hakimi, M., Isnaeni, Y., Hadi, H., Kurniasari, Y., Fatimah, S., Yulyani, L., & Wijayanti, I. (2022). A Qualitative Study: Mothers' Experience in the Management of Gestational Diabetes Mellitus during and after Pregnancy in Yogyakarta, Indonesia. *Open Access Macedonian Journal of Medical Sciences*, *10*(T8), 180–187. https://doi.org/10.3889/oamjms.2022.9500

Thomas, S., Pienyu, R., & Rajan, S. K. (2020). Awareness and knowledge about gestational diabetes mellitus among antenatal women. *Psychology, Community & Health*, *8*(1), 237–248. https://doi.org/10.5964/pch.v8i1.287

Yuhandini, D. S., & Widiyastuti, D. (2017). Peran Pendidikan Kesehatan Dengan Media Leaflet Dan Audio Visual (Video) Terhadap Pengetahuan Suami Tentang Tanda Bahaya Kehamilan dan Nifas. *4*(2). http://repo.poltekkestasikmalaya.ac.id/158/