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Analysis of factors influencing the prevention of diabetes mellitus in pregnant women at the Johan Pahlawan Community Health Center, West Aceh Regency

Rina Julianti[1], Asmanidar[2], Yushida[3], Rikaoctriantiaskar[4], Evi Kristina[5]
[1,2,3]Program Studi Kebidanan Meulaboh, Politeknik Kesehatan Kementerian Kesehatan Aceh, Indonesia
[4]Kebidanan, STIKES Ranah Minang, Indonesia
[5]Pendidikan Profesi Bidan, Universitas Pasir Pengaraian, Indonesia

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ABSTRACT

Background: Gestational Diabetes Mellitus (GDM) is a metabolic disorder characterized by glucose intolerance first recognized during pregnancy and is associated with increased maternal and neonatal morbidity. Pregnant women with high-risk pregnancies are more susceptible to GDM due to biological, behavioral, and social factors. However, previous studies have mostly examined these factors separately, and their direct and indirect relationships in GDM prevention remain unclear.Objective: This study aimed to analyze the effects of information sources, family roles, nutritional status, physical activity, and dietary behavior on the prevention of Gestational Diabetes Mellitus among pregnant women using Partial Least Squares–Structural Equation Modeling (PLS-SEM). Methods: An analytical observational study with a cross-sectional design was conducted among 100 pregnant women with gestational age greater than 20 weeks in the working area of Johan Pahlawan Community Health Center, West Aceh Regency. Participants were selected using purposive sampling. Data were collected using the Summary of Diabetes Self-Care Activities (SDSCA), Health-Related Family Support Scale (HDFSS), dietary adherence questionnaire, Metabolic Equivalent of Task (MET), and Body Mass Index (BMI). Data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM). Results: The structural model demonstrated good predictive ability, with an R^2 value of 0.602 for GDM prevention. Nutritional status was the strongest determinant (55.30%), followed by dietary behavior (42.50%), physical activity (28.80%), family roles (27.00%), and information sources (19.10%). The findings indicate that nutritional status and healthy lifestyle behaviors have the greatest influence on GDM prevention, while information sources and family support primarily contribute through behavioral pathways.Conclusion: GDM prevention requires an integrated approach addressing biological, behavioral, and social determinants. Improving nutritional status, promoting healthy dietary practices and physical activity, and strengthening family support and health education are essential strategies for preventing GDM among pregnant wome.

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Corresponding Author:

Rina Julianti,

Program Studi Kebidanan Meulaboh,
Politeknik Kesehatan Kementerian Kesehatan Aceh,
Jln. Keperawatan, No. 25, Suak Ribee, Provinsi Aceh Barat, Indonesia
Email: rinajulianti@poltekkesaceh.ac.id

INTRODUCTION

High-risk pregnancy is a pregnant woman with various risk factors that can disrupt the pregnancy process until delivery, which threatens the safety of the mother and fetus (WULANDARI, 2024)(Hidayati, 2022). Gestational Diabetes Mellitus (GDM) is one of the contributors to maternal and infant mortality rates (MMR). This condition is caused by glucose intolerance that develops during pregnancy, with glucose homeostasis usually restored after birth (Adli, 2021)(Ilham, Metasari, & Bintang, 2024).

High-risk pregnancy has a direct relationship with Gestational Diabetes Mellitus because women presenting with risk factors such as obesity, advanced maternal age, previous GDM, excessive gestational weight gain, hypertension, and family history of diabetes are more likely to develop insulin resistance during pregnancy. This metabolic disturbance increases maternal blood glucose levels and contributes to adverse pregnancy outcomes including preeclampsia, fetal macrosomia, cesarean delivery, and neonatal complications. Therefore, GDM represents one of the most important metabolic disorders within the spectrum of high-risk pregnancies, making early prevention an essential component of antenatal care.

GDM has continued to increase over the past 20 years, globally 16.2% of live births are associated with hyperglycemia in pregnancy, of which 86.4% are due to GDM 6.2% are due to pre-existing type 1 or type 2 (Nasution et al., 2025)(Khusna, Pujiastuti, & Darmini, 2025). For pregnant women, it is associated with an increased risk of preeclampsia during pregnancy as well as comorbidities such as cardiovascular disease after pregnancy 1.3. For fetuses in GMG pregnancies, it can affect various aspects of the offspring's health throughout their lives, for example, at birth, the offspring tend to be large and suffer from birth injuries, after birth they are more likely to experience childhood obesity, impaired tolerance and blood vessel disorders (Dian Rahmawati et al., 2025)(Putri, 2024).

Although numerous studies have identified individual risk factors for GDM, most have focused on isolated variables such as nutritional status, physical activity, or dietary behavior. Limited studies have simultaneously examined the direct and indirect relationships among behavioral, biological, and social determinants influencing GDM prevention, particularly in Indonesian primary healthcare settings.

The cause of DMG is also not yet known for certain, but early prevention of DMG is related to health workers who play a role in providing counseling at every visit to pregnant women, where pregnant women are advised to maintain good nutritional status, do physical activities such as doing housework and light exercise in their spare time, arrange a healthy and nutritious diet and direct the family to accompany and provide assistance to pregnant women (Aliffia, 2023)(Sukma Hilmana & Herlinda, 2024).

Therefore, this study differs from previous research by integrating information sources, family roles, nutritional status, physical activity, and dietary behavior into a single structural model using Partial Least Squares–Structural Equation Modeling (PLS-SEM). This approach enables the simultaneous evaluation of both direct and indirect effects among these variables, providing a more comprehensive understanding of factors influencing GDM prevention.

Based on the 2023 Indonesian Health Survey (SKI) approximately 11.7% of the total population estimated at 877,531 people are known to suffer from DM 7. The prevalence of DM in Aceh Province in 2023 was recorded at 53% in 2024 increased by 57.36%. West Aceh Regency is one of the areas with the highest DM cases in Aceh Province where in 2023 DM cases were 2.9% and

DMG cases were 0.42%. Based on DM data at the Johan Pahlawan Health Center in 2024, as many as 5,251 (7.8%) suffered from DMG amounting to 0.09% or 28 pregnant women (Ministry of Health, 2023).

RESEARCH METHOD

The research method used is an analytical method with a cross-sectional approach where the relationship between exogenous and endogenous variables is measured simultaneously with the aim of determining the direct and indirect influence and its magnitude between the influence on the influence of information sources (SDSCA questionnaire), family roles (HDFSS questionnaire), eating patterns (diet compliance questionnaire), physical activity (MET questionnaire) and nutritional status (BMI) on the incidence of diabetes mellitus in pregnant women (Putu Arya Indira, 2023)(Oktaviani, Purbaningsih, & Indrina, 2026). The analysis method used is Structural Equation Modeling (SEM), a multivariate statistical technique that is a combination of factor analysis and regression analysis (correlation), aimed at testing the relationships between variables in a model, both between indicators and their constructs, or the relationships between constructs (Marliana, 2020)(Borman, Rosidi, & Arief, 2017). This data management where the number of indicators is multiplied by 5 to 10, in this study the indicators used are 9 so the number of samples is in the range of 45 to 100 people, so the researcher took a maximum sample size of 100 pregnant women. This study was conducted on pregnant women over 20 weeks who were at the Johan Pahlawan Health Center with a data collection technique that is purposive side until the number of samples is met. The AVE value in this study is used to measure how much variance can be captured by the construct compared to the variance caused by measurement errors. The AVE value obtained is >0.75 (strong), 0.50 (moderate) and 0.25 (weak). This data is obtained in the form of composition and frequency of the sample, presentation of SEM analysis, presentation of this hypothesis in the form of research based on the output of data processing results (Hinyah, nd).

RESULTS AND DISCUSSIONS

The results of the study on the characteristics of each respondent of 100 pregnant women, respondents aged 20-35 years as many as 67%, have a junior high school-high school education level of 83%, mothers who have jobs 26%. Figure 1 PLS Output (Loading Factors) observes if each indicator or dimension of the formation of latent variables can produce better values, namely obtained in the prevention of diabetes mellitus and diet.

Table 1. Evaluation of R square value

Variables	R square
Resources	0.327
The role of the family	0.362
Dietary habit	0.531
Activity	0.452
Nutritional status	0.302
DM Prevention	0.602

Based on Table 1, it can be seen that the R square of information sources is 0.327, indicating that the model is able to explain 32.7% of the variation in the information source variable, while the rest is influenced by other factors not included in the study. This value indicates the model's predictive ability in the moderate category, indicating that access to health information media, education from health workers, social media, and other information sources is still influenced by individual characteristics, education level, socioeconomic status, and access to health services. The R square value of family roles is 0.362, indicating that 36.2% of the

variation in Family Roles can be explained by the research model, while 63.8% is influenced by other factors. This value indicates that family support is a construct influenced by various aspects, such as family members' knowledge, culture, economic conditions, communication within the family, and emotional and social support. The R square value of dietary patterns is 0.531. This value indicates a fairly good predictive ability of the model. Dietary patterns are influenced by knowledge obtained from information sources, family support, nutritional status, and physical activity of pregnant women.

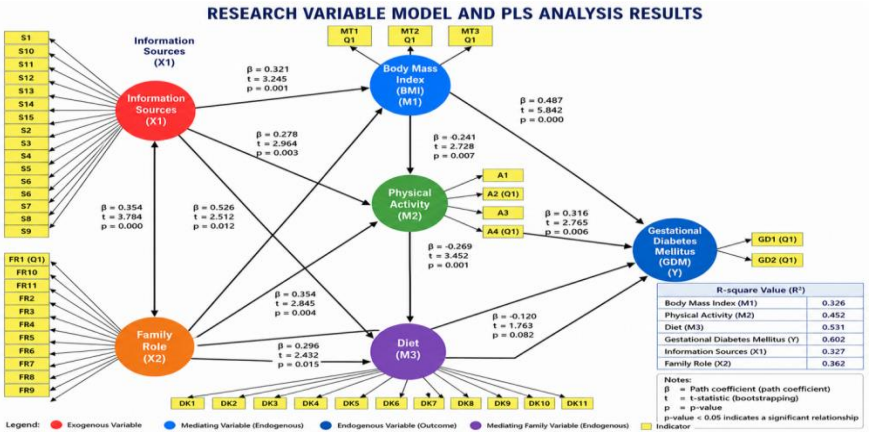


Figure 1. PLS output

Based on Table 1, it can be seen that the R square of 45.2% of pregnant women's activity can be explained by the variables in the model. Family support and health information play a role in encouraging mothers to engage in safe physical activity during pregnancy. The R square value for nutritional status indicates that Information Sources and Family Roles are able to explain 30.2% of the variation in nutritional status of pregnant women. Although it is included in the moderate category, there are still other factors such as genetics, nutritional status before pregnancy, age, and comorbidities that also influence nutritional status. The R square value for Diabetes Mellitus prevention of 0.602 indicates that the model has good predictive ability. A total of 60.2% of Gestational Diabetes Mellitus incidence can be explained by nutritional status, physical activity, and diet, while the remainder is influenced by other factors such as maternal age, history of GMG, family history of diabetes, obesity before pregnancy, hormonal factors, and genetic factors.

Source	*LV Correlation*	*Direct Path*		*Indirect Path*		Total		*Direct* (%)	*Indirect* (%)	Total (%)
		Coefficient	*p-value*	Coefficient	*p-value*	Coefficient	*p-value*			
Information Sources (X1) → GDM Prevention (Y)	0.612	-0.102	0.166	-0.091	0.021	-0.193	0.010	10.10	9.00	19.10
Family Role (X2) → GDM Prevention (Y)	0.594	-0.128	0.082	-0.142	0.004	-0.270	0.001	12.80	14.20	27.00
Body Mass Index (M1) → GDM Prevention (Y)	0.646	0.487	0.000	0.066	0.143	0.553	0.000	48.70	6.60	55.30
Physical Activity (M2) → GDM Prevention (Y)	0.587	-0.216	0.006	-0.072	0.038	-0.288	0.001	21.60	7.20	28.80
Diet (M3) → GDM Prevention (Y)	0.634	0.315	0.000	0.110	0.009	0.425	0.000	31.50	11.00	42.50
R-square of GDM Prevention (Y)						**0.602**	**0.000**			**60.20**

Note: *Percentages are calculated from the absolute coefficient values for the total effect of each variable.*

Figure 2. Percentage of influence between variable on gestational diabetes mellitus (GDM) prevention variable

Overall, the research model has an R-square value of 0.602, which means that 60.20% of the variation in Gestational Diabetes Mellitus prevention can be explained by the variables of information sources, family roles, nutritional status, activity, and diet, while the remaining 39.80% is influenced by other factors not included in the research model. This value indicates that the model has a fairly strong (moderate) explanatory power in explaining the factors that influence the prevention of Gestational Diabetes Mellitus. Based on the total contribution of each variable, the order of influence on the prevention of Gestational Diabetes Mellitus is nutritional status (55.30%), followed by Diet (42.50%), Activity (28.80%), Family Role (27.00%), and Information Source (19.10%). This finding indicates that nutritional status and healthy lifestyle factors are the main determinants in efforts to prevent Gestational Diabetes Mellitus, while information sources and family roles provide more influence through indirect mechanisms or through mediating variables.

Discussion

The results of the study showed that the R^2 value of Information Sources was 0.327, meaning that 32.7% of the variation in information sources can be explained by the constructs contained in the model, while 67.3% is influenced by other factors outside the study. This value is in the moderate category, indicating that the model has a fairly good ability to explain variations in information sources. These results are in line with research by Anik et al. (2023) who reported that access to health information during pregnancy is influenced by education level, use of digital media, access to health services, and the ability of health workers to provide education (Nasif, Dillasamola, & Andini, nd)(Mariska, 2025). The study showed that the quality of information sources contributes to increased maternal knowledge regarding the prevention of pregnancy complications, including Gestational Diabetes Mellitus (GDM). Research by Sharma et al. (2022) also stated that pregnant women who obtained health information from trusted health workers and digital media had higher levels of health literacy than those who only obtained information from their surroundings (Zulfikar, 2025)(Husin et al., 2025). Researchers assume that information sources are a significant factor influencing pregnant women's health behaviors. However, the model's ability to explain information sources is limited due to other factors that have not been analyzed, such as education level, employment status, ownership of communication media, internet access, culture, and quality of antenatal care.

The R^2 value of 0.362 indicates that 36.2% of the variation in family roles can be explained by the research model, while 63.8% is influenced by other factors. This result is supported by research by Rahmawati et al. (2023), who found that family support influences pregnant women's compliance with a healthy lifestyle, regular antenatal checkups, and adherence to health care provider recommendations (Elviani et al., 2026)(Riska, 2025). Emotional and instrumental support from family has been shown to increase maternal motivation to maintain health during pregnancy. Similar findings were also reported by Liu et al. (2021), who stated that partner and family involvement in antenatal care programs increased maternal adherence to healthy eating and physical activity, thereby reducing the risk of pregnancy complications. Researchers argue that the role of the family is influenced not only by family knowledge but also by economic conditions, culture, communication within the family, and the husband's involvement during pregnancy (SARI & EDIYONO, 2025). These factors are likely the cause of the 63.8% variation that cannot be explained by the model.

The R^2 value of 0.302 indicates that 30.2% of the variation in nutritional status can be explained by the variables in the research model. Research by Goldstein et al. (2018) shows that the nutritional status of pregnant women is influenced by diet, physical activity, family support, and lifestyle habits before pregnancy. Good nutritional status is associated with a reduced risk of obstetric complications, including GDM. According to the American Diabetes Association (2024), obesity before and during pregnancy is one of the main risk factors for Gestational Diabetes Mellitus because it increases insulin resistance (Fajrin & Keb, 2026)(Salsabila, Rindarwati,

Destiani, & Jamaica, 2024). Researchers assume that nutritional status is the result of the interaction of various biological and behavioral factors. Variables not included in the model, such as maternal age, parity, comorbidities, and pre-pregnancy nutritional status, may also influence the R^2 value obtained.

The R^2 value of 0.452 indicates that the model is able to explain 45.2% of the variation in pregnant women's activity. Research by Nascimento et al. (2022) shows that physical activity during pregnancy is associated with reduced blood glucose levels, increased insulin sensitivity, and a reduced risk of GDM. In addition, education provided by health workers and family support increases maternal compliance with regular physical activity. The results of research by Davenport et al. (2018) also show that mothers who engage in physical activity according to recommendations have a lower risk of GDM than mothers who are less active. Researchers assume that pregnant women's activity is influenced by many factors, including occupation, gestational age, physical condition, environment, and family support. Therefore, there is still 54.8% of the variation in activity that cannot be explained by the model.

The dietary pattern variable obtained an R^2 value of 0.531, meaning that 53.1% of the variation in dietary patterns can be explained by the variables in the research model. Research by Schoenaker et al. (2020) showed that a diet high in fiber, fruits, vegetables, and whole grains can reduce the risk of Gestational Diabetes Mellitus, while consumption of foods high in sugar and fat increases the risk of the disease. Research by Zhang et al. (2021) also stated that nutrition education provided during pregnancy significantly improved the quality of pregnant women's diets. Researchers argue that diet is a behavior that is relatively easily influenced by health information, family support, nutritional status, and physical activity. Therefore, a higher R^2 value compared to other variables indicates that the model is quite good at explaining pregnant women's eating behavior.

The R^2 value of 0.602 indicates that the model is able to explain 60.2% of the variation in Gestational Diabetes Mellitus prevention, while 39.8% is influenced by other factors outside the research model. These results indicate that the combination of information sources, family roles, nutritional status, physical activity, and diet variables has a significant contribution to GDM prevention efforts. This finding is in line with the American Diabetes Association (2024) which states that lifestyle modification through weight management, physical activity, and diet is a primary strategy in preventing GDM. Research by Moon et al. (2017) also shows that lifestyle interventions can significantly reduce the risk of GDM in a group of pregnant women with 24 risk factors. Researchers assume that the success of GDM prevention is the result of the interaction of various behavioral and biological factors. The R^2 value of 0.602 indicates that the research model has good predictive ability. However, there are still other factors such as maternal age, previous history of GDM, family history of diabetes, genetic factors, socioeconomic status, and adherence to antenatal checkups that have not been included in the model, thus providing opportunities for further research.

CONCLUSION

Based on the PLS-SEM analysis, this study demonstrates that Gestational Diabetes Mellitus prevention is determined by the interaction of biological, behavioral, and social factors rather than by a single determinant. Nutritional status emerged as the strongest predictor of GDM prevention, followed by dietary behavior and physical activity, while information sources and family roles indirectly strengthened preventive behaviors through improved maternal lifestyle practices. These findings indicate that interventions focusing only on clinical risk factors are insufficient unless they are supported by effective health education and family involvement. The scientific contribution of this study lies in the development of an integrated structural model that simultaneously explains the direct and indirect relationships among information sources, family support, nutritional status,

physical activity, dietary behavior, and GDM prevention using PLS-SEM. This comprehensive model extends previous studies that generally evaluated these determinants separately and provides empirical evidence for designing multidimensional GDM prevention programs in primary healthcare settings.

References

Adli, FK (2021). Gestational Diabetes Mellitus: Diagnosis and Risk Factors. Jurnal Medika Hutama, 3(October 1), 1545–1551.

Aliffia, JH (2023). DESCRIPTION OF DIETARY PATTERNS, NUTRITIONAL INTAKE, NUTRITIONAL STATUS AND NUTRITIONAL KNOWLEDGE OF PREGNANT WOMEN UNDERGOING ANC AT THE INPATIENT HEALTH CENTER OF SUKABUM, BANDAR LAMPUNG CITY IN 2023. POLTEKKES, MINISTRY OF HEALTH, TANJUNGKARANG.

Borman, RI, Rosidi, A., & Arief, MR (2017). Evaluation of the implementation of the personnel management information system (Simpeg) in the Pamekasan Regency Regional Personnel Agency using the human-organization-technology (hot) fit model approach. Respati Information Technology Journal, 7(20), 409685.

Dian Rahmawati, SST, Oviana, A., Keb, SSTM, Utami, R., Keb, MT, Damayanti, BM, … Sari, AZC (2025). ANIMAL MANAGEMENT OF HIGH-RISK PREGNANCY. Nuansa Fajar Cemerlang.

Elviani, Y., Keb, AM, SKM, SK, Ns, MK, Ningsih, R., Kep, M., … Kom, S. (2026). Transformation of Health Education for Anemic Pregnant Women Through Runners (Peer Group and Flip Sheet) Efforts to Increase Knowledge and Compliance with Pregnancy Care. PT KIMHSAFI ALUNG CIPTA.

Fajrin, I., & Keb, M. (2026). RISK FACTORS & PATHOPHYSIOLOGY OF GDM. Complementary Midwifery Care for Pregnant Women at Risk of Gestational Diabetes, 20.

Hidayati, I. (2022). Continuous Midwifery Care for Mrs. R, 34 Years Old, G5P3A1, with High-Risk Pregnancy at PMB Kuswatiningsih. Polytechnic of the Ministry of Health, Yogyakarta.

Hinyah, IR (nd). The relationship between breakfast habits, physical activity, and body fat percentage with the physical fitness level of female adolescents at MAN 2 Semarang City.

Husin, H., Kosvianti, E., Weti, DH, Pratiwi, BA, Wati, N., Puteri, FJ, … Yanuarti, R. (2025). Spectrum of Public Health Issues. CV Abad Cakrawala Nusantara.

Ilham, R., Metasari, AR, & Bintang, A. (2024). The Relationship between Pregnant Women's Perceptions and Early Detection Behavior of Gestational Diabetes Mellitus at the Bajoe Bone Community Health Center. Mitrasehat Journal, 14(1), 549–557.

Ministry of Health, Republic of Indonesia (2023). Indonesian Health Survey (SKI). Jakarta: Ministry of Health, Republic of Indonesia.

Khusna, U., Pujiastuti, E., & Darmini, D. (2025). Screening Test for Gestational Diabetes Mellitus (GDM) Through Random Blood Glucose Examination in Pregnant Women in Rungkang Village, Brebes Regency. Igakerta Journal, 2(2), 8–13.

Mariska, R. (2025). RELATIONSHIP BETWEEN MOTHER'S PARENTING PATTERNS AND THE INCIDENCE OF STUNTING IN TODDLERS. Observational Study at Wonosalam 1 Community Health Center, Demak Regency. Sultan Agung Islamic University, Semarang.

Marliana, RR (2020). Partial least squares-structural equation modeling on the relationship between student satisfaction levels and Google classroom quality based on the webqual 4.0 method. Journal of Mathematics, Statistics and Computation, 16(2), 174–186.

Nasif, H., Dillasamola, D., & Andini, AF (nd). Use of Analgesics in Post-Surgical Patients. Adab Publisher.

Nasution, NA, Mutia, F., Ritonga, SH, Batubara, NH, Siregar, YA, & Harahap, NH (2025). HEALTH EDUCATION ON GESTATIONAL DIABETES MELLITUS (GDM) AT POSYANDU POKAT PANYANGGAR, PADANGSIDIMPUAN CITY. Aufa Community Service Journal (JPMA), 7(3).

Oktaviani, F., Purbaningsih, W., & Indrina, JA (2026). The Relationship between Diet, Activity Patterns, and Nutritional Status with the Incidence of Complications in Type 2 Diabetes Mellitus Patients at Tamansari Community Health Center in 2025. In Bandung Conference Series: Medical Science (Vol. 6, pp. 679–686).

Putri, NN (2024). PICTURE OF BLOOD GLUCOSE LEVELS DURING PREGNANT WOMEN AT PRINGSEWU REGIONAL HOSPITAL 2023. Poltekkes Kemenkes Tanjungkarang.

Putu Arya Indira, P. (2023). RELATIONSHIP BETWEEN PHYSICAL ACTIVITY, NUTRITIONAL INTAKE,

AND BODY MASS INDEX WITH HBA1C GLYCEMIC CONTROL IN TYPE 2 DIABETES MELLITUS PATIENTS IN BANDAR LAMPUNG IN THE PERIOD OF NOVEMBER-DECEMBER 2022 (BASED ON DATA FROM THE PRAMITRA BIOLAB INDONESIA CLINICAL LABORATORY).

Riska, R. (2025). ANALYSIS OF FACTORS RELATED TO PREGNANT WOMEN'S COMPLIANCE IN UNDERGOING TRIPLE ELIMINATION EXAMINATION (HIV, SYPHILIS AND HEPATITIS B) AT JONGAYA PUBLIC HEALTH CENTER, MAKASSAR CITY IN 2023. Hasanuddin University, Makassar.

Salsabila, L., Rindarwati, AY, Destiani, DP, & Jamaica, PA (2024). Efforts to Increase Public Awareness and Early Detection of Diabetes Mellitus Through Education and Screening. Journal of Multicultural Community Development and Service, 2(2), 76–80.

SARI, E., & EDIYONO, S. (2025). FAMILY CONTRIBUTION TO EARLY RISK DETECTION IN PREGNANT WOMEN: A SYSTEMATIC REVIEW OF THE LITERATURE. Journal Of Midwifery, 13(2), 64–69.

Sukma Hilmana, D., & Herlinda, H. (2024). Comprehensive Midwifery Care for Pregnant Women in the Second Trimester with Chronic Energy Deficiency (KEK) with the Implementation of Balanced Nutrition "Fill My Plate" at Pmb "D" Bengkulu City in 2024. Sapta Bakti College of Health Sciences.

WULANDARI, A. (2024). Effectiveness of the KIH Restikol Application on Pregnant Women's Knowledge of High-Risk Pregnancy in the Work Area of the Sumur Batu Community Health Center, Bandar Lampung City in 2024. Poltekkes Kemenkes Tanjungkarang.

Zulfikar, S. (2025). Smart Health Promotion: The Era of Globalization and Digital Transformation. AMU Press, 1–243.