Review Paper

The Effectiveness of the Models and Guidelines on Detecting High-risk Pregnancies: A Systematic Review

Taty Nurti[1*], Asni Johari[2], M. Naswir[3], Herlambang[4]

1. Department of Midwifery, Health Polytechnic of Jambi, Jambi, Indonesia.
2. Department of Biology Education, Faculty of Mathematic and Science Programe, Jambi University, Jambi, Indonesia.
3. Department of Cemistry Education, Faculty of Mathematic and Science Programe, Jambi University, Jambi, Indonesia.
4. Department of Obstetrics and Gynecology, Faculty of Medicine and Health Sciences, Jambi University, Jambi, Indonesia.

Use your device to scan and read the article online

Citation Nurti, T., et al. 2022. The Effectiveness of the Models and Guidelines on Detecting High-risk Pregnancies: A Systematic Review. *Journal of Client-Centered Nursing Care*, 8(2), pp. 89-98. https://doi.org/10.32598/JCCNC.8.2.419.1

https://doi.org/10.32598/JCCNC.8.2.419.1

Article info:
Received: 06 Jan 2022
Accepted: 06 Feb 2022
Published: 01 May 2022

Keywords:
Antenatal, Theoretical model, Guideline, Pregnant women, High-risk pregnancy

ABSTRACT

Background: The models or guidelines that make it possible for pregnant mothers to diagnose high-risk pregnancy signs and symptoms are not clearly stated. This systematic review was conducted to answer the question: what models/guidelines have contributed to women's knowledge/performance regarding the detection of a high-risk pregnancy?

Methods: This systematic review used the Preferred Reporting Items for Systematic Review and Meta-analyses (PRISMA) statement. The electronic databases used were PubMed, Cochrane, ProQuest, and Google Scholar from 2010 to 2021. The main inclusion criteria were English interventional educational studies on high-risk pregnant women in the antenatal period using models or guidelines with more than 20 subjects. Review articles, editorials, comments, not full texts, case reports, and meta-analytical or systematic review articles were excluded. National Institute of Health (NIH) study quality assessment tool was used to assess the quality rating of the articles. The risk of bias was assessed by two authors independently using the Cochrane Collaboration revised tool. The studies were analyzed qualitatively by collecting the main findings, the design, and the applied interventions.

Results: A total of 1,173 articles were obtained from the four databases used. After eliminating duplicates, thesis/dissertation, proceedings, book chapters, those with no inclusion criteria, no discussion of the high-risk pregnancy, and low quality based on the NIH for interventional studies, the remaining five articles were entered into the review process. Based on articles that met the inclusion criteria, it was found that the models used included the Health Belief Model, Bandura's self-efficacy theory, the World Food Program flip-chart, the Dietary Guidelines for Americans, and the Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women, with educational class and counseling approaches for women with high-risk pregnancies.

Conclusion: This systematic review showed a generally positive effect of various models and guidelines for educating high-risk pregnancy detection by pregnant women. Approaches to the application of the models included educational classes and counseling for these women. These models and guidelines have a significant effect on the ability of pregnant women to recognize the symptoms of a high-risk pregnancy.

*** Corresponding Author:**
Taty Nurti, S.Pd., M.Kes.
Address: *Department of Midwifery, Health Polytechnic of Jambi, Jambi, Indonesia.*
Tel: *+62 (812) 7413-132*
E-mail: *tatypoltekkes@gmail.com*

Highlights

- The increasing prevalence of maternal and fetal mortality could be related to the mothers' lack of knowledge of the early signs of high-risk pregnancy.

- Models and guidelines for the diagnosis of high-risk pregnancy symptoms by mothers are not clearly identified.

- According to this systematic review, the models identified as the Health Belief Model, Bandura's Self-Efficacy Theory, the World Food Program flip-chart, the Dietary Guidelines for Americans, and the Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women.

- This systematic review showed a generally positive effect of various models and guidelines in educating pregnant women to detect high-risk pregnancies.

Plain Language Summary

It is necessary to increase the knowledge and awareness of pregnant women about the signs and symptoms of high-risk pregnancies. High-risk pregnancies have detrimental effects on maternal and fetal health. The increasing prevalence of maternal and fetal mortality is largely associated with the mother's lack of awareness of the early signs of high-risk pregnancy. However, effective educational models and guidelines in this regard are not clearly identified. This systematic review identified effective models and guidelines for educating pregnant women to identify high-risk pregnancy symptoms.

1. Introduction

Prenatal education about birth and early parenting is a widely accepted method of educating new parents in high-income countries. During pregnancy, many women and their partners attend a series of classes to be prepared for the transition to life in childbirth and parenting (Zakiyya, Rusmini & Sartika, 2019). Antenatal education is provided to pregnant women in most high-income countries, even recently to fathers-to-be (Chikalipo, Chirwa & Muula, 2018).

Antenatal education aims to provide strategies for pregnant women to deal with pregnancy, childbirth, and parenthood (Ingegerd Ahldén et al., 2012). In addition, the main intervention for pregnant women is to use approaches to increase their awareness of the possible risks of pregnancy. A high-risk pregnancy is a pregnancy with one or more risk factors; both from the mother and the fetus, which have an unfavorable impact on both the mother and the fetus (Rochjati, 2011). High-risk pregnancies require appropriate treatment, one of which is providing education about these risks and appropriate action if someone experiences them (Astari, Sandela & Elvira, 2018). Health education helps the mothers to monitor fetus growth and their health during pregnancy (Astari, et al., 2018). Information provided by health workers to mothers with a high-risk pregnancy is to carry out routine checks during pregnancy and educate mothers about delivery plans (Kovala, Cramp & Xia, 2016).

In addition, pregnant women need to have sufficient knowledge for early detection of high-risk pregnancies, one of which is to take appropriate actions if they faced the signs during pregnancy (Mwilike et al., 2018; Utami et al., 2020). According to the Sustainable Development Goals (SDGs), various studies on education regarding high-risk pregnancy have been carried out, but not enough to reduce maternal mortality (World Health Organization, 2021). Therefore, the approach to the care of pregnant women is an effort that must be carried out continuously by improving pregnant women's health in a promotive, preventive, curative, and rehabilitative manner (Widarta et al., 2015). The potential risk of pregnancy and childbirth is likely to affect the risk of complications, and emergencies in childbirth can also be influenced (Cavazos-Rehg et al., 2015; Danielsson et al., 2019; Rajbanshi, Norhayati & Nik Hazlina, 2020). The higher the risk factors in pregnant women, the more complications experienced (Jung et al., 2019; Puspitaningrum, Indrawati & Purwanti, 2018).

In addition, predisposing factors can also affect the level of pregnancy risk, including knowledge and socioeconomic factors (Caldeira-Dias et al., 2018; Navarro, Tiongco &Bundalian, 2019).

Every pregnant woman needs supervision during pregnancy, considering that every pregnancy has a risk even though it shows normal conditions at the beginning of pregnancy (Jung et al., 2019). Furthermore, the importance of health care professionals' monitoring and early detection during pregnancy to plan follow-up care has been demonstrated and it has been shown that it minimizes the risks to the mother and fetus (Kurniawan, Sistiarani&Hariyadi, 2017; Singh, 2020).

Pregnant women need to know about high-risk conditions because high-risk pregnancies impact mothers and babies (Dewi, 2019). The impacts on the mother include miscarriage, premature delivery, uncomplicated infection, anemia, gestosis, and high maternal mortality; also the most common impact on babies is shoulder distortion (Tal et al., 2015). Furthermore, if the condition is discovered late in pregnancy, it cannot be prevented. Therefore, it is essential to make efforts to detect high-risk pregnancies early (Rajbanshi, et al., 2020).

Inadequate implementation of the early diagnosis program has led to an increase in maternal and neonatal mortality rates (Duwi Sri Lestari, 2020). It could be due to the problems related to pregnant women, such as lack of adequate knowledge and appropriate attitudes and behaviors, the public health environment, low level of education of pregnant women, and the lack of knowledge of pregnant women about high-risk pregnancies (Rachmawati, Puspitasari&Cania, 2017). Therefore, increasing public knowledge, especially about pregnant women, is necessary for detecting high-risk pregnancies. However, the effectiveness of models or guidelines that make it possible for pregnant mothers to diagnose high-risk pregnancy symptoms is not clearly identified. Accordingly, this systematic review was conducted to answer the question: what models/guidelines have contributed to women's knowledge/performance regarding the detection of a high-risk pregnancy?

2. Materials and Methods

Review protocol

This systematic review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement and tried to answer the question of how health education through models and guidelines increases the knowledge of pregnant women about pregnancy problems, in particular their ability to recognize or identify the early signs of a high-risk pregnancy. We used the PICO format (Patient: pregnant women, Intervention: using models and guidelines, Comparison: with a control group or before/after, Outcome: detection of the signs of high-risk pregnancy) for asking a focused question.

Sources of information and search strategies

Searching was conducted through international electronic databases, including PubMed, Cochrane, ProQuest, and Google Scholar. The keywords used were based on the Medical Subject Headings (MeSH) standard. Boolean operators and a combination of keywords were used as follows: "Antenatal OR Maternal OR Prenatal OR Perinatal" AND "Class OR Group OR Education Class" AND "High-Risk Pregnancy OR Pregnancy". These keywords were mainly used in PubMed. Cochrane, ProQuest, and Google Scholar do not use Boolean operators as conjunctions to combine or exclude keywords in a search, which is their limitation.

Eligibility criteria

Articles with the following criteria were included as study/review materials: 1) studies on pregnant women; 2) evaluating the structured form of antenatal education; 3) studies providing structured intervention outcomes using models/guidelines; 4) studies on the concept of antenatal education; 5) articles published in English; and 6) the number of samples >20. Furthermore, review articles, editorials, comments, not full texts, case reports, and meta-analytical or systematic review articles were excluded.

Article quality rating

All articles were assessed by two authors (AJ, MN) using the National Institute of Health (NIH) study quality assessment tool for prospective and qualitative studies and the NIH quality assessment tool for controlled intervention studies (Nih, 2019). Conflicting judgments were resolved by the first authors (TN). A scoring sheet was prepared to evaluate the research method and observe the scoring criteria for each article in terms of inclusion criteria. Articles with scores <30% of the criteria were classified as "poor," scores between 30 and 70% were classified as "moderate," and scores >70% were classified as "good" regarding study quality. The selected articles had "moderate" or "good" quality.

Data synthesis and data extraction

Data were synthesized in two ways: (1) the research design and intervention strategies were presented, and (2) the findings of each study were analyzed qualitatively by collecting the main findings with the design and intervention applied. Data from the included studies could not be pooled for meta-analysis because there was significant heterogeneity in the methodological design of the studies. Therefore, a narrative synthesis of the findings of the included studies is presented and was guided by the Synthesis without Meta-analysis (SWiM) in systematic reviews reporting a guideline (Campbell et al., 2019). Furthermore, data extraction was carried out to provide a brief description of the substance of the reviewed articles, such as the characteristics of the respondents and the characteristics of the study. The results are presented in a table and descriptively in the article's body.

Two reviewers (AJ and MN) assessed the risk of bias independently. Further reviewers (TN) were consulted to adjudicate unresolved disagreements. The risk of bias in included studies was assessed using the Cochrane Collaboration revised tool (Sterne, et al., 2019). Judgments are classified as "low risk of bias", "some concerns", and "high risk of bias". The Outcome Reporting Bias in Trials (ORBIT) classification system was used to help identify selective outcome reporting (Kirkham et al., 2018). The quality of the body of evidence was evaluated based on the criteria of the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system (Higgins et al., 2019): directness of the evidence, within-study risk of bias, the precision of the effect estimate, heterogeneity, and risk of publication bias.

3. Results

Search result

Searching the four databases resulted in 1.173 articles according to the keywords applied; 210 articles were excluded because of duplication; thus, 963 were reviewed left. Furthermore, screening of titles and abstracts was carried out on the remaining articles resulting in 893 articles being excluded because they had not discussed the high risk of pregnancy or educational models, or included books/chapters, case reports, and comments for editors so that 70 articles remained. Based on the eligibility criteria and article quality assessment, 65 articles were excluded. Therefore, a total of five articles were assessed according to the inclusion criteria (Figure 1). Characteristics of the included studies are shown in Table 1.

Study characteristics

A total of five articles from three countries met the inclusion criteria: Iran (n=3) (Eshghi Motlagh et al., 2019; Khoramabadi et al., 2016), Indonesia (n= 1) (Wijaya-Erhardt, Muslimatun & Erhardt, 2014), and England (n=1) (Spratling et al., 2014). A total of 637 pregnant women had been assessed in the studies reviewed in this systematic review. The research design used in these studies was quasi-experimental (Khiyali et al., 2017; Spratling et al., 2014) and randomized controlled trial (Eshghi Motlagh et al., 2019; Khoramabadi et al., 2016; Wijaya-Erhardt, et al., 2014).

Intervention model

Several models have been used to enhance pregnant women's knowledge to diagnose high-risk pregnancies in the five articles reviewed in this study: The theory of Health Belief Model (Khiyali et al., 2017; Khoramabadi et al., 2016), Bandura's self-efficacy theory (Eshghi Motlagh et al., 2019), World Food Program (WFP) flip-chart (Wijaya-Erhardt, et al., 2014), and the Dietary Guidelines for Americans and Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women (Spratling et al., 2014).

The target application of the educational model

Overall, the articles studied focused on increasing knowledge, perceptions, and actions to be taken by pregnant women related to high-risk pregnancy conditions, including gestational diabetes (Eshghi Motlagh et al., 2019; Khiyali et al., 2017), nutrition of pregnant women (Khoramabadi et al., 2016; Wijaya-Erhardt, et al., 2014), and cardiovascular disease (Spratling et al., 2014).

The approach to implementing the educational model

The approach taken in implementing the models used is considered quite important because it determines the success of the given intervention. Therefore, the approach taken from the five articles included in this study were education classes (Khoramabadi et al., 2016; Wijaya-Erhardt, et al., 2014), educational groups (Khiyali et al., 2017), counseling (Eshghi Motlagh et al., 2019), and structured CVD education by telephone (Spratling et al., 2014).

Table 1. Characteristics of the included studies

Results	Model used for education	Participant Characteristics	Study Design	Country	Author, Year, Title
The results showed a direct and significant correlation between age and preventive behaviors (r=0.22, P<0.05), and also between body mass index and perceived susceptibility (r=0.26, P<0.05). The mean scores of all constructs of the Health Belief Model in the intervention group, three months after the intervention, were significantly higher compared to the control group (P<0.05).	6 training sessions with weakly intervals through adaptation of Health Belief Model during pregnancy	91 pregnant women (n=45 in the intervention group and (n=46 in the control group).	Quasi-experimental	Iran	Khiyali et al., 2017. Educational Intervention on Preventive Behaviors on Gestational Diabetes in Pregnant Women: Application of Health Belief Model (Khiyali et al., 2017)
The mean age of the participants in the intervention and control groups was 28.9±7.1 and 29.3±6.2 years, respectively. According to the Mann-Whitney U test, the intervention group obtained higher scores regarding self-care behaviors and sense of self-efficacy (41.8±13.5, 99.3±16.2), compared to the control group (22.8±5.0, 99.3±16.2, P<0.001). The mean fasting blood sugar level in the intervention group (75.8±6.7) was significantly lower than that of the control group (85.4±9.7, P<0.001).	Educational training according to the constructs of Bandura's Self-Efficacy Theory	100 pregnant women with pre-diabetes	RCT	Iran	Eshghi Motlagh et al., 2019. Effect of an Educational Intervention Program Based on Bandura's Self-efficacy Theory on Self-care, Self-efficacy, and Blood Sugar Levels in Mothers with Pre-diabetes during Pregnancy (Eshghi Motlagh et al., 2019)
Women in the education group had better knowledge about the risks and consequences of getting worm infection and the causes, consequences, and prevention of anemia during pregnancy (P=0.003)	The educational materials were based on Indonesia's Ministry of Health and World Food Program (WFP) flipchart. The topics covered danger signs in children and in pregnancy requiring medical attention, delivery complications, controlling helminth infection, anemia prevention, infant feeding, as well as antenatal care. The duration of an educational session was maximally one hour for each session on a monthly basis. In each session, 7–28 women attended the education classes.	252 pregnant women aged 15–49 years at 12–20 weeks of gestation	RCT	Indonesia	Wijaya-Erhardt, et al., 2014. Effect of an educational intervention related to health and nutrition on pregnant women in the villages of Central Java Province, Indonesia (Wijaya-Erhardt, et al., 2014)
After CVD education, levels of CVD risk perception were significantly higher than the baseline.	The CVD* educational intervention was centered on healthy meal planning, physical activity, medication compliance (if indicated), and the importance of regular blood pressure and cholesterol screenings.	64 pregnant women with preeclampsia	Quasi-experimental/ single group, pre-test/post-test	UK	Spartling et al., 2014. Effect of an Educational Intervention on Cardiovascular Disease Risk Perception among Women with Preeclampsia (Spartling et al., 2014)
There were significant differences between the two groups in terms of mean scores of knowledge, perceived severity, perceived barriers, performance guide, and individual performance, and the means of these variables in the intervention group were also higher than the control group. (P<0.001)	Principles of education were based on the Health Belief Model and performed twice during two-hour sessions in the intervention group. Women in the control group received routine care and did not receive training.	130 pregnant women and the subjects were then randomized into two groups by a block randomization procedure	RCT	Iran	Khoramabadi et al., 2016. Effects of Education Based on Health Belief Model on Dietary Behaviors of Iranian Pregnant Women (Khoramabadi et al., 2016)

CVD*: Cardiovascular Disease

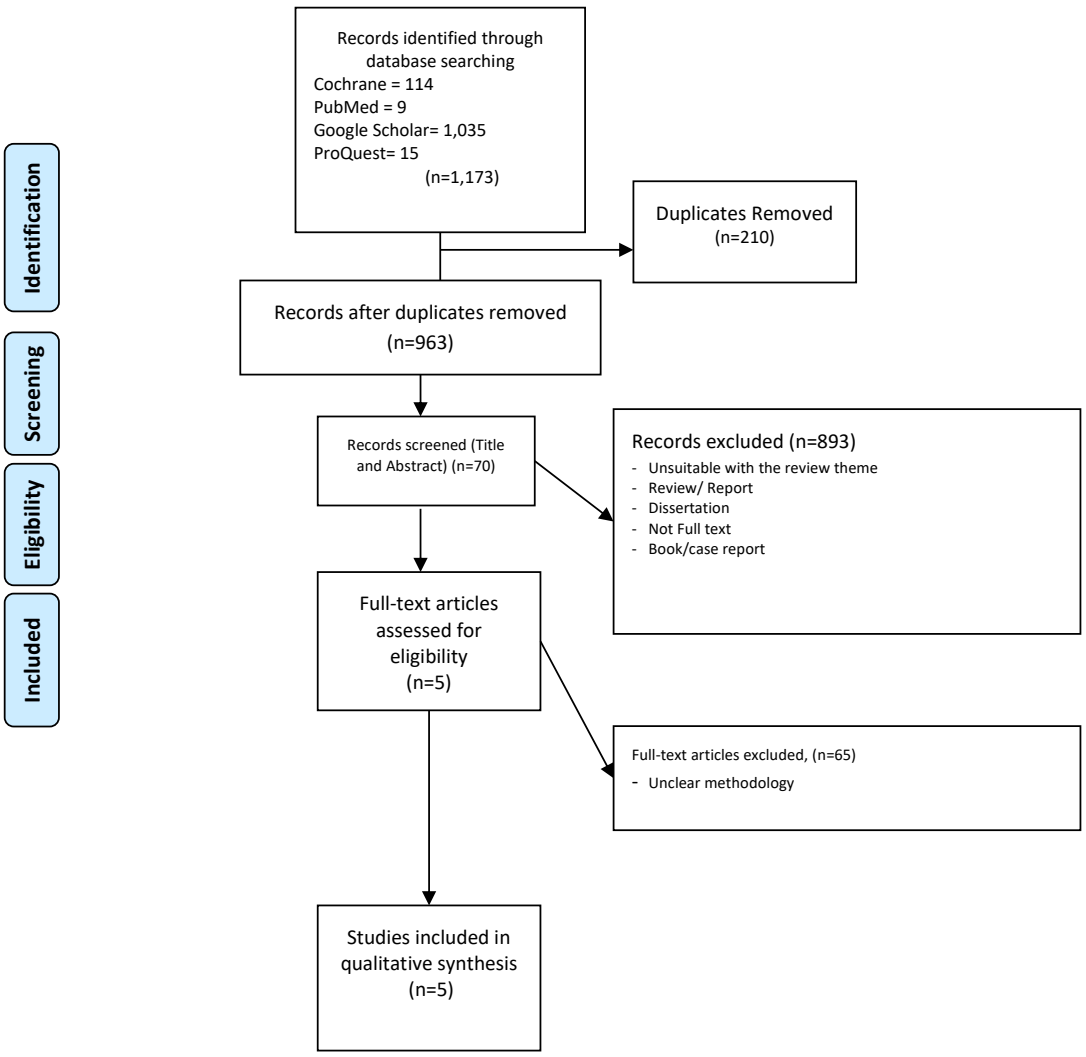

Figure 1. PRISMA Flowchart of Literature Search

Client- Centered Nursing Care

Efficacy of the models

Overall, the results of the study showed the positive impact of the models used. Achievement results from each study included increased preventive behavior (Khiyali et al., 2017), self-care behavior (Eshghi Motlagh et al., 2019), knowledge (Wijaya-Erhardt, et al., 2014), and perception (Spratling et al., 2014).

4. Discussion

This systematic review provides an overview of the effective models and guidelines used to help pregnant women in detecting high-risk pregnancies. Several models have been identified in the reviewed articles, including approaches that support the implementation of the intervention, such as holding training classes (Wijaya-Erhardt, et al., 2014), educational groups (Khiyali et al., 2017), counseling (Eshghi Motlagh et al., 2019) and structured CVD education by telephone (Spratling et al., 2014).

The authors find that although the available literature is limited, the results of the existing studies are promising and suggest that most interventions are valuable. Khiyali et al. in their study found that six training sessions lead to a significant increase in diabetes prevention behavior, one of which is controlling body mass index (BMI). The training sessions were conducted according to the constructs of the Health Belief Model. The intervention sequence begins with identifying the mother's knowledge about gestational diabetes and the role of nutrition and exercise in controlling the disease. Khiyali et al., 2017). Another study showed positive effects on behavior so that statistically visible changes are reported in maternal behavior (Eshghi Motlagh et al., 2019). A study in Indonesia also showed positive results. In this study, holding training classes for pregnant

women led to an increase in their awareness (Wijaya-Erhardt, et al., 2014). The counseling approach provides flexibility for pregnant women to express their ignorance and their need for health information related to high-risk pregnancies (Spratling et al., 2014).

The efficacy of the models discussed in our study has been proved in other settings. In line with the findings of this systematic review, Matlabi et al. studied the effectiveness of the Health Belief Model in breast cancer screening behaviors among female health volunteers (n=72) using a quasi-experimental design. Seven training sessions were held and implemented for the intervention group using local language and different educational approaches. The results showed a significant difference regarding breast self-exam, knowledge, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers between the control and intervention groups before and after the intervention (Matlabi et al., 2021). Also, Farazian et al. conducted an RCT on 60 patients with hypertension to determine the effect of self-care training using Bandura's Self-Efficacy Model.

The findings revealed significant differences between the experimental and control groups in terms of adherence to medication regimen (P=0.004), engagement in physical activity (P=0.002), and adherence to weight management goals (P=0.006). Also, there was a significant difference between the two groups in terms of their total self-care score immediately after the intervention and one month later (P=0.002) (Farazian et al., 2019). Regarding the use of the World Food Program Flip-Chart, Soofi et al. in a protocol quasi-experimental study assessed the effectiveness of specialized nutritious foods (SNF) and social and behavior change communication (SBCC) strategies during the first 1000 days of life to prevent stunting among children in Afghanistan. They used an intervention focusing on the provision of SNF, targeting pregnant and lactating women and children 6–23 months, and SBCC strategies implemented for at least 12 months. They expect a reduction in the prevalence of stunting among children under two years in the intervention group compared to the control group (Soofi et al., 2021).

Through the counseling method, Eshghi Motlagh et al., (2019) were able to explore the obstacles and problems faced by pregnant women during the stages of pregnancy. About the use of counseling techniques, in their article, Mosher et al., (2016) discussed a comprehensive set of national evidence-based recommendations called Dietary Guidelines for Americans, which can highlight the efforts of primary care providers to improve patient outcomes through optimal nutrition and support healthy lifestyle behaviors. They also defined the basic behavioral counseling techniques that primary care providers can include in time-limited patient interactions to help improve their patients' dietary behaviors and physical activity.

The authors of this systematic review were not able to collect enough relevant articles due to a lack of access to relevant articles in databases. Also, the language used was limited to English articles.

5. Conclusion

This systematic review shows the generally positive effects of various models and guidelines for educating pregnant women, including the Health Belief Model, Bandura's Self-Efficacy Theory, the World Food Program Flip-Chart, the Dietary Guidelines for Americans, and the Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women. Approaches to the application of the educational model include holding training classes for pregnant women and counseling. These models and guidelines have a significant effect on the ability of pregnant women to recognize the signs of high-risk pregnancy. However, much more is needed to increase knowledge and awareness of women regarding the signs and symptoms of high-risk pregnancies. It is suggested that a systematic review of high-risk pregnancies be performed using a larger number of databases over a wider period of time.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

Authors' contributions

All authors actively contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interests.

Acknowledgments

We express our gratitude to the director of Jambi University for its support for the implementation of this research

References

Astari, R. Y., Sandela, D. & Elvira, G., 2018. [Gambaran Kematian Ibu di Kabupaten Majalengka Tahun 2015 (Study Kualitatif) (Indonesian)]. *Midwifery Journal*, 3(1), pp. 69-75. [DOI:10.31764/mj.v3i1.149]

Bazer, F. W., 2012. *Endocrinology of pregnancy*. New Jersey: Humana Press. https://www.google.com/books/edition/Endocrinology_of_Pregnancy/funpBwAAQBAJ?hl=en&gbpv=0

Caldeira-Dias, M., et al., 2018. Preeclamptic plasma stimulates the expression of miRNAs, leading to a decrease in endothelin-1 production in endothelial cells. *Pregnancy Hypertension*, 12, pp. 75-81. [DOI:10.1016/j.preghy.2018.03.001] [PMID]

Campbell M., et al., 2020. Synthesis without meta-analysis (SWiM) in systematic reviews: Reporting guideline. *BMJ*, 368, pp. l6890 [DOI:10.1136/bmj.l6890] [PMID] [PMCID]

Cavazos-Rehg, P. A., et al., (2015). Maternal age and risk of labor and delivery complications. *Maternal and Child Health Journal*, 19(6), pp. 1202-11. [DOI:10.1007/s10995-014-1624-7] [PMID] [PMCID]

Chikalipo, M. C., Chirwa, E. M. & Muula, A. S., 2018. Exploring antenatal education content for couples in Blantyre, Malawi. *BMC Pregnancy and Childbirth*, 18(1), pp. 497. [DOI:10.1186/s12884-018-2137-y] [PMID] [PMCID]

Danielsson, K. C., et al., 2019. Maternal complications in pregnancy and childbirth for women with epilepsy: Time trends in a nationwide cohort. *PloS One*, 14(11), pp. e0225334. [DOI:10.1371/journal.pone.0225334] [PMID] [PMCID]

Dewi, B. P., 2019. [Analisis Hubungan Faktor Epidemiologi dan Faktor yang Terjadi Selama Kehamilan dengan Kejadian Kelahiran Preterm di RSUD Ogan Ilir Tahun 2018 (Indonesian)]. *Jurnal Kesehatan Dan Pembangunan*, 9(18), pp. 1-10. [DOI:10.52047/jkp.v9i18.36]

Duwi Sri Lestari, D. S. L., 2020. Faktor-faktor yang Berhubungan dengan Kejadian Preeklamsi pada Ibu Hamil: Sebuah Tinjauan Sistematik. *STIK Bina Husada Palembang*.

Eshghi Motlagh, A., et al., 2019. Effect of an educational intervention program based on bandura's self-efficacy theory on self-care, self-efficacy, and blood sugar levels in mothers with pre-diabetes during pregnancy. *Evidence Based Care Journal*, 9(2), pp. 53-64. [DOI:DOI:10.22038/ebcj.2019.37173.1959]

Farazian, F. et al., 2019. Effect of self-care education designed based on bandura's self-efficacy model on patients with hypertension: A randomized clinical trial. *Evidence Based Care Journal*, 9(2), pp. 44-52. [DOI:10.22038/EBCJ.2019.36466.1944]

Higgins, J, & Green, S., 2019. *Cochrane handbook for systematic reviews of interventions*. New Jersey: Wiley. https://www.google.com/books/edition/Cochrane_Handbook_for_Systematic_Reviews/G1SyDwAAQBAJ?hl=en&gbpv=0

Ingegerd, Ahldén., et al., 2012. Parents' expectations about participating in antenatal parenthood education classes. *The Journal of Perinatal Education*, 21(1), pp. 11-7. [DOI:10.1891/1058-1243.21.1.11] [PMID] [PMCID]

Jung, J., et al., 2019. Effects of hemoglobin levels during pregnancy on adverse maternal and infant outcomes: A systematic review and meta-analysis. *Annals of the New York Academy of Sciences*, 1450(1), pp. 69-82. [PMID]

Khiyali, Z., et al., 2017. Educational intervention on preventive behaviors on gestational diabetes in pregnant women: Application of health belief model. *International Journal of Pediatrics*, 5(5), pp. 4821-31. https://ijp.mums.ac.ir/article_7750.html

Khoramabadi, M., et al., 2016. Effects of education based on health belief model on dietary behaviors of Iranian pregnant women. *Global Journal of Health Science*, 8(2), pp. 230-9. [DOI:10.5539/gjhs.v8n2p230] [PMID] [PMCID]

Kirkham J. J., et al., 2018. Outcome reporting bias in trials: A methodological approach for assessment and adjustment in systematic reviews. *BMJ*, 362, pp. k3802. [DOI:10.1136/bmj.k3802] [PMID] [PMCID]

Kovala, S., Cramp, A. G. & Xia, L., 2016. Prenatal education: Program content and preferred delivery method from the perspective of the expectant parents. *The Journal of Perinatal Education*, 25(4), pp. 232-41. [DOI:10.1891/1058-1243.25.4.232] [PMID]

Kurniawan, A., Sistiarani, C. & Hariyadi, B., 2017. Early detection of high-risk pregnancy. *KEMAS: Journal Kesehatan Masyarakat*, 12(2), pp. 96-103. [DOI:10.15294/kemas.v12i2.5998]

Matlabi, H., et al., 2021. The effectiveness of health belief model initiative in breast cancer screening behaviors among women health volunteers. *Social Work in Public Health*, 36(3), pp. 365-76. [PMID]

Mosher, A.L., et al., 2016. Dietary guidelines for Americans: Implications for primary care providers. *American Journal of Lifestyle Medicine*, 10(1), pp. 23-35. [PMID]

Mwilike, B., et al., 2018. Knowledge of danger signs during pregnancy and subsequent healthcare seeking actions among women in Urban Tanzania: A cross-sectional study. *BMC Pregnancy and Childbirth*, 18(1), pp. 4. [PMID] [PMCID]

Navarro, A., Tiongco, R. E. & Bundalian, R., 2019. Knowledge, attitude, practices, and health beliefs of pregnant women about urinary tract infection and its associated risk factors: A local filipino community experience. *Kesmas: National Public Health Journal*, 14(2), pp. 82-7. [DOI:10.21109/kesmas.v14i2.3111]

NIH., 2019. *Study quality assessment tools*. Maryland: National Heart, Lung, and Blood Institute. https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools

Puspitaningrum, D., Indrawati, N. D. & Purwanti, I. A., 2018. [Korelasi Ibu Hamil Resiko Tinggi Dengan Kesiapan Program Premarital Skrining di Puskesmas Kota Semarang (Indonesian)]. *Jurnal Kebidanan*, 7(2), pp. 155-60. [DOI:10.26714/jk.7.2.2018.155-160]

Rachmawati, A. I., Puspitasari, R. D. & Cania, E., 2017. [Faktor-faktor yang Memengaruhi Kunjungan Antenatal Care (ANC) Ibu Hamil (Malay)]. *Medical Journal of Lampung University*,

7(1), pp. 72-6. https://juke.kedokteran.unila.ac.id/index.php/majority/article/view/1748/1705

Rajbanshi, S., Norhayati, M. N., & Nik Hazlina, N. H., 2020. High-risk pregnancies and their association with severe maternal morbidity in Nepal: A prospective cohort study. *PloS One,* 15(12), pp. e0244072. [PMID]

Rochjati, P., 2011. [*Skrining antenatal pada ibu hamil (Edisi 2): Pengenalan faktor risiko deteksi dini ibu hamil risiko tinggi (Indonesian)*]. Surabaya: Airlangga University Press. https://play.google.com/store/books/details/Poedji_Rochjati_Skrining_Antenatal_Pada_Ibu_Hamil?id=Qs-EDwAAQBAJ

Singh, S., 2020. Coronavirus disease-2019 in pregnancy with neurological manifestations versus pregnancy with eclampsia: Need for liberal testing to rule out the masquerades. *Acta Obstetricia et Gynecologica Scandinavica,* 99(7), pp. 950. [PMID]

Soofi S. B., et al., 2021. Effectiveness of specialized nutritious foods and social and behavior change communication interventions to prevent stunting among children in Badakhshan, Afghanistan: Protocol for a quasi-experimental study. *Methods and Protocols*, 4(3), pp. 55. [DOI:10.3390/mps4030055] [PMID]

Spratling, P. M., et al., 2014. Effect of an educational intervention on cardiovascular disease risk perception among women with preeclampsia. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 43(2), pp. 179-89. [PMID]

Sterne, J. A., et al. 2019. RoB 2: A revised tool for assessing risk of bias in randomized trials. *BMJ*, 366, pp. l4898. [PMID]

Tal, R., et al., 2015. Antimullerian hormone as predictor of implantation and clinical pregnancy after assisted conception: Asystematic review and meta-analysis. *Fertility and Sterility,* 103(1):119-30.e3. [DOI:10.1016/j.fertnstert.2014.09.041] [PMID]

Utami, S. M., et al., 2020. Ecological analysis of preeclampsia/eclampsia case in Sidoarjo Regency, Indonesia, 2015-2019. *Indian Journal of Forensic Medicine & Toxicology*, 14(4), pp. 3474-9. https://medicopublication.com/index.php/ijfmt/article/view/12164

Widarta, G. D., et al., 2015. [Deteksi dini risiko ibu hamil dengan kartu skor poedji rochjati dan pencegahan faktor empat terlambat (Indonesian)]. *Majalah Obstetri & Ginekologi*, 23(1), pp. 28-32. [DOI:10.20473/mog.v23i1.2100]

Wijaya-Erhardt, M., Muslimatun, S. & Erhardt, J. G., 2014. Effect of an educational intervention related to health and nutrition on pregnant women in the villages of Central Java Province, Indonesia. *Health Education Journal,* 73(4), pp. 370-81. [DOI:10.1177/0017896913485741]

Zakiyya, A., Rusmini, R. & Sartika, Q. L., 2019. Enhancing the pregnant women knowledge through health education about high risk pregnancy. *Jurnal Kesehatan Ibu dan Anak*, 13(1), pp. 67-73. [DOI:10.29238/kia.v13i1.415]

World Health Organization (WHO)., 2021. *New global targets to prevent maternal deaths*. Geneva: World Health Organization. https://www.who.int/news/item/05-10-2021-new-global-targets-to-prevent-maternal-deaths

This Page Intentionally Left Blank