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The Application Of The Health Belief Model In Improving Healthy Behaviors Among Pregnant Women: A Literature Review

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Abstract

Introduction: Maternal mortality rates around the world are still high. The first place out of 25 countries in Asia Pacific is Salomon Island with 327 per 100,000 live births, while the sustainable development goal target in 2030 is 70 per 100,000 live births. Factors influencing the high maternal mortality rate are pregnancy complications, demographics, sanitation, maternal education, and husband's education. Knowledge deficits require intervention in order to change behavior with appropriate approaches, such as the HBM (Health Belief Model). Objective: to determine changes in health behavior with the application of the Health Belief Model among pregnant women. Methods: This study used a literature review design. The databases involved in the search are Scopus, PubMed, Web of Science, Embase, and Google Scholar. Inclusion criteria: research with the topic Health Belief Model in Pregnancy, publication 2018-2023, full text Mesh terms used: health belief model AND pregnant women OR pregnancy. Result: Database extraction results obtained (n = 8) articles from 235 articles. Educational or evaluation materials that use Health Belief Model were nutrition education, prevention of anemia, preeclampsia, gestational diabetes, influenza vaccination, prevention of urinary tract infections, and acceptance of the COVID-19 vaccination. Conclusions: This review demonstrates the lack of evidence-based research to apply Health Belief Model to pregnant women. Nurses need to apply the concept of health belief model to pregnant women in future research and education.

Keywords: Health Belief Model, Behaviors, Pregnancy

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1. Introduction

Mortality caused by pregnancy or complications of pregnancy, which occurs within one year and is related to pregnancy is referred to as maternal mortality (Sobhy et al., 2019)). The highest maternal mortality rate in Asia Pacific was Salomon Island, while Indonesia ranks fifth highest compared to other countries (WHO, 2019). In 2016-2018, Indonesia's maternal mortality rate ranked first in ASEAN (WHO et al., 2019). The Sustainable Development Goals (SDGs) set a maternal mortality target of 70/per 100,000 live births (Kurjak et al., 2023).

The Republic of Indonesia has 38 provinces and 17,001 islands with different geographical conditions. The maternal mortality rate in Nusa Tenggara, Maluku, and Papua reaches 489/100,000 live births, which is twice as high as the maternal mortality rate in Java and surrounding islands. Differences in geography, demography, society, economy, limited access to services, and limited health resources trigger the high maternal mortality rate (Permenkes No.2, 2022). The cause of maternal mortality is pregnancy complications. Based on CDC data, the causes of maternal death are mental health conditions (22.7%), bleeding (13.7%), cardiac and coronary (12.8%), infection (9.2%), thrombotic embolism (8.7%), and cardiomyopathy (8.5%) (WHO, 2022). One meta-analysis study stated that the causes of mortality reduction that did not reach the set target were inequality in access to health services, suboptimal maternal and child health services, and poor health systems (Kurjak et al., 2023). Another study states that 50% of deaths occur in countries with lower middle income, from a review of 33 countries, the factors that determine the high maternal mortality rate are the location of delivery, maternal education, delay in seeking health services, antenatal services, skilled birth attendants, family income, and husband's knowledge (Tajvar et al., 2022).

The Ministry of Health of the Republic of Indonesia makes policies to handle and prevent maternal mortality through maternal health surveillance, local campaigns related to reducing maternal mortality, health checks, giving blood supplement tablets, education, and healthy living community movements (Permenkes No.2, 2022). Education programs are important to improve pregnant women's understanding of pregnancy danger signs and

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improve their health status. Many pregnant women were educated using the Health Belief Model. Poor knowledge of the danger signs of pregnancy complications leads to inappropriate actions (Jose et al., 2021). The gaps between knowledge and the need for behavior change require the right approach. The construction of the health belief model includes perceptions of vulnerability, pain, barriers and benefits, self-efficacy, and cues to action (Green et al., 2020). Pregnancy classes have not been implemented after the pandemic due to limited resources. Limited health workers can be bridged with an education that can increase the awareness of pregnant women to change their health behavior. The Health Belief Model is one of the educational approaches that can be given to pregnant women.

2. Research Method

This study used a literature review design. The databases involved in the search were Scopus, PubMed, Web of Science, Embase, and Google Scholar. Inclusion criteria: research with the topic Health Belief Model in Pregnancy, publication 2018–2023, and full text. Mesh terms were used: the Health Belief Model and pregnant women, or pregnancy. This study used a PRISMA flow diagram to select articles (Page et al., 2021). We found 29 duplicates. Eight articles were usable (Figure 1). The purpose of this literature review was to determine the application of the health belief model theory among pregnant women.

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Volume 1 | Number 3 | September 2023 |

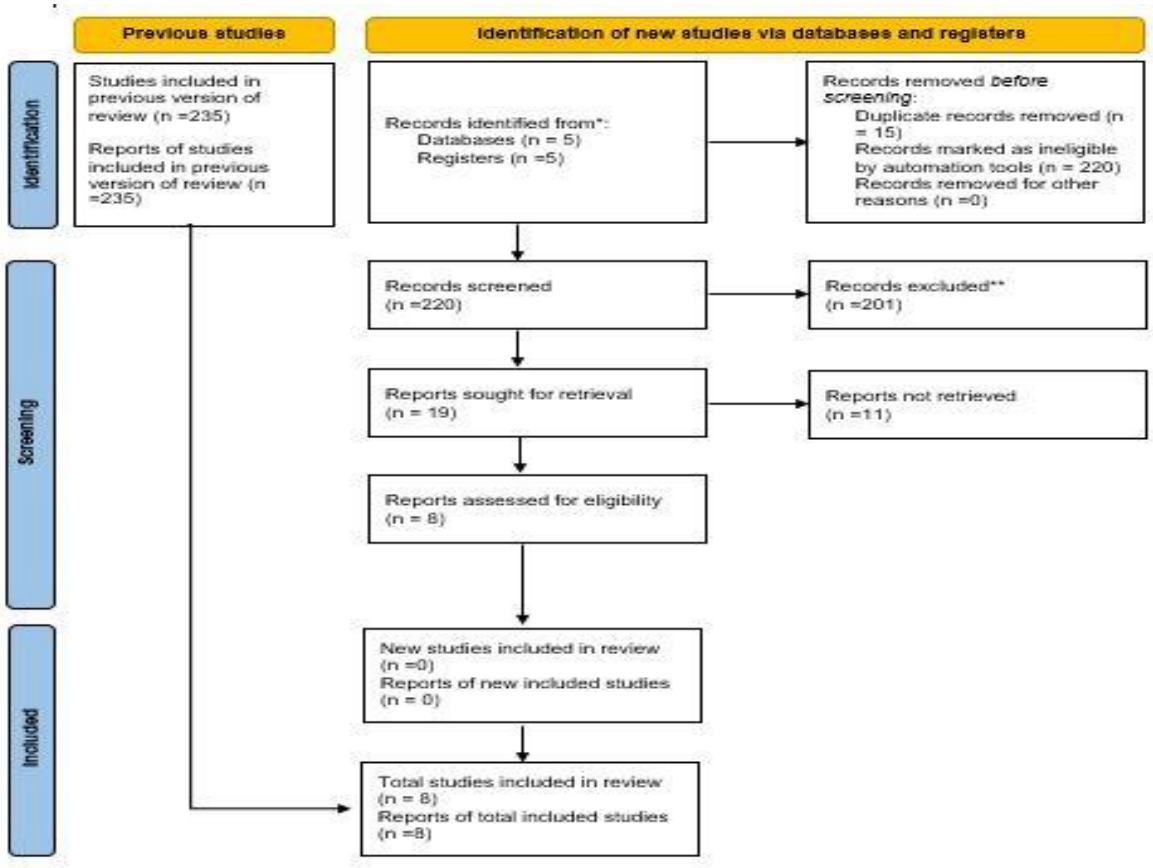

Figure 1. Flow of Article Reviewed

3. Results And Discussions

a. Result

The total number of articles identified was 235. Search results using databases obtained from Scopus (n = 13), PubMed (n = 5), Web of Science (n = 105), Embase (n = 82), and Google Scholar (n = 30) From the 235 articles in the search results, there were 5,135 pregnant women. The results of the analysis were eight studies on the use of the Health Belief Model in pregnant women. Articles came from the countries of Ethiopia, Nigeria, Iran, Indonesia, Singapore, China, and Palestine. The research design involved was a randomized control trial (RCT), qualitative, cross-sectional, and quasi-experimental.

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Volume 1 | Number 3 | September 2023 |

Table 1. Identification of article analysis

No	Author	Country	Design	Sample	Application of Health Belief Model	Research Strengths And Weaknesses
1	(Diddana et al., 2018)	Ethiopia	RCT	138	Nutrition education for pregnant women	The limitations of this study were not explained in detail. The strengths of this study are in the methodology used using RCT; the researcher controlled for research bias by randomizing the participants.
2	(Diddana , 2019)	Ethiopia	RCT	138	Nutrition education with Health Belief Model	The limitation of this study is that it did not look at food insecurity factors in Ethiopia, which may have influenced the study. The strength of this study is not only looking for the association but also continuing with logistic regression analysis.
3	(Sripad et al., 2019)	Nigeria	Qualitative	42	Application to pregnant women with Pre-eclampsia and eclampsia	The limitation of this study is that it only involves women who have experienced pre-eclampsia and eclampsia. Another weakness is that it does not look at other factors such as beliefs, prayers, and bad behavior of officers not reviewed here. The strength of this study is that the long-term memory of women with complications will be an input for education for pregnant women at risk.
4	(Nahrisah et al., 2020)	Indonesia	Quasi-experiment	140	Anemia prevention education	The limitations of this study were that the assessment of nutritional status was not based on laboratory examination results, weight measurement was only

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Volume 1 | Number 3 | September 2023 |

No	Author	Country	Design	Sample	Application of Health Belief Model	Research Strengths And Weaknesses
						based on the questionnaire or subjective measures, the limited sample size did not calculate the number of antenatal visits, and the design used was quasi-experimental. The advantages of this study are that the they develop educational media with the input from experts and behavioral changes were seen after 15 weeks, and variable assessments were carried out qualitatively and quantitatively.
5	(Eslami et al., 2022)	Iran	Cross-sectional	235	Prevention of urinary tract infection in pregnant women	The study's limitations are the use of self-reporting tools that cause mothers to sometimes forget and questionnaires that are too long. The study's strength is the relationship between health literacy and the behavior of preventing urinary tract infections in pregnant women with Health Belief Model. This study has never been done before.
6	(Offeddu et al., 2019)	Singapore	Cross-sectional	814	Influenza vaccine coverage in pregnant women	The weakness of this study is that the sample was only taken from hospitals, so it cannot be generalized. The strength of this study is that it assessed knowledge, attitude, use of insurance, willingness to pay, and willingness to vaccinate.

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Volume 1 | Number 3 | September 2023 |

No	Author	Country	Design	Sample	Application of Health Belief Model	Research Strengths And Weaknesses
7	(Wang et al., 2021)	China	Cross-sectional	2,568	Influenza vaccine acceptance	Strong points: the educational intervention in the study increased participants' knowledge and acceptance of the vaccine, and a large number of participants. Research sample limitations were only carried out on participants who made antenatal visits, the specific impact of COVID-19 on willingness to vaccinate.
8	(Nazzal et al., 2023)	Palestine	Cross-sectional	950	Vaccination coverage for pregnant women	The shortcoming of this study is that the data relied solely on participant reporting on some variables. The study's strength is that it controlled for bias by creating four forms of questionnaires. The content of the questionnaire was about attitudes, side effects, and vaccine effectiveness. This study used $\chi 2$-tests to compare the distribution of answers.

b. Discussion

The Health Belief Model is a behavioral concept that has been developed since 1950 in America (Maria Goreti usboko, 2018). Humans have feelings, when they face a challenge or illness, they automatically feel worried or anxious. Negative coping will harm individuals and their families. Good coping will make a person able to face the challenges or illnesses. The Health Belief Model theory is an educational medium to increase people's knowledge and understanding of the risks that threaten them (Green et al., 2020). With education, it is hoped that the community will be able to take preventive action against the threat of disease/challenge. Perceived susceptibility to

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Volume 1 | Number 3 | September 2023 |

poor health, perceived risk, perceived severity of illness, perceived benefits of behavior change, and perceived barriers to decision-making or action are four aspects of the health belief model (Green et al., 2020).

The application of Health Belief Model in education for pregnant women takes various forms. One study showed that nutrition education with Health Belief Model was given for 1-4 months. Education is given for 15 consecutive days for 5 months. The intervention group received an education based on Health Belief Model theory, namely the vulnerability of pregnant women and fetuses to malnutrition due to improper diet / excess or deficiency, the severity of malnutrition (too fat / too thin), the benefits of a proper diet, the obstacles faced in implementing a proper diet, and confidence in applying a proper diet. Education was provided using posters, theater, brochures, flipcharts, and whiteboards. Follow-up was conducted after 5 months without providing additional education. In the control group that provided cadre education (Diddana et al., 2018).

A similar study discussed nutrition education using the Health Belief Model approach. This study was motivated by the finding that 60% of pregnant women in Ethiopia have poor nutritional status. Education includes concepts about nutrition in pregnant women and dietary practices. The results showed an increase in nutritional knowledge from 6.9 to 13.4 and an increase in dietary practices to 84.1% (Diddana, 2019).

Another study applied Health Belief Model on pregnant women with preeclampsia and eclampsia. This study used five open-ended questions with the Health Belief Model approach. The open questions were related to how they perceived the threat of preeclampsia and eclampsia complications during pregnancy and childbirth, their health history, their knowledge of causes, cues to action/awareness of seeking care, perceived barriers (socio-cultural barriers, distrust of the health system), and benefits of seeking health services (Sripad et al., 2019). This study used open-ended questions to ask women on their experiences with pre-eclampsia and eclampsia. The

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Volume 1 | Number 3 | September 2023 |

results of this study formed a theory on the prevention of these complications based on participants' experiences.

The next study implemented Health Belief Model in anemia management. Education related to anemia using the handbook was conducted in 2 sessions for 15 days with home visits. The first session of education included definitions, causes, risk factors, prevention, and therapy. The second session meeting counseled on foods high in iron, consumption of blood supplement tablets, factors inhibiting drug consumption, and susceptibility to anemia. Each meeting was about 45-60 minutes (Nahrisah et al., 2020). The results of this study showed an increase in knowledge and consumption of high-iron foods, but this study was not completed with laboratory results.

One of the frequent complications of pregnancy is urinary infection. In this study, researchers applied Health Belief Model in the prevention of urinary tract infections. The infection prevention instrument was developed using Health Belief Model theory with 25 questions. The questions included clothing, eating habits, toileting, hygiene, and sexual behavior (Eslami et al., 2022). This study shows that health literacy is considered a predictor of behavioral change to prevent urinary tract infections.

This study differs from previous studies that applied Health Belief Model for complication prevention or health improvement. This study implements Health Belief Model for influenza vaccination. The present study was used to measure knowledge, attitudes, and willingness to vaccinate using a questionnaire. The points asked included perceived susceptibility, perceived benefits, and perceived barriers (Offeddu et al., 2019). This study showed that perceived susceptibility and benefits were low, resulting in low influenza vaccine usage.

In contrast to previous studies, a study in China showed favorable results. This study used the Health Belief Model approach for influenza vaccine acceptance on pregnant women. Vaccine acceptance reached 76.5% (95%, CI 74.8-78.1%). Factors associated with acceptance are knowledge, perceived susceptibility, perceived benefits,

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Volume 1 | Number 3 | September 2023 |

cues to action, and low barriers. This study began with education of participants to increase their understanding of pregnant women. A questionnaire was developed from the Health Belief Model with 12 statements related to maternal and infant infection susceptibility, parity, barriers and benefits of the vaccine (Wang et al., 2021). Research on the application of Health Belief Model in vaccine acceptance in Singapore and China is different, this could be due to research in China starting with massive and programmed education while Singapore only relies on information through social media. The knowledge increased vaccine acceptance.

A similar study applied Health Belief Model on Covid-19 vaccination coverage. COVID-19 vaccine coverage is the receipt of at least two doses of the COVID-19 vaccine before or during pregnancy. This study assessed perceptions of COVID-19 and knowledge of the COVID-19 vaccine and history of COVID-19 diagnosis. The third part assessed attitudes toward COVID-19 vaccination using the Health Belief Model construct. The Health Belief Model is an effective theoretical framework for studying pregnant women's vaccination attitudes. Its main assumption is that pre-existing beliefs can be used to anticipate future behavior. The Health Belief Model concept explains that perceived susceptibility, severity, benefits, barriers, and cues to action all play a role in motivating people to adopt a healthy lifestyle (Nazzal et al., 2023).

The application of the Health Belief Model is shown to increase knowledge and improve health behaviors for pregnant women. Educational or evaluation materials that use Health Belief Model are nutrition education, prevention of anemia, preeclampsia and eclampsia, gestational diabetes, influenza vaccination, prevention of urinary tract infections, and receipt of Covid-19 vaccination. This is supported by previous research which explains that perceived vulnerability can be considered an important belief in attitudes toward preventive behavior, health beliefs, and self-efficacy positively affect preventive behavior. Risk prevention behavior is related to health belief (Jose et al., 2021). Another study related to travelers' prevention behavior states that self-efficacy,

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Volume 1 | Number 3 | September 2023 |

benefits, and perceived vulnerability are predictors of risk prevention behavior (Huang et al., 2020).

4. Conclusion

This review demonstrates the lack of evidence-based research to apply Health Belief Model to pregnant women. The application of Health Belief Model to pregnant women in this study includes a basis for education and evaluation/measuring the knowledge of pregnant women. Educational or evaluation materials that use Health Belief Model are nutrition education, prevention of anemia, preeclampsia, and eclampsia, gestational diabetes, influenza vaccination, prevention of urinary tract infections, and receipt of the COVID-19 vaccination. Health Belief Model is proven to increase knowledge and change health behavior in pregnant women. It is necessary to develop the use of Health Belief Model in the prevention of other pregnancy complications. Nurses have the opportunity to develop educational media with this theory among pregnant women.

5. Compliance with ethical standards

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Disclosure of conflict of interest

All authors of this article declare that there are no competing interests.

Statement of informed consent

Every action we take as authors is a mutual agreement or consent.

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