

Stillbirth prevention with counseling during antenatal care visits in pregnant women: A systematic review

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ABSTRACT

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At important stages in women's lives, antenatal care (ANC) serves as a means of communication for women, their families and communities. This study aimed to determine the effectiveness of counseling during ANC as an intervention to prevent stillbirths. Narrative studies with scientific journal database sources published in PubMed, EBSCO and Science Direct were used. This study was conducted during September–November 2023. The keywords used were stillbirth, counseling, ANC, and pregnancy, and the search included research published within five years of the study. A total of 185 articles were found, and 12 articles were selected for review. The findings indicate that an effective intervention to prevent stillbirth can be carried out through counseling during ANC visits. Antenatal counseling is the intervention of choice to change the behavior of pregnant women and health workers and improve the quality of ANC as a strategy for preventing stillbirths. ANC counseling topics that are effective in preventing stillbirth include weight control, breastfeeding, nutrition, physical activity, alcohol, smoking, HIV, drugs, and safe medication during pregnancy. By enhancing the quality of ANC and focusing on education and support, healthcare providers can play a crucial role in preventing stillbirths and promoting maternal and infant health.

Keywords: antenatal; health care; stillbirth; pregnant women; systematic review

1. INTRODUCTION

The estimated global prevalence of stillbirths based on WHO data for 2022 is 2.6 million annually, the equivalent of one stillbirth every 16 seconds. Stillbirths are typically present in areas with a lower-middle class economy accounting for 98% of the incidences. Half (1.3 million) of

all stillbirths also occur prenatally and intranasally (Hadibarata et al., 2018; Tsimbos et al., 2021; WHO, 2023; Zhu et al., 2021). The incidence of stillbirths in Indonesia in 2021 decreased in relation to 2020, from 28,158 to 27,566 respectively.

The detection of high-risk pregnancies through the analysis of socioeconomic, medical, and obstetric factors is

key for preventing stillbirths during antenatal care (ANC) (Aleem and Bhutta, 2021; Kim et al., 2021; Roberts et al., 2021; Sharma and Kaushik, 2021; Wang et al., 2023; WHO, 2023). The opportunity to teach expectant mothers and their families about health issues, for example by health promotion activities, screening, and diagnosis, is a significant benefit of ANC services. The services are a vital communication channel for women, their families, and communities at pivotal stages in their lives. A systematic review (Morón-Duarte et al., 2019) assessing the quality of ANC worldwide using WHO ANC guidelines revealed that health education and prevention counseling had been carried out in 93.3% of cases (Lorenz et al., 2022). Specifically, aspects of counseling included breastfeeding (48.9%), counseling on danger signs of pregnancy (40%), diet (52.2%), and supplementation of iron and folic acid (Morón-Duarte et al., 2019; Phommachanh et al., 2019).

Counseling is not only given to pregnant women but also to their family members (Babaheidarian et al., 2021). This provides information regarding treatment, medication, and possible contingencies (Phommachanh et al., 2019). A study revealed that more women change behaviors that are detrimental to pregnancy after receiving nutritional counseling. Therefore, it has been demonstrated that receiving individual counseling throughout pregnancy improves one's nutritional status (Finlayson et al., 2015). Counseling approaches can strengthen the relationship between pregnant women and family members, as well as health services during and after childbirth. This holistic approach helps ensure that everyone involved is adequately supported and informed throughout the pregnancy journey. It can also help address any concerns or questions that family members may have about the pregnancy and upcoming changes. However, counseling services are sometimes of poor quality in low-income nations, and the advice given is frequently inappropriate for the social and cultural context of women to encourage good behavior during pregnancy at home (Phommachanh et al., 2019).

A literature review also found that pregnant women had a greater increase in knowledge when a partner accompanied them during ANC visits, including knowledge about dangerous signs of pregnancy and preparation for childbirth (August et al., 2016; Suandi et al., 2020; Wastnedge et al., 2021). In addition, partner involvement has a positive effect on joint decision making (Comrie-Thomson et al., 2015). Partner involvement during ANC visits not only enhances knowledge acquisition but also fosters a supportive environment for joint decision-making between couples. This collaborative approach improves maternal and neonatal outcomes. ANC counseling also empowers couples regarding their role in preventing stillbirths by helping to remind them about their sleeping positions (Cronin et al., 2019; Leppänen et al., 2016; Robertson et al., 2020; Warland et al., 2017).

The results of another study revealed that the inadequacy of the information provided by officers was due to time limitations, lack of detailed information, and the large number of pregnant women who came per day. In addition, the officers have other duties, such as home

visits to villages, conducting classes for pregnant women, and integrated service posts (Audina, 2018).

This was conducted to determine the effectiveness of counseling techniques for preventing stillbirths during ANC visits for pregnant women. The novelty of this study is that the incidence of stillbirths is still quite high, but research on strategies for preventing stillbirths is relatively limited globally.

2. MATERIALS AND METHOD

Narrative studies with scientific journal database sources published in PubMed, EBSCO and Science Direct were used to determine the effectiveness of counseling techniques for preventing stillbirths during ANC visits for pregnant women. The studies were selected based on their relevance to the research topic and the quality of their methodology. Only articles published in English were included in the review process. The keywords used in the search were "stillbirth", "counseling", "ANC", and "ANC for pregnant women". To ensure that the information obtained was still relevant and up to date, the search included research published within the last five years, that is, 2018–2023. A total of 180 articles were found based on the search titles, and 12 articles were selected for review. The selected articles were carefully reviewed and analyzed to extract relevant information for the study. The articles were then tabulated in an Excel table to organize key findings and compare results across different articles, revealing common themes and trends that were used to draw conclusions and recommendations for future research in the field. A flowchart of the article search process is shown in Figure 1.

3. RESULTS

The findings show that counseling during ANC visits is an effective intervention to prevent stillbirth. Antenatal counseling is the intervention of choice to change the behavior of pregnant women and health workers and to improve the quality of ANC services as a strategy to prevent stillbirths. ANC counseling topics that are effective in preventing stillbirth include weight control, breastfeeding (Sujata et al., 2022), nutrition, physical activity (Murray-Davis et al., 2020), alcohol, smoking (Murphy et al., 2020), HIV (Zandam et al., 2021; Bintabara et al., 2021; Choi et al., 2022; Watt et al., 2019), drugs (Devkota et al., 2017), improving communication skills (Omer et al., 2020), and safe medication during pregnancy (Devkota et al., 2017). Prenatal counseling significantly increases the self-efficacy of breastfeeding mothers up to 4 months postpartum and overcomes breastfeeding problems (Shafaei et al., 2020; Mallick et al., 2020). Antenatal counseling has been proven to have a positive influence on pregnant women in an effort to prevent stillbirth. Thus, it is necessary to strengthen counseling materials for counsellors so that they can provide proper counseling to pregnant women and empower their husbands and target family members. Further details can be found in Table 1.

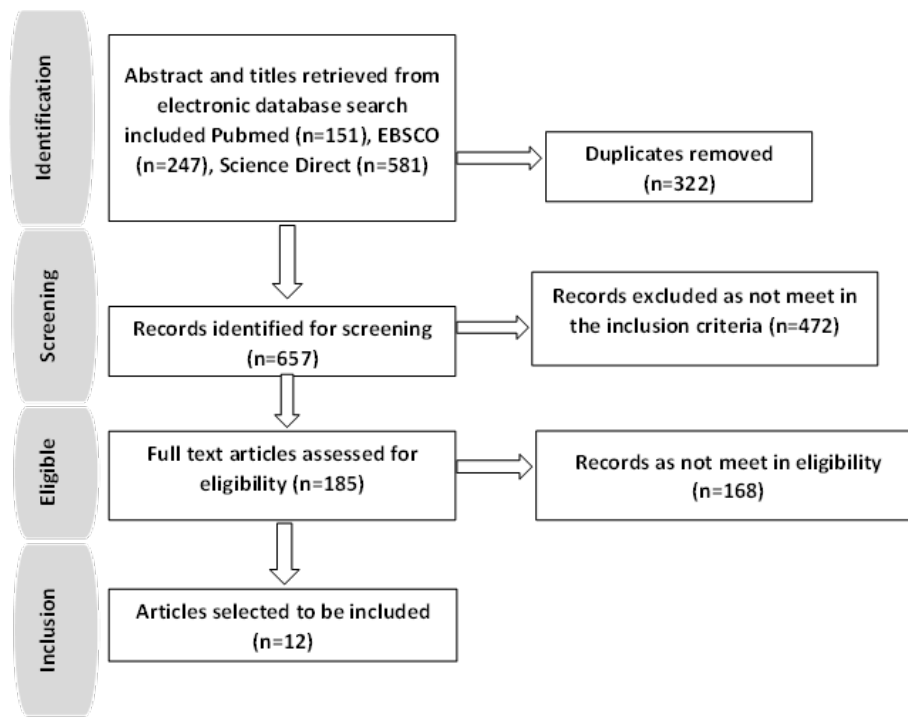


Figure 1. Research flow chart

4. DISCUSSION

The review reveals that antenatal counseling is an effective intervention to prevent stillbirths in pregnant women. Topics effective in preventing stillbirth include weight control, breastfeeding, nutrition, physical activity, alcohol, smoking, HIV, drugs, communication skills, and safe medication during pregnancy. These topics aim to educate pregnant individuals on the importance of maintaining a healthy lifestyle and avoiding harmful substances that can increase the risk of stillbirth. By addressing these factors during ANC sessions, healthcare providers can empower expectant mothers to make informed decisions for the well-being of themselves and their babies. Discussing the importance of regular prenatal check-ups and monitoring fetal movements can also help in early detection of any potential issues that could lead to stillbirth. Providing emotional support and resources for managing stress and anxiety during pregnancy can further contribute to a positive outcome for both mother and baby (Al-Mutawtah et al., 2023). This intervention improves the quality of ANC services and reduces the risk of stillbirths, boosting breastfeeding self-efficacy and overcoming breastfeeding issues, while antenatal counseling helps prevent stillbirth. Strengthening counseling materials is crucial for counselors to provide proper support to pregnant women and empower their families.

Health workers in health services play an important role in ensuring that every pregnant woman has the information and services they need. Counseling is important during ANC. It helps women make informed decisions about their pregnancy, promotes healthy behaviors, and identifies potential risks early on. It provides emotional support and reassurance during this crucial time in a woman's life. This is because counseling during ANC makes pregnant women consider many

subjects with health workers regarding their pregnancy. Various guidelines for pregnancy health services reveal timely referrals to other health workers as professional and ethical obligations for health workers and in order to provide impartial counseling (Geurtzen et al., 2018; McClure et al., 2022). Providing accurate information and supporting pregnant women is essential for ensuring the well-being of both the mother and the baby. By offering comprehensive and unbiased guidance, health workers can empower pregnant women to make informed decisions about their pregnancy and overall health.

A study by Berglas et al. (2018) revealed some unclear matters regarding whether counseling should be given to all pregnant women, only some women, or only when requested. This is because many women do not discuss unwanted pregnancies with their health workers. In addition, health workers who do not handle pregnancy counseling still exist in health centers (Holt et al., 2017). This is in line with research conducted by Berglas et al. (2018), who stated that 9% of women expressed an interest in attending counseling, even though they did not need it (Danna et al., 2023; Christou et al., 2020).

Counseling increases the quality of the mother's pregnancy and prevents risky pregnancies. Previous studies have shown that counseling is useful for weight control, breastfeeding, oral health, and nutrition. It also educates about alcohol consumption, drugs, smoking, domestic violence, fear, physical activity, and chronic diseases, such as diabetes mellitus, and HIV (Warland and Glover, 2019). Counseling can also help expectant mothers manage stress and anxiety, leading to improved mental health outcomes for both the mother and baby. Additionally, it has been found to enhance communication between healthcare providers and pregnant women, resulting in better overall care during pregnancy.

Table 1. Summary of articles from 2018 to 2023 regarding ANC counseling for stillbirth prevention

Author	Sample	Purposes	Research design	Intervention	Results
Murray-Davis et al. (2020)	7 family doctors, 6 midwives, and 5 obstetricians	To comprehend the counseling provided by family doctors, midwives, and obstetricians in Ontario and to identify the limiting and enabling variables	Grounded theory	The in-depth interviews were transcribed and processed using the NVivo software.	Health workers have offered weight-related counseling to all patients. Weight gain goals, nutrition, exercise, and gestational diabetes prevention are all addressed in counseling. Patient attitudes, societal and cultural concerns, and resource accessibility were challenges addressed by health professionals during counseling. After receiving counseling, the patients became motivated and visited nutritionists for more detailed advice regarding pregnancy weight.
Shafaei et al. (2020)	59 pregnant women	To assess how counseling affects women's self-efficacy in nursing and how often they experience breastfeeding issues	RCT	The study involved a control group and an intervention group, each receiving educational materials on breastfeeding, its benefits, psychological aspects, anatomy, hormones, reasons for discontinuation, typical conditions, mother's nutrition, and advice for pumping, compared to the control group's regular care.	Prenatal counseling significantly increased the self-efficacy of breastfeeding mothers up to 4 months postpartum and overcame breastfeeding problems. This study also revealed that mothers who previously failed to breastfeed, with counseling by midwives and counsellors, resume breastfeeding so that their children receive exclusive breastfeeding.
Mallick et al. (2020)	1,464 health facilities with ANC, 3,688 pregnant women, and 2,574 health workers	To find out the relationship between the health care environment related to breastfeeding during ANC and early initiation of breastfeeding	Survey	This study uses a service provision assessment survey by linking DHS data. Three indicators were measured, namely (1) availability of facilities with ANC services that reported routine breastfeeding counseling, (2) training on breastfeeding, and (3) breastfeeding counseling during ANC.	The findings of this study were that 95% of facilities in Haiti and Malawi routinely provide breastfeeding counseling during ANC. However, only 40% of health workers in both countries received training related to breastfeeding counseling. Furthermore, only 4–10% of clients received counseling. This study revealed that health workers who had received training generally took the initiative to provide breastfeeding counseling.
Omer et al. (2020)	80 health workers	To assess the impact of nutrition education and counseling on the ability of health professionals to provide counseling during ANC	Cluster RCT	The Ethiopian Ministry of Health modified an intervention focusing on nutrition for adolescents, mothers, infants, and adolescents, including international guidelines and health belief models for pregnant women. ANC health workers receive two days of training, consisting of three sessions. The first session focuses on the need for a pregnant mother nutrition training program, discussing nutritional needs, IFA supplements, pregnancy weight control, food group classification, lifestyle issues, safety, and counseling skills.	The intervention significantly improved the counseling skills of the majority of ANC health workers. With a comprehensive approach, it was found that the ANC health workers in the intervention group provided more nutrition advice and had better communication skills than the health workers in the control group.

Table 1. (continued)

Author	Sample	Purposes	Research design	Intervention	Results
Sujata et al. (2022)	140 mothers	To evaluate antenatal and postnatal counseling for mothers who experience preterm labour to achieve exclusive breastfeeding for premature infants	RCT	The intervention group received antenatal and postnatal counseling about the benefits of exclusive breastfeeding, and were given a demonstration of breastfeeding. Meanwhile, the control group only received postnatal counseling regarding breastfeeding.	Individual counseling during the antenatal and postnatal periods increased exclusive breastfeeding, and the initiation of exclusive breastfeeding was significantly higher in the intervention group than in the control group.
Devkota et al. (2017)	229 pregnant women	To evaluate the counseling provided regarding the understanding of drug use during pregnancy and its effects, as well as pregnant women's knowledge, attitudes, and practices toward medicine	Survey	Knowledge, attitude, and practice are the three components of the questionnaire used to assess the safety of medications before and during pregnancy counseling. Participants received the 15-question survey after receiving their medications from the hospital pharmacy.	Compared to the ratio of awareness and practice, the majority of pregnant women had a favourable view of drug use during pregnancy. Before counseling, more than 50% of participants were aware of difficulties, but few were aware of the usage of prescribed medications. However, 71.6% of the respondents were aware that drugs should not be used during pregnancy because they impair both the mother's and the unborn child's health, but they were less aware of how dangerous they were. Only 30.6% of people were aware that drugs can impair fetal organogenesis.
Young-Wolff et al. (2020)	70,031 women	To identify the clinical and demographic relationships between prenatal care system participation in early assessment and counseling interventions	Survey	Kaiser Permanente, Northern California has been using a prenatal screening questionnaire for over 20 years, involving interviews and drug-use assessments. Prenatal drug use is defined as alcohol, nicotine, or cannabis use.	Research with substance use screening and counseling interventions integrated into prenatal care had two findings. First, the majority of pregnant women were screened positive for drug use through prenatal screening at 83%. Second, low-income women experienced barriers to prenatal care in the first trimester.
Choi et al. (2022)	10 midwives, 10 pregnant women, 2 nurses	To assess adherence to HIV testing and counseling provided at ANC clinics in two rural districts in Ghanautara by comparing practice against national guidelines	Grounded theory	Two interview guides are designed for health workers and pregnant women. Researchers scheduled interviews with midwives so as not to disrupt service delivery and ensured a constant comparative approach to monitoring thematic saturation.	The findings of this study were that not all pregnant women were informed before the test or informed about their test results. Many mothers revealed that pre-test counseling was not given even though the midwife claimed to have been given it. Posttest counseling was mainly provided to those who tested positive, and some midwives agreed not to provide counseling to pregnant women who tested negative for HIV. However, in this study, there was disagreement that HIV testing counseling during ANC is voluntary or mandatory. Midwives also revealed that a lack of adequate infrastructure, communication barriers, and inadequate training were obstacles to counseling.

Table 1. (continued)

Author	Sample	Purposes	Research design	Intervention	Results
Watt et al. (2019)	1,000 women and 700 men	To evaluate Maisha's counseling intervention regarding HIV stigma when coming to ANC services	RCT	Intervention to assess the potential effectiveness of the intervention on HIV care and the construction of HIV stigma. Participants are enrolled at the first antenatal visit, before the HIV test. After consent and a baseline survey, participants are randomized to a control group and an intervention group (Maisha). Maisha's intervention includes a video screening and counseling session before the HIV test, and two additional counseling sessions if the HIV test result is positive.	The results of the study indicated that Maisha's intervention was a novelty for overcoming HIV stigma during the first visit to pregnant women who tested positive. In addition, Misha's intervention was able to promote acceptance and empathy for people with PLWHA.
Bintabara et al. (2021)	1,853 health facilities	To assess facility readiness to encourage the use of provider initiated HIV testing and counseling in pregnant women coming to ANC to enhance the prevention of mother-child transmission of HIV interventions in Tanzania	Survey	The Tanzania service provision assessment was utilized for the survey in this study. This survey offers data on the accessibility of fundamental and necessary health services as well as the preparedness of those services. The role of a crucial element in the provision of high-quality ANC services, including HIV counseling and testing services, is one of the concerns evaluated by this survey.	According to the study's findings, the quality of provider-initiated HIV testing and counseling for pregnant women during the first ANC visit and the readiness of facilities to deliver prevention of mother to child transmission of HIV services both fell into the moderate range. Additionally, this study demonstrates that with each percentage improvement in facility readiness score, it is anticipated that expectant women will receive better high-quality PITC.
Zandam et al. (2021)	10,073 pregnant women with 1,603 pregnant women with disabilities	To investigate disparities in HTC service utilization between women with and without disabilities in Uganda	Survey	A retrospective study evaluated HIV testing and counseling services during antenatal periods, including counseling before, administering tests, and post-test, using a binary response measure to gauge positive reactions.	The likelihood that women with disabilities would obtain pre-test HIV counseling (59.6 vs. 52.4), HIV test findings (68.2 vs. 61.4), post-test HIV counseling (55.5 vs. 51.6), and all HTC services (49.2 vs. 43.5) was lower than it was for women without disabilities. The study's regression analysis also showed that women with impairments had lower odds of receiving pre-test counseling and HIV test results.
Murphy et al. (2020)	718 pregnant women	To assess the prevalence of preventive health counseling during pregnancy	Survey	The ANC observation checklist contains several counseling observations during client visits. One of the counseling topics observed was the danger signs of pregnancy complications. During counseling, a list of observations was used such as vaginal bleeding, fever, swollen face or hands, fatigue or shortness of breath, headache or blurred vision, coughing or difficulty breathing, and decreased fetal movement.	The findings of this study reported that the level of counseling for breastfeeding mothers was 84.8%, alcohol was 48.4%, smoking was 47.%, and weight gain was 31.5%. Although the negative effects of smoking were known, one-third of participants who smoked pre-pregnancy continued to smoke during pregnancy. The findings of this study also reveal that preventive health counseling during pregnancy is not given routinely, even though pregnant women report the potential for dangerous behavior.

4.1 Effectiveness of ANC counseling for weight control

The findings show that patient attitudes, societal and cultural concerns, and resource accessibility were challenges addressed by health professionals during counseling. After receiving counseling, the patients became motivated and visited a nutritionist for more detailed advice regarding pregnancy weight (Murray-Davis et al., 2020). During pregnancy is an opportunity for pregnant women to prevent excess weight gain. The average woman gains 0.5 and 3 kg during pregnancy. In 1990, the Institute of Medicine formulated specific body mass index (BMI) recommendations for healthy pregnancy weight gain (Althuisen et al., 2013). Obesity is a risk factor that can cause complications during pregnancy with many studies stating that obesity can cause stillbirth (Fakhraei et al., 2022). Previous studies found evidence of a significantly greater risk of preeclampsia in women with obesity than in those with gynoid obesity (Høgh et al., 2020). The pathophysiology of obesity and stillbirth is not fully understood but may be related to abnormal placental function and inflammatory, metabolic, and hormonal imbalances in the mother. The risk of stillbirth has a positive relationship with the body mass index (BMI), especially during or after pregnancy. Obesity is associated with other risk factors, such as diabetes, which can cause stillbirths. Therefore, weight gain must be prevented in ANC services by counseling (Woolner and Bhattacharya, 2015).

Several studies have shown that counseling interventions in patients with ANC positively correlate with weight loss. A study (Althuisen et al., 2013) in the Netherlands comprising 219 women revealed that the New Life counseling intervention was successful in reducing postpartum weight, and weight gain during pregnancy in obese women could be dangerous for babies and mothers. The program consisted of five individual counseling modules (Althuisen et al., 2013). The respondents went to counseling for 36 weeks, meeting in person at 18, 22, 30, and 36 weeks of gestation, and via phone at 8 weeks after giving birth. In line with the GBD 2019 Diseases and Injuries Collaborators (2020), qualitative research revealed that counseling doctors and midwives enthusiastically encouraged them to go to a nutritionist for more in-depth counseling related to pregnancy weight (Perkes et al., 2022). This means that health workers not only discuss the condition of pregnant women, but also direct them to professional health workers according to their scientific fields.

On the other hand, Cole and Roter (2016) revealed that doctors dominated the conversation more than patients, with a total duration of counseling at 64.9 seconds. This research shows that it is important for health workers to listen to patients, and counseling must be carried out in a comprehensive manner. This is done so that counseling can have a positive impact on pregnancy. Effective communication between healthcare providers and patients is crucial in ensuring successful outcomes in pregnancy. By actively listening to patients and engaging in comprehensive counseling sessions, healthcare workers can address concerns, provide necessary information, and ultimately improve the overall experience for expectant mothers.

4.2 Effectiveness of ANC counseling for breastfeeding and nutrition

Prenatal counseling significantly increases the self-efficacy of breastfeeding mothers up to 4 months postpartum and overcomes breastfeeding problems (Shafaei et al., 2020; Mallick et al., 2020). Breastfeeding problems in the postnatal phase include insufficient milk, scarring of nipples, breast abscess, mastitis, and pain. The most frequent issues that affect approximately 20–80% of women include mastitis, breast soreness caused by inflammatory tissue on the nipples, and mothers' concerns about not producing enough milk. Counseling will therefore enable clients to comprehend and address their emotional and relational issues more fully. Breastfeeding counseling includes observation and assessment of breastfeeding, assisting mothers in holding their babies properly, and clinical management of breast problems such as sore nipples, mastitis, and non-existent milk. The theoretical and clinical aspects of breastfeeding have been introduced together in this type of counseling (Shafaei et al., 2020).

An Iranian study (Shafaei et al., 2020) on 108 pregnant women showed that prenatal counseling significantly increased the self-efficacy of breastfeeding mothers up to four months postpartum and overcame breastfeeding problems. This study also revealed that mothers who had previously failed to breastfeed allowed their children to receive exclusive breastfeeding after counseling by midwives and breastfeeding counsellors. Accordingly, a survey by Mallick et al. (2020) revealed that 95% of the health facilities in Haiti and Malawi routinely provide breastfeeding counseling during ANC (Mallick et al., 2020). However, this study also showed that only 40% of health workers in both countries received training related to breastfeeding counseling with only 4–10% of pregnant women receiving counseling. These findings illustrate the importance of counseling training for health workers to provide comprehensive counseling. This is in line with Omer et al. (2020), who found that health workers who were given the Ethiopian Ministry of Health BINLM module II intervention with additional international guideline counseling provided more nutrition-related advice and had better communication skills than the control group. A recent study (Sujata et al., 2022) in India also revealed that individual counseling on an ongoing basis in the antenatal and postnatal periods would significantly increase exclusive breastfeeding and initiation of exclusive breastfeeding.

4.3 Effectiveness of ANC counseling for physical activity

The health of the mother or fetus is not at risk when pregnant women engage in physical activity, which is thought to provide benefits to them (Barakat et al., 2015). Although there is not yet enough data to demonstrate the usefulness of physical activity programs in avoiding gestational diabetes mellitus, physically active pregnant women have also been proven to have a lower risk of this condition (Aune et al., 2014). According to two systematic reviews, exercise helps prevent preeclampsia in women who are still in their early stages of pregnancy. Additionally, a recent systematic analysis showed that exercise can reduce lower back pain and lumbopelvic discomfort (Davenport et al., 2019).

It has been demonstrated that physical activity improves the psychological health of pregnant women. Physically active pregnant women are less likely to have perinatal depression and are more likely to believe that their health is improving than their sedentary counterparts (Gaston and Prapavessis, 2013; Perales et al., 2015). Notably, participation in moderate-intensity exercise from the beginning to the end of pregnancy is not linked to premature labor and has no impact on birth (Barakat et al., 2014). Therefore, the introduction of physical activity programs aimed at pregnant women should be supported to promote physical activity. Before, during, and after pregnancy, women are urged to engage in aerobic and muscle strengthening activities. Swimming, brisk walking, cycling, and aerobic dancing are all forms of suitable exercise (American College of Obstetricians, 2015).

A survey of midwives and nurses in the United States found that 65% of the respondents provided antenatal training counseling to pregnant women. However, in Malaysia, health workers do not counsel pregnant women who have no medical problems or complications from participating in aerobic and muscle-strengthening exercises. A pregnancy exercise module can be an option to increase knowledge and confidence in providing counseling to pregnant women (Azura et al., 2020). This is in line with a previous study by Chan et al. (2019) which small changes in physical activity in the first and second trimesters were the outcome of personalized counseling by a physiotherapist as part of lifestyle intervention. The intervention group was less physically active, likely to be more fat, and scored lower on comprehension tests. Pregnant women need to exercise sufficiently because it has been shown to improve both the mother's and the fetus's health. Therefore, it is advisable to adopt treatments to increase physical activity levels (Chan et al., 2019).

4.4 Effectiveness of ANC counseling to control alcohol consumption, smoking, HIV, and medication usage

Alcohol consumption during pregnancy and lactation leads to adverse health outcomes for both mothers and children, including fetal alcohol spectrum disorders (FASD). Individual beliefs, knowledge/advice, culture, and personal circumstances influence alcohol use during pregnancy (Duko et al., 2022; Popova et al., 2022). Smoking during pregnancy has been associated with an increased risk of stillbirth, premature birth, low birth weight, congenital anomalies such as cleft lip, and sudden infant death syndrome (U.S. Department of Health and Human Services, 2014). A smoking cessation counseling intervention, known as 5As (ask, advise, assess, assist, and arrange), is known to have been effective helping to refrain subjects from smoking. A meta-analysis revealed that women who received smoking cessation counseling were 44% more likely to not smoke during pregnancy than those who received the usual care (Chamberlain et al., 2017).

A survey by Murphy et al. (2020) reported that 84.8% of mothers received counseling covering breastfeeding, 48.4% on alcohol consumption, 47% on smoking and 31.5% on weight gain. Despite being aware of the harmful effects of smoking, one-third of the participants who smoked before becoming pregnant smoked while they were pregnant. The results of this study also show that despite pregnant women reporting the possibility of risky behavior, routine prenatal health counseling is not

provided. Consuming alcohol during pregnancy is potentially harmful as it may result in mental retardation and attention issues (Murphy et al., 2020). Nilsen et al. (2012) compared the effectiveness of the risk drinking counseling model and showed an improvement of 4%.

Several studies related to drug use counseling (Omer et al., 2020; Sujata et al., 2022) and HIV (Barakat et al., 2015; Davenport et al., 2019) have also been conducted. A survey (Devkota et al., 2017) showed that compared to the percentage of awareness and practice, the majority of expectant mothers had a favorable view regarding drug use during pregnancy (Devkota et al., 2017). Before counseling, more than 50% of the participants were aware of the potential risks, but few were aware of the use of prescribed medications. However, 71.6% of the respondents were aware that drugs should not be used during pregnancy because they impair both the mother's and the unborn child's health, but they were less aware of how dangerous they were. Only 30.6% of people were aware that drugs can impair fetal organogenesis. Two results were obtained from substance use screening and counseling interventions included in prenatal care. First, 83% of the pregnant women had prenatal screening results that were positive for drug use. Second, there were obstacles to accessing prenatal care for low-income mothers in their first trimester (Young-Wolff et al., 2020).

Choi et al. (2022) investigated HIV counseling and found that not all pregnant women are informed before testing or given their test results. Many mothers stated that pretest counseling was not given, even though the midwife claimed to have given it. Posttest counseling was mainly provided to those who tested positive, and some midwives agreed not to provide counseling to pregnant women who tested negative for HIV. However, in this study, there was disagreement that HIV testing counseling during ANC is voluntary or mandatory. Midwives also revealed that a lack of adequate infrastructure, communication barriers, and inadequate training were obstacles to counseling. In addition, Bintabara et al. (2021) showed that health facilities are not optimal in quality of provider-initiated HIV testing, counseling for pregnant women during the first ANC visit, and preventing mother-to-child transmission of HIV services.

Many pregnant women continue to use prescription drugs throughout their pregnancy (Perales et al., 2015). Additionally, antibiotics and prescriptions for long-term diseases such as asthma and thyroid issues are the most frequently prescribed pharmaceuticals during pregnancy (Palmsten et al., 2015). The Centers for Disease Control and Prevention (CDC) recommend a systematic strategy for safer drug use during pregnancy (Broussard et al., 2014). Approximately 90% of ANC members receive drug counseling (Krans et al., 2013). This is in line with a survey by The ESHRE Working Group on Ultrasound in ART et al. (2019), which stated that at 34 study sites, the majority of women (89.2%) said they had prenatal counseling regarding which medications were safe to take during pregnancy (Nuñez et al., 2020).

4.5 Effectiveness of ANC counseling to increase husband support

A study was conducted to gauge men's knowledge of the warning signs of obstetric problems in rural Kenya and determine the correlation between knowledge and male demographics. According to these findings, respondents

were skilled at spotting warning indicators of pregnancy problems and had a greater overall understanding (Dunn et al., 2011). However, because maternal mortality is still high throughout Kenya, more research is needed to determine whether or not males use this knowledge to take action. This must be included in the prenatal counseling procedure so that the husband's participation is significant. Numerous African studies have found that decisions concerning childbearing are frequently made by spouses and other family members (Evjen-Olsen et al., 2008; Wegner et al., 2007). Consequently, active partner awareness is required to identify difficulties during pregnancy and labor and to determine when emergency action is necessary.

It is crucial for healthcare providers to involve husbands in prenatal care to ensure better outcomes for both the mother and the baby. By educating men about the risks of maternal mortality and involving them in decision-making, maternal health can be improved. This approach can lead to increased support for pregnant women and ultimately contribute to reducing maternal mortality rates in African communities. Involving husbands in prenatal care can also promote gender equality and shared responsibility in family planning.

5. CONCLUSION

These findings show that counseling performed during the antenatal period is effective in reducing stillbirths. Counseling materials cover weight control, breastfeeding, nutrition, physical activity, alcohol, smoking, HIV, drugs, and safe medication during pregnancy. To date, counseling interventions based on reviews have not maximally involved couples and families. Therefore, a counseling model study is needed that comprehensively involves couples and families so that they can play a role in helping mothers prevent stillbirths. In addition, counseling materials also need to be developed covering practical matters during the pregnancy period such as the sleeping position of the mother and control of fetal movement. Involving couples and families in counseling interventions can potentially lead to better outcomes in preventing stillbirths. By including partners and family members in the counseling process, mothers may receive more support and guidance throughout their pregnancy, ultimately reducing the risk of adverse outcomes. Providing education on recognizing warning signs and seeking prompt medical attention can also play a crucial role in preventing stillbirths. By empowering mothers with knowledge and involving their support system, the likelihood of preventing stillbirths can be significantly increased. Suggestions regarding lifestyle changes, such as quitting smoking and maintaining a healthy diet, can also be included in counseling sessions to further reduce the risk of stillbirth. Additionally, regular prenatal check-ups and monitoring fetal movements can help detect any potential issues early on, allowing for timely intervention to prevent stillbirths.

REFERENCES

- Al-Mutawtah, M., Campbell, E., Kubis, H. P., and Erjavec, M. (2023). Women's experiences of social support during pregnancy: A qualitative systematic review. *BMC Pregnancy and Childbirth*, 23, 782.
- Aleem, S., and Bhutta, Z. A. (2021). Infection-related stillbirth: An update on current knowledge and strategies for prevention. *Expert Review of Anti-Infective Therapy*, 19(9), 1117–1124.
- Althuisen, E., van der Wijden, C. L., van Mechelen, W., Seidell, J. C., and van Poppel, M. N. M. (2013). The effect of a counselling intervention on weight changes during and after pregnancy: A randomised trial. *BJOG: An International Journal of Obstetrics and Gynaecology*, 120(1), 92–99.
- American College of Obstetricians and Gynecologists. (2015). Physical activity and exercise during pregnancy and the postpartum period. Committee Opinion No. 650. *Obstetrics and Gynecology*, 126(6), e135-e142.
- Audina, M. (2018). Pelaksanaan pelayanan antenatal terpadu. *Jurnal Ilmiah Mahasiswa Fakultas Keperawatan*, 3(3), 38–47.
- August, F., Pembe, A. B., Mpembeni, R., Axemo, P., and Darj, E. (2016). Community health workers can improve male involvement in maternal health: Evidence from rural Tanzania. *Global Health Action*, 9(1), 30064.
- Aune, D., Saugstad, O. D., Henriksen, T., and Tonstad, S. (2014). Physical activity and the risk of preeclampsia: A systematic review and meta-analysis. *Epidemiology*, 25(3), 331–343.
- Azura, I. N., Azlina, I., Rosnani, Z., and Norhayati, M. N. (2020). Effectiveness of an antenatal-exercise counseling module on knowledge and self-efficacy of nurses in Northeast Peninsular Malaysia: A quasi-experimental study. *The Malaysian Journal of Medical Sciences*, 27(3), 84–92.
- Babaheidarian, F., Masoumi, S. Z., Sangestani, G., and Roshanaei, G. (2021). The effect of family-based counseling on domestic violence in pregnant women referring to health centers in Sahneh city, Iran, 2018. *Annals of General Psychiatry*, 20, 11.
- Barakat, R., Pelaez, M., Montejo, R., Refoyo, I., and Coterón, J. (2014). Exercise throughout pregnancy does not cause preterm delivery: A randomized, controlled trial. *Journal of Physical Activity and Health*, 11(5), 1012–1017.
- Barakat, R., Perales, M., Garatachea, N., Ruiz, J. R., and Lucia, A. (2015). Exercise during pregnancy. A narrative review asking: What do we know? *British Journal of Sports Medicine*, 49(21), 1377–1381.
- Berglas, N. F., Williams, V., Mark, K., and Roberts, S. C. M. (2018). Should prenatal care providers offer pregnancy options counseling? *BMC Pregnancy and Childbirth*, 18, 384.
- Bintabara, D., Lilungulu, A., Jumanne, S., Nassoro, M. M., and Mpondo, B. C. (2021). Does facility readiness promote high-quality of provider-initiated HIV testing and counseling to pregnant women? A national survey for improving policy of prevention of mother-to-child transmission of HIV in Tanzania. *AIDS Research and Therapy*, 18, 38.
- Broussard, C. S., Frey, M. T., Hernandez-Diaz, S., Greene, M. F., Chambers, C. D., Sahin, L., Collins Sharp, B. A., and Honein, M. A. (2014). Developing a systematic approach to safer medication use during pregnancy: Summary of a Centers for Disease Control and Prevention-convened meeting. *American Journal of Obstetrics and Gynecology*, 211(3), 208–214.



- Chamberlain, C., O'Mara-Eves, A., Porter, J., Coleman, T., Perlen, S. M., Thomas, J., and McKenzie, J. E. (2017). Psychosocial interventions for supporting women to stop smoking in pregnancy. *Cochrane Database of Systematic Reviews*, 2, CD001055.
- Chan, C. W. H., Au Yeung, E., and Law, B. M. H. (2019). Effectiveness of physical activity interventions on pregnancy-related outcomes among pregnant women: A systematic review. *International Journal of Environmental Research and Public Health*, 16(10), 1840.
- Choi, W. A., Sakeah, E., Oduro, A. R., Aburiya, J. B. A., and Aborigo, R. A. (2022). Compliance to HIV testing and counseling guidelines at antenatal care clinics in the Kassena-Nankana districts of northern Ghana: A qualitative study. *PLOS One*, 17(9), e0274871.
- Christou, A., Alam, A., Sadat Hofiani, S. M., Rasooly, M. H., Mubasher, A., Rashidi, M. K., Dibley, M. J., and Raynes-Greenow, C. (2020). Understanding pathways leading to stillbirth: The role of care-seeking and care received during pregnancy and childbirth in Kabul province, Afghanistan. *Women and Birth*, 33(6), 544–555.
- Cole, K. O. W., and Roter, D. L. (2016). Starting the conversation: Patient initiation of weight-related behavioral counseling during pregnancy. *Patient Education and Counseling*, 99(10), 1603–1610.
- Comrie-Thomson, L., Tokhi, M., Ampt, F., Portela, A., Chersich, M., Khanna, R., and Luchters, S. (2015). Challenging gender inequity through male involvement in maternal and newborn health: Critical assessment of an emerging evidence base. *Culture, Health and Sexuality*, 17(S2), 177–189.
- Cronin, R. S., Li, M., Thompson, J. M. D., Gordon, A., Raynes-Greenow, C. H., Heazell, A. E. P., Stacey, T., Culling, V. M., Bowring, V., Anderson, N. H., O'Brien, L. M., Mitchell, E. A., Askie, L. M., and McCowan, L. M. E. (2019). An individual participant data meta-analysis of maternal going-to-sleep position, interactions with fetal vulnerability, and the risk of late stillbirth. *eClinicalMedicine*, 10, 49–57.
- Danna, V. A., Lavender, T., Laisser, R., Chimwaza, A., Chisuse, I., Kasengele, C. T., Kimaro, D., Kuzenza, F. D., Lyangenda, K., Mwamadi, M., Shayo, H., Tuwele, K., Wakasiaka, S., and Bedwell, C. (2023). Exploring the impact of healthcare workers communication with women who have experienced stillbirth in Malawi, Tanzania and Zambia. A grounded theory study. *Women and Birth*, 36(1), e25–e35.
- Davenport, M. H., Marchand, A.-A., Mottola, M. F., Poitras, V. J., Gray, C. E., Garcia, A. J., Barrowman, N., Sobierajski, F., James, M., Meah, V. L., Skow, R. J., Riske, L., Nuspl, M., Nagpal, T. S., Courbalay, A., Slater, L. G., Adamo, K. B., Davies, G. A., Barakat, R., and Ruchat, S. M. (2019). Exercise for the prevention and treatment of low back, pelvic girdle and lumbopelvic pain during pregnancy: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 53(2), 90–98.
- Devkota, R., Khan, G. M., Alam, K., Sapkota, B., and Devkota, D. (2017). Impacts of counseling on knowledge, attitude and practice of medication use during pregnancy. *BMC Pregnancy and Childbirth*, 17, 131.
- Duko, B., Bedaso, A., Wolka, S., Tantu, T., Wolde, D., and Ayano, G. (2022). The prevalence of alcohol consumption among pregnant women in Ethiopia: A systematic review and meta-analysis. *Maternal and Child Health Journal*, 26, 1800–1810.
- Dunn, A., Haque, S., and Innes, M. (2011). Rural Kenyan Men's awareness of danger signs of obstetric complications. *Pan African Medical Journal*, 10, 39.
- Evjen-Olsen, B., Hinderaker, S. G., Lie, R. T., Bergsjø, P., Gasheka, P., and Kvåle, G. (2008). Risk factors for maternal death in the highlands of rural northern Tanzania: A case-control study. *BMC Public Health*, 8, 52.
- Fakhraei, R., Denize, K., Simon, A., Sharif, A., Zhu-Pawlowsky, J., Dingwall-Harvey, A. L. J., Hutton, B., Pratt, M., Skidmore, B., Ahmadzai, N., Heslehurst, N., Hayes, L., Flynn, A. C., Velez, M. P., Smith, G., Lanes, A., Rybak, N., Walker, M., and Gaudet, L. (2022). Predictors of adverse pregnancy outcomes in pregnant women living with obesity: A systematic review. *International Journal of Environmental Research and Public Health*, 19(4), 2063.
- Finlayson, K., Downe, S., Hinder, S., Carr, H., Spiby, H., and Whorwell, P. (2015). Unexpected consequences: Women's experiences of a self-hypnosis intervention to help with pain relief during labour. *BMC Pregnancy and Childbirth*, 15, 229.
- Gaston, A., and Prapavessis, H. (2013). Tired, moody and pregnant? Exercise may be the answer. *Psychology and Health*, 28(12), 1353–1369.
- GBD 2019 Diseases and Injuries Collaborators. (2020). Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: A systematic analysis for the global burden of disease study 2019. *Lancet*, 396, 1135–1159.
- Geurtzen, R., Van Heijst, A., Hermens, R., Scheepers, H., Woiski, M., Draaisma, J., and Hogeveen, M. (2018). Preferred prenatal counselling at the limits of viability: A survey among Dutch perinatal professionals. *BMC Pregnancy and Childbirth*, 18, 7.
- Hadibarata, T., Syafiuddin, A., Al-Dhabaan, F. A., Elshikh, M. S., and Rubiyatno. (2018). Biodegradation of Mordant orange-1 using newly isolated strain *Trichoderma harzianum* RY44 and its metabolite appraisal. *Bioprocess and Biosystems Engineering*, 41, 621–632.
- Haws, R. A., Yakoob, M. Y., Soomro, T., Menezes, E. V., Darmstadt, G. L., and Bhutta, Z. A. (2009). Reducing stillbirths: Screening and monitoring during pregnancy and labour. *BMC Pregnancy and Childbirth*, 9(Supplement 1), S5.
- Høgh, S., Wolf, H. T., von Euler-Chelpin, M., Huusom, L., Pinborg, A., Tabor, A., and Hegaard, H. K. (2020). Multivitamin use and risk of preeclampsia in a high-income population: A cohort study. *Sexual and Reproductive Healthcare*, 24, 100500.
- Holt, K., Janiak, E., McCormick, M. C., Lieberman, E., Dehlendorf, C., Kajeepeta, S., Caglia, J. M., and Langer, A. (2017). Pregnancy options counseling and abortion referrals among US primary care physicians: Results from a national survey. *Family Medicine*, 49(7), 527–536.
- Kim, U. O., Barnekow, K., Ahamed, S. I., Dreier, S., Jone, C., Taylor, M., Hasan, M. K., and Basir, M. A. (2021). Smartphone-based prenatal education for parents with preterm birth risk factors. *Patient Education and Counseling*, 102(4), 701–708.
- Krans, E. E., Davis, M. M., and Schwarz, E. B. (2013). Psychosocial risk, prenatal counseling and maternal behavior: Findings from PRAMS, 2004–2008. *American Journal of Obstetrics and Gynecology*, 208(2), 141.e1–141.e7.

- Leppänen, T., Töyräs, J., Muraja-Murro, A., Kupari, S., Tiihonen, P., Mervaala, E., and Kulkas, A. (2016). Length of individual apnea events is increased by supine position and modulated by severity of obstructive sleep apnea. *Sleep Disorders*, 2016(1), 9645347.
- Lorenz, L., Krebs, F., Nawabi, F., Alayli, A., and Stock, S. (2022). Preventive counseling in routine prenatal care—A qualitative study of pregnant women's perspectives on a lifestyle intervention, contrasted with the experiences of healthcare providers. *International Journal of Environmental Research and Public Health*, 19(10), 6122.
- Loughnan, S. A., Boyle, F. M., Ellwood, D., Crocker, S., Lancaster, A., Astell, C., Dean, J., Horey, D., Callander, E., Jackson, C., Shand, A., and Flenady, V. (2022). Living with loss: Study protocol for a randomized controlled trial evaluating an internet-based perinatal bereavement program for parents following stillbirth and neonatal death. *Trials*, 23, 464.
- Mallick, L., Benedict, R. K., and Wang, W. (2020). Facility readiness and counseling during antenatal care and the relationship with early breastfeeding in Haiti and Malawi. *BMC Pregnancy and Childbirth*, 20, 325.
- McClure, E. M., Saleem, S., Goudar, S. S., Tikmani, S. S., Dhaded, S. M., Hwang, K., Guruprasad, G., Shobha, D., Sarvamangala, B., Yogeshkumar, S., Somannavar, M. S., Roujani, S., Reza, S., Raza, J., Yasmin, H., Aceituno, A., Parlbeg, L., Kim, J., Bann, C. M., ... Robert M Silver, R. M., (2022). The causes of stillbirths in south Asia: Results from a prospective study in India and Pakistan (PURPOSE). *The Lancet Global Health*, 10(7), e970–e977.
- Morón-Duarte, L. S., Ramirez Varela, A., Segura, O., and Freitas Da Silveira, M. (2019). Quality assessment indicators in antenatal care worldwide: A systematic review. *International Journal for Quality in Health Care*, 31(7), 497–505.
- Murphy, M., McHugh, S., O'Keeffe, L. M., Greene, R. A., Corcoran, P., and Kearney, P. M. (2020). Preventive health counselling during antenatal care using the pregnancy risk assessment monitoring system (PRAMS) in Ireland. *BMC Pregnancy and Childbirth*, 20, 98.
- Murray-Davis, B., Berger, H., Melamed, N., Mawjee, K., Syed, M., Barrett, J., Ray, J. G., Geary, M., and McDonald, S. D. (2020). Gestational weight gain counselling practices among different antenatal health care providers: A qualitative grounded theory study. *BMC Pregnancy and Childbirth*, 20, 102.
- Nilsen, P., Skagerström, J., Rahmqvist, M., Hultgren, E., and Blomberg, M. (2012). Alcohol prevention in Swedish antenatal care: effectiveness and perceptions of the risk drinking project counseling model. *Acta Obstetrica et Gynecologica Scandinavica*, 91(6), 736–743.
- Núñez, P. A., Fernández, M. S., Turjanski, P., Pérez, A., Rivero, M. R., De Angelo, C., Salomón, O. D., and Cueto, G. (2020). Substantial reduction in child stunting is differentially associated to geographical and socioeconomic disparities in Misiones province, Argentina. *Tropical Medicine and International Health*, 25(7), 874–885.
- Omer, A. M., Haile, D., Shikur, B., Macarayan, E. R., and Hagos, S. (2020). Effectiveness of a nutrition education and counselling training package on antenatal care: A cluster randomized controlled trial in Addis Ababa. *Health Policy and Planning*, 35(Supplement 1), i65–i75.
- Ota, E., da Silva Lopes, K., Middleton, P., Flenady, V., Wariki, W. M. V., Rahman, M. O., Tobe-Gai, R., and Mori, R. (2020). Antenatal interventions for preventing stillbirth, fetal loss and perinatal death: An overview of Cochrane systematic reviews. *Cochrane Database of Systematic Reviews*, 12(12), CD009599.
- Palmsten, K., Hernández-Díaz, S., Chambers, C. D., Mogun, H., Lai, S., Gilmer, T. P., and Huybrechts, K. F. (2015). The most commonly dispensed prescription medications among pregnant women enrolled in the U.S. Medicaid Program. *Obstetrics and Gynecology*, 126(3), 465–473.
- Perales, M., Refoyo, I., Coterón, J., Bacchi, M., and Barakat, R. (2015). Exercise during pregnancy attenuates prenatal depression: A randomized controlled trial. *Evaluation and the Health Professions*, 38(1), 59–72.
- Perkes, S. J., Huntriss, B., Skinner, N., Leece, B., Dobson, R., Mattes, J., Hall, K., and Bonevski, B. (2022). Development of a maternal and child mHealth intervention with aboriginal and Torres Strait islander mothers: Co-design approach. *JMIR Formative Research*, 6(7), e33541.
- Phommachanh, S., Essink, D. R., Wright, E. P., Broerse, J. E. W., and Mayxay, M. (2019). Do health care providers give sufficient information and good counseling during ante-natal care in Lao PDR?: An observational study. *BMC Health Services Research*, 19, 449.
- Popova, S., Dozet, D., Akhand Laboni, S., Brower, K., and Temple, V. (2022). Why do women consume alcohol during pregnancy or while breastfeeding? *Drug and Alcohol Review*, 41(4), 759–777.
- Roberts, L., Renati, S. J., Solomon, S., and Montgomery, S. (2021). Stillbirth and infant death: Mental health among low-income mothers in Mumbai. *BMC Pregnancy and Childbirth*, 21, 292.
- Robertson, N., Okano, S., and Kumar, S. (2020). Sleep in the supine position during pregnancy is associated with fetal cerebral redistribution. *Journal of Clinical Medicine*, 9(6), 1773.
- Shafaei, F. S., Mirghafourvand, M., and Havizari, S. (2020). The effect of prenatal counseling on breastfeeding self-efficacy and frequency of breastfeeding problems in mothers with previous unsuccessful breastfeeding: a randomized controlled clinical trial. *BMC Women's Health*, 20, 94.
- Sharma, R., and Kaushik, H. (2021). Micro-plastics: an invisible danger to human health. *CGC International Journal of Contemporary Technology and Research*, 3(2), 182–186.
- Suandi, D., Williams, P., and Bhattacharya, S. (2020). Does involving male partners in antenatal care improve healthcare utilisation? Systematic review and meta-analysis of the published literature from low- and middle-income countries. *International Health*, 12(5), 484–498.
- Sujata, S., Das, K., Mukhopadhyay, K., Kaur, S., and Rohilla, M. (2022). Effect of antenatal and postnatal individualized counseling of mothers on exclusive human milk feeding in preterm infants during hospital stay and at discharge: A randomized controlled trial. *Journal of Neonatal Nursing*, 28(1), 31–36.
- The ESHRE Working Group on Ultrasound in ART., D'Angelo, A., Panayotidis, C., Amso, N., Marci, R., Matorras, R., Onofriescu, M., Turp, A. B., Vandekerckhove, F., Veleza, Z., Vermeulen, N., and Vlasisavljevic, V. (2019). Recommendations for good practice in ultrasound:

- Oocyte pick up. *Human Reproduction Open*, 2019(4), hoz025.
- Tsimbos, C., Verropoulou, G., and Petropoulou, D. (2021). Economic crisis and stillbirth ratios: Evidence from Southern Europe. *PLOS One*, 16(11), e0259623.
- U.S. Department of Health and Human Services. (2014). *The Health Consequences of Smoking—50 years of progress: A report of the surgeon general*. Atlanta: U.S. Department of Health and Human Services, pp. 1–943.
- Wang, B., Lin, Q., Wang, Y., and Tang, S. (2023). Policy analysis of the integration of sports and medicine against the backdrop of “Healthy China”: A qualitative study using NVivo. *International Journal of Environmental Research and Public Health*, 20(3), 2079.
- Warland, J., and Glover, P. (2019). Tertiary education regarding stillbirth for student midwives: The tears 4 SMS project. *Women and Birth*, 32(3), e409–e412.
- Warland, J., Mitchell, E. A., and O'Brien, L. M. (2017). Novel strategies to prevent stillbirth. *Seminars in Fetal and Neonatal Medicine*, 22(3), 146–152.
- Wastnedge, E., Waters, D., Murray, S. R., McGowan, B., Chipeta, E., Nyondo-Mipando, A. L., Gadama, L., Gadama, G., Masamba, M., Malata, M., Taulo, F., Dube, Q., Kawaza, K., Khomani, P. M., Whyte, S., Crampin, M., Freyne, B., Norman, J. E., and Reynolds, R. M. (2021). Interventions to reduce preterm birth and stillbirth, and improve outcomes for babies born preterm in low and middle-income countries: A systematic review. *Journal of Global Health*, 11, 04050.
- Watt, M. H., Knippler, E. T., Minja, L., Kisigo, G., Knettel, B. A., Ngocho, J. S., Renju, J., Osaki, H., Mwamba, R., Rogathi, J. J., and Mmbaga, B. T. (2019). A counseling intervention to address HIV stigma at entry into antenatal care in Tanzania (Maisha): Study protocol for a pilot randomized controlled trial. *Trials*, 20, 807.
- Wegner, M. N., Ruminjo, J., Sinclair, E., Pessoa, L., and Mehta, M. (2007). Improving community knowledge of obstetric fistula prevention and treatment. *International Journal of Gynecology and Obstetrics*, 99(Supplement 1), S108–S111.
- WHO. (2023). Improving maternal and newborn health and survival and reducing stillbirth. progress report 2022. Geneva: World Health Organization, pp. 1–33.
- Woolner, A. M. F., and Bhattacharya, S. (2015). Obesity and stillbirth. *Best Practice and Research Clinical Obstetrics and Gynaecology*, 29(3), 415–426.
- Young-Wolff, K. C., Tucker, L.-Y., Armstrong, M. A., Conway, A., Weisner, C., and Goler, N. (2020). Correlates of pregnant women's participation in a substance use assessment and counseling intervention integrated into prenatal care. *Maternal and Child Health Journal*, 24, 423–431.
- Zandam, H., Akobirshoev, I., Nandakumar, A., and Mitra, M. (2021). Utilization of HIV testing and counselling services by women with disabilities during antenatal care in Uganda: Analysis of 2016 demographic and health survey. *BMC Public Health*, 21, 1984.
- Zhu, J., Zhang, J., Xia, H., Ge, J., Ye, X., Guo, B., Liu, M., Dai, L., Zhang, L., Chen, L., Wang, Y., Wang, X., Liu, H., Chen, C., Wang, Y., Wang, G., Cai, M., Yang, X., Li, F., ... Zhang, J. (2021). Stillbirths in China: A nationwide survey. *BJOG: An International Journal of Obstetrics and Gynaecology*, 128(1), 67–76.