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Experience and Challenges Related to the Implementation of Low Birth Weight Programs in Indonesia: Perspectives from Health Care Cadres

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Abstract Low birth weight (LBW) presents children with a higher risk of health problems and complications over their life course. Prevention efforts are largely carried out through health promotion programs for pregnant mothers, including monitoring those deemed to be at risk, measuring nutritional status, and ensuring timely prenatal care. These programs rely on community health workers—or 'cadres' as they are known in Indonesia—who serve as intermediaries between the health system and the community. However, cadres often face challenges in carrying out their duties which can impact the effectiveness of LBW prevention program implementation. This study aimed to explore experiences and challenges in implementing LBW prevention programs for cadres. A qualitative study design with a descriptive phenomenological approach was used, which included a semi-structured interview guide. In-person interviews (n=11) were conducted with cadres who were active in the community and had at least one-year of experience. Interviews were recorded and transcribed, and analyzed using inductive content analysis. Our analyses revealed two main themes: (1) experiences associated with the implementation of LBW prevention programs and (2) perceived challenges. Unsurprisingly, we found that the perceived challenges faced by cadres in our sample greatly influenced the potential impact of LBW prevention programs for pregnant women in this community. There is great need to increase the capacity and continued education of cadres in order to support them in their role and prevent future LBW cases for mothers and infants.

Keywords Low Birth Weight, Healthcare Cadres, Indonesia, Prevention Programs, Qualitative

1. Introduction

Low birth weight (LBW) constitutes a complex public health challenge that can lead to child mortality, disability, cognitive impairment, infectious disease, and the later onset of chronic illness as a result of the condition [1]. The prevalence of LBW remains high in developing countries, and Indonesia is ranked ninth in the world with the number of cases of LBW at 15.5% of births each year [2].

The prevention and control of LBW typically involve health education or health promotion efforts targeted at pregnant mothers [3]; monitoring pregnant women, especially those identified as being at risk; preventing hypothermia in babies to help normal growth; measuring the nutritional status of the pregnant mother; and performing prenatal care regularly and in a timely manner

[4-8].

These efforts rely on community health workers—or 'cadres' as they are known in Indonesia. Cadres serve as intermediaries between the health system and the community, and they often become the trusted faces of Community Health Centers ('*Puskesmas*') [9,10]. In this role, cadres carry out multiple forms of health care, including nutritional training, mother and child screening and services, counseling on the care of newborn babies, and advice on signs of danger for pregnant mothers and babies [11-13]. Given their breadth of knowledge and experience, cadres are often authorized to entirely manage local prevention programs such as those targeting LBW [14]. Ensuring cadres feel supported in doing so, and receive their own continuing education to enhance their knowledge and skills, can help to increase their motivation for their work and subsequent success [15,16].

That said, it is important to understand and contextualize the challenges faced by cadres in fulfilling their roles and duties. Research has shown that motivation, competence, and commitment influence the performance of cadres [17-19], in addition to scarce monitoring, lack of healthcare facilities in the community, and challenges with data reporting systems [20]. Little research in this area has focused on challenges specific to cadres working with mothers to promote LBW prevention, however. This gap must be filled in order to ensure the cadres leading community LBW prevention programs are equipped with the tools needed to mitigate implementation barriers and result in successful prevention. Therefore, we conducted a qualitative study to explore the experiences and challenges to implementation of LBW prevention programs perceived by cadres, with the ultimate goal of informing future programming efforts in Indonesia and reducing incidence of LBW in this setting.

2. Materials and Methods

2.1. Study Setting

The present study was conducted in Kulon Progo Regency which has the highest incidence rate of LBW in Indonesia. Data were collected in person at the Nanggulan Public Health Center, District of Kulon Progo, from November to December 2023. Based on publicly available data from the Kulon Progo District Health Office, the prevalence of LBW incidents in this region in 2022 was 287 cases (6.98%), with the highest prevalence at the Nanggulan Health Center totaling 27 cases (9.38%).

2.2. Study Design

We conducted a qualitative approach with a descriptive phenomenological design that attempts to describe life and health framework actions in the prevention program of LBW with semi-structured face-to-face interviews conducted with 11 cadres who were purposively sampled and recruited. Inclusion criteria were: (1) cadres who identified as active healthcare personnel with at least one year's experience; (2) cadres who specifically work with mothers and infants; (3) cadres who did not currently exhibit any physical limitations to participating; and (4) cadres who were willing and able to provide consent. Interviews were conducted at one timepoint for each participant, and ranged in completion time from 45 to 60 minutes. First, the purpose of the study was explained to the participants, and consent was obtained prior the start of the interview. We carried out the Consolidation Criteria for Qualitative Research Reporting (COREQ), which covers qualitative research reporting using interviews and helps to ensure explicit and comprehensive reporting [21].

Semi-structured interviews were used to collect data to obtain in-depth information and allow cadres to share their experiences openly. We created interview questions including the following stages: (1) Determining the main themes that are in line with the research objectives; (2) Creating a list of initial questions; (3) Verifying the relevance of the questions; and (4) Conducting a pilot test with initial participants to adjust the language and ensure the clarity of the questions.

To ensure privacy and a comfortable atmosphere, interviews were conducted at the community courthouse. Sociodemographic data were collected as part of the interview process. Interviews were recorded, and field notes were taken to verify non-verbal responses. Audio recordings were transcribed immediately. Then, interview transcripts were returned to the participants for confirmation before encoding. The semi-structured interview guide consisted of ten open questions developed by the researchers (see Table 1).

2.3. Data Analysis

The recorded interviews were analyzed using inductive content analysis, which involves an abstraction process to minimize and group data so that the researcher can answer the research questions using concepts, categories, or themes [22]. Thematic analysis was conducted by listening to the recorded interviews and carefully reading their transcriptions and notes to identify initial codes, phrases, or sentences that fit a particular code, and labeling these for interpretation. Emerging themes were identified and reviewed carefully, along with emerging subthemes and relationships between categories used to describe the phenomenon being studied. The results are presented with verbatim quotes from participants after being thoroughly verified.

Table 1. Interview guide

1.	What do you understand about the types of LBW prevention programs?
2.	What is the purpose of the LBW prevention program that is being implemented?
3.	Where did you get information about the program for LBW prevention?
4.	What is your contribution to the LBW prevention program as a cadre? How was your experience while implementing the program?
5.	What are the activities related to the practice in the LBW prevention program?
6.	What activities are related to providing education in the LBW prevention program?
7.	What are the activities related to detecting and monitoring pregnant women at risk?
8.	How is the implementation of the LBW prevention program in the community assessed, in your opinion?
9.	What obstacles did you experience while being a cadre related to LBW prevention efforts?
10.	Do you need help providing community facilities and health services?

2.4. Quality Control

Data triangulation was conducted to increase the research findings' trustworthiness. The triangulation technique in this study used source triangulation by conducting interviews with the person in charge of the Maternal and Child Health Polyclinic and three pregnant women. Member and peer review of transcripts and themes was conducted to ensure the credibility and confirmability aspects of the established themes. The dependability and transferability aspects were obtained through comprehensive field notes.

2.5. Ethical Consideration

Ethical approval for this study was issued by the Research Ethics Committee of Alma Ata University (Number: KE/AA/XI/10111296/EC/2023). Written informed consent was obtained from all study participants before the interview. An information sheet about the purpose, procedure, affiliation, benefits, and risks of the study was provided to all participants. Data privacy and confidentiality were ensured by providing initials without including identifiable information, and an individual's right to refuse to answer questions or participate was communicated before the interview. All study participants were verbally informed about the study's purpose, procedure, and benefits during the first meeting with the researcher. Participants were assured that there would be no harm and that all information collected would be kept confidential. Interviews were conducted at the participants' homes to ensure a neutral and comfortable environment. During the interviews, participants' right to privacy was respected, and they were informed that they could stop the interview at any time if they desired.

3. Results

Eleven cadres were interviewed, ranging in age from 29 to 56 years old. Two cadres had an elementary school education, eight cadres had a senior high school education, and one cadre had a junior high school education. Most (n=9) cadres had experience of more than ten years, and the remaining two had experience under five years. All cadres were involved in the LBW prevention program, namely four cadres as members, and seven cadres as coordinator in the village (Table 2).

3.1. Overview of the Implementation of the LBW Prevention Program

We found two main themes and seven sub-themes. The first main theme pertained to participants' experiences implementing current LBW prevention programs and several key roles they serve in.

Sub-Theme 1: Aspects of LBW Prevention Programs

All participants discussed the various aspects that play into programs related to LBW prevention based on their familiarity and experiences. In particular, they described how each program aspect was carried out, and how certain goals or objectives were achieved:

…"For pregnant women, additional food is provided every month from the village budget; there is also self-help from the community at the Posyandu for pregnant women and toddlers"… (P1).

…"Monitoring pregnant women is done every month. Later, there will be recording and reporting for pregnant women that we will continue to monitor"… (P6).

…"There are classes for pregnant women, additional food provided from the village hall and health center, and then there is "Kelambu Siti." The class for pregnant women has been running for a long time, sis. Later, it will be gathered at the village hall, and there will be direction from the health center midwife"… (P2).

… "Kelambu Siti, too, that is a group for high-risk mothers. Later visits to pregnant women will be carried out, screening will be carried out, blood pressure, upper arm circumference, weight will be measured, and at most, asking about hemoglobine"… (P3).

… "There is also TPK, which is also mentoring. It is actually not much different from "Kelambu Siti," but if TPK has a routine report such as how old the pregnant woman is and what her complaints are, then the midwife will follow up, like that"… (P7).

... "Prevention is routine pregnancy check-ups, integrated ANC must be routine, continue consuming sufficient nutritious food"... (P9).

Sub-Theme 2: Understanding the Program Objectives

Participants highlighted the importance of understanding the objectives of LBW prevention programs in order to carry out their duties appropriately:

... "The goal is to prevent stunting, miss. What is clear is to reduce LBW as well"... (P3).

... "Then we can appeal to pregnant women so that their babies are not born prematurely"... (P4).

... "In order to reduce the risk, pregnant women with high risk like that can be treated immediately"... (P8).

... "Yes, so that the baby will be normal and the growth can be maximized, and to create a generation that is of higher quality and healthier"... (P9).

... "Eee, the infant mortality rate is also low to prevent stunting"... (P11).

Sub-Theme 3: Sources of Information Available to Cadres

All participants described the different sources of information available to cadres to support them in effective implementation. Importantly, cadres noted seeking out sources of information independently when health cadres they felt their knowledge was lacking in a certain area. Most participants shared that sources of information on LBW prevention programs could be obtained from groups, including counseling from the Health Center, training, village officials, National Population and Family Planning Agency *(called ''BKKBN"),* Family Planning Field Officer (*called "PLKB"),* Kulon Progo Health Office, discussions with fellow cadres, and discussions with health workers.

... "Finding out for ourselves, then from here we were also given information from BKKBN"... (P1).

... "There was a presentation of material from the health center. If in the village hall, it is also from the health center. If from the health office, it will also be in the village hall. For cadres, the presentation can be 2-3 times a year"... (P2).

... "If during the gathering, the presentation is probably from the PLKB"... (P4).

... "direct discussion with the midwife and also discussion with other cadres"... (P7).

... then usually also from the WA Group, the material is shared, sometimes the Public Health share and also discuss in the WA Group"... (P10).

... "Another source is from brochures. Usually, the Health Center likes to give brochures like that"... (P5).

Table 2. Sociodemographic characteristics of participating cadres (N=11)

Participants	Characteristics			
	Age (years)	Education Attainment	Time as A Cadre (years)	Involvement in the LBW Prevention Program
P1	53	Senior High School	24	Yes (Coordinator in the village)
P2	48	Elementary School	18	Yes (Coordinator in the village)
P3	45	Senior High School	17	Yes (Member)
P4	43	Senior High School	13	Yes (Coordinator in the village)
P5	53	Senior High School	14	Yes (Coordinator in the village
P6	43	Senior High School	4	Yes (Member)
P7	37	Senior High School	13	Ya (Coordinator in the village)
P8	56	Senior High School	21	Ya (Coordinator in the village)
P9	33	Junior High School	15	Yes (Coordinator in the village)
P10	44	Elementary School	10	Yes (Member)
P11	29	Senior High School	3	Yes (Member)

Sub-Theme 4: Experience of Cadres in Implementation

Several specific experiences were discussed among the cadres, including accompanying pregnant and postpartum mothers to various activities and visiting pregnant women. In addition, cadres talked about their involvement in the Supplementary Feeding program (*called "PMT*), classes for pregnant women, the "Kelambu Siti" activity, the "Posyandu" for pregnant women and toddlers, the TPK, and the adolescent "Posyandu". Activities include monitoring and examination visits to pregnant women at risk, mentoring cadres, health education to families and providing iron tablets to young women.

... "accompaniment in the TPK team, monitoring pregnant women, visiting pregnant women, that's what I'm directly involved in"... (P11).

"Yes, that's it, my experience in providing PMT for pregnant women and toddlers"... (P6).

... "Yes, in this LBW program, my experience is in the pregnant women's class, Kelambu Siti, assistance and monitoring"... (P7).

"If the current experience is more detailed, it is more organized. If the previous experience was not organized, maybe it was just the pregnancy or the baby if the current experience is more detailed" (P9).

Sub-Theme 5: The Role of Cadres in the Low Birth Weight Prevention Program

The role carried out by health cadres in implementing the LBW prevention program will differ from one to another. Many things influence the practice of health cadres in the program. This can be seen from the description of participants in expressing the description of the role of health cadres regarding the LBW prevention program, including home visits, health education activities, LBW prevention program training, and high-risk detection practices for pregnant women, as stated below:

... "When we make home visits, accompany and monitor pregnant women, almost 100% of the cadres can do it, although now I take turns so that everyone can do it"... (P1).

... "Later we will visit and then carry out examinations and education, usually to maintain the diet and PHBS, later there will be education with the family"... (P2).

... "Our education often conveys about adequate nutrition for pregnant women too"... (P5).

... "For the 'Kelambu Siti' cadre training..." (P8).

... "I monitor it directly. I asked if the mother was at high risk and if the Puskesmas would monitor her; I also asked directly about her last examination and what her complaints were now. Then the TPK team and other cadres visited the pregnant woman's house to monitor and accompany her"... (P11).

Sub-Theme 6: Assessment of Program Implementation

Cadres emphasized assessment of implementation as being important for understanding areas for improvement. Some shared that they felt the program they were implementing was effective and provided benefits, while others felt their program was not on target to achieve its intended objectives.

... "The forms of negative and positive assessments from participants regarding the LBW prevention program that have been identified include: the program is considered effective; the program provides benefits; the PMT program is not on target. This is as stated in the following participant statements:e, yes it is effective, there are programs like that, "Kelambu Siti," pregnant women's classes for the LBW program"... (P4).

... "can reduce stunting with this assistance, because there has been assistance in stages from an early age"... (P7).

..." really reduces infant mortality and maternal mortality rates"... (P8).

"Yes, there are still things that need to be improved in the provision of PMT"... (P10).

3.2. Challenges Related to the Implementation of Low Birth Weight Programs

The second main theme pertained to participants' experiences navigating challenges related to implementing LBW prevention programs.

Sub-Theme 7: Challenges to LBW Prevention Programs

Participants in the implementation of the LBW prevention program described barriers and challenges. The obstacles to the LBW prevention program expressed by participants were: the approach of pregnant women; monitoring the implementation of pregnant women towards the program; low program knowledge; reporting problems; limited communication tools; and road conditions. The challenges felt by health cadres are providing health education, demands to learn, attitudes of pregnant women, low self-confidence, and public speaking. Providing health education is one of the challenges for health cadres in implementing LBW prevention programs; this is largely due to low self-confidence, limited public speaking, and attitudes of pregnant women who refuse. The demand to continue learning is a challenge for cadres because science continues to develop. This statement can be seen in the following participant's statement quote:

... "Maybe the obstacle is approaching the pregnant women and then motivating the working pregnant women. Because the schedule is difficult, they have to be motivated to have regular ANC, too"... (P1).

... "Then there are those who don't have WA, so communication is difficult, it's difficult to monitor"... (P6).

... "The obstacle during implementation is the road conditions for visits to their homes"... (P8).

... "Well, that's just knowledge, that I feel is not adequate, apart from maybe the pregnant women who are difficult"... (P9).

... "I also think about how to make education comfortable and acceptable to pregnant women. Sometimes, visits to pregnant women's homes for monitoring must involve a little education, so the hard part is how to make it comfortable so that it can be accepted"... (P4).

... "For me, the challenge is a lack of self-confidence; when I'm at the Health Center, I'm given a lot of questions and told to answer them"... (P7).

... "Regarding the program, the challenge is that you have to be willing to learn, activities for toddlers, the elderly, pregnant women, all of them have to be followed, right?... (P8).

The more competent party, the head of the Maternal and Child Health Polyclinic, confirmed that the Nanggulan Public Health Center had explained the LBW prevention program and its objectives. The Maternal and Child Health Polyclinic also affirmed the correctness of the LBW prevention program, the cadres' knowledge and ability to implement it, and their communication of the challenges encountered during program implementation. Below is an excerpt from the statement:

"Yes, it has happened before, even starting in pregnancy, with the existence of prenatal classes and toddler classes with specific goals. This hope has been conveyed. The cadres have accurately recorded and reported their monthly activities, as the program type mentioned is correct"... (T1).

"...but there are areas with middle to high economies, such as Kembang, Wijimulyo, and Jatisaron, which are urban areas. Sometimes, if there is a class for pregnant women, integrated ANC, there are those who don't want it, because they still think that the cadres don't know anything"... (T1).

"I believe the cadres' understanding of the program's details, particularly the health center program, is still unclear. Therefore, the cadres perform their duties in accordance with our instructions, leading me to believe that they are still unaware of the details"... (T1).

Three pregnant women also confirmed the implementation of the LBW prevention program. They said that the cadres had implemented the program well. The cadres were involved in the pregnant women's class program, monitored pregnant women, and encouraged them to actively participate in the Posyandu program in the village. In addition, they stated that the role of cadres in health education was not optimal. The following quote shows this statement:

"If the pregnant women's class program provides education from the community health center, but the cadres also participate in the activities"... (T2).

"The integrated health post measures body weight, blood pressure, height, and upper arm circumference, checks the KIA book, and provides health education and PMT services"... (T3).

"The role of cadres in providing health information is only to educate about eating sufficient and nutritious food. That's all I remember, nothing else"... (T4).

4. Discussion

Cooperation between cadres and women receiving intervention programming—in this case, pregnant women—is necessary to ensure implementation is effective. In this regard, cadres should be knowledgeable in navigating certain challenges or experiences that may arise when working with pregnant women in community settings. Through in-depth interviews with cadres, we identified several key themes regarding the (1) various aspects of LBW prevention programs and their objectives; (2) sources of information available to cadres; (3) how cadres' experiences shape program implementation; (4) roles of the cadres; and (5) evaluation of program implementation and impact.

One particular LBW prevention program that came up in discussion with cadres was PMT which is carried out for 90 consecutive days and targets pregnant women who have been identified as having chronic energy deficiency and low socioeconomic status. Based on Alam's research [4] on prevention of low birth weight in Emerging Societies-Coexistence of Childhood Malnutrition and Obesity, there is a strong positive relationship between having chronic energy deficiency and increased risk for incidence of LBW. Given this, the PMT program is specifically designed to prevent chronic energy deficiency in prospective and currently pregnant women [6,23]. This finding aligns with the research conducted by Umijati and Andajani [24], which suggests that improving maternal nutrition before pregnancy, ensuring adequate nutritional intake, and maintaining maternal health during pregnancy are appropriate.

Most cadres stated that the overall purpose of all LBW prevention programs is to reduce risk of stunting and incidence of LBW. However, some also expressed additional objectives and goals of these programs, such as creating a healthy next generation and improving maternal and infant health as a whole. The availability of health facilities that support the care of premature babies, LBW babies, and sick newborns is a current problem, as stated by Usman *et al.* [25]. Other studies have also found that low birth weight recognition programs and baby perception are crucial [26].

The cadre in charge of the Maternal and Child Health Polyclinic revealed that LBW prevention programs, for example, "Kelambu Siti" implemented by cadres, have been running effectively, and they determined this because cadres were generally able to successfully detect high-risk pregnant women, report and refer them. These findings align with research [27], which suggests that primary healthcare aims to reduce high-risk pregnancy cases by optimizing health cadres. However, these cadres also face pressure during emergencies in maternal and newborn

health services [28].

The same is true for cadres that, indeed, the experience in the LBW prevention program that is often an obstacle is the attitude of pregnant women who are closed and do not comply with the program. The Public Health Center also evaluates activities and asks about obstacles or difficulties for health cadres so that they can resolve them together. For the pregnant women's class program, all cadres are not involved, so, likely, the cadres do not understand the program. In addition, qualitative research on interventions for at-risk pregnant women shows how important the role of cadres is in building collaboration with mothers [29]. This study also considers the perspectives and cultural beliefs of mothers.

Cadres need to be knowledgeable and give reliable access to sources of information in order to most effectively implement prevention programs. Information obtained from various sources can impact cadres' knowledge and ability to carry out their duties [30]. All cadres in our sample stated that they obtained most of their information from training and counseling received at the Public Health Center. This finding is also in line with the qualitative research by Jama *et al.* [31], which states that periodic evaluations are necessary for cadres' ability to support exclusive breastfeeding. Another study supporting these findings is by Andriani *et al.* [32], which states that periodic training is necessary for cadres to be able to conduct counseling and health services, particularly maternal and child health.

It was revealed that often, when cadres did not understand something, they would hold group discussions or ask more competent parties such as those in charge of maternal and child health polyclinics at the Health Center, midwives, and others. In our sample, cadres seemed to work together well. In addition, the results of other studies strengthen the idea that the principle of helping "Gotong Royong" and always accompanying cadres when they go into the field can help overcome cadre confusion [33,34]. This approach fosters good cooperation, facilitates program completion, and positively impacts pregnant women. This method is finally considered an effective approach to overcoming family problems [35,36].

Importantly, cadres also expressed several challenges that hindered effective implementation of programs. Some of these included barriers to monitoring pregnant women or those at higher risk for LBW, especially when those women had negative attitudes or beliefs regarding their healthcare. In addition, having to source and understand new knowledge was a perceived challenge. These findings indicate that obstacles such as limited resources, inadequate education, negative parental experiences, community awareness, and sensitization of any health intervention hinder the referral of pregnant women at risk of LBW [37,38].

5. Limitations

The use of semi-structured interviews is one of the limitations of this study. While this method allows for a thorough exploration of the topic, it is nearly impossible to uncover topics beyond the framework of the created questions. Therefore, the information obtained is very dependent on the initial questions and how the interview proceeds. The researcher has designed open-ended questions to mitigate this limitation, enabling informants to discuss topics not explicitly included in the questions. However, keep in mind that the initial framework may not fully explore the possibility of significant new issues emerging. Therefore, we can complement these findings with more exploratory research, like unstructured interviews or group discussions.

6. Conclusions

In conclusion, the present study highlights the experiences and challenges faced by Indonesian cadres who work in their communities to prevent LBW. Barriers to effective prevention program implementation included having limited knowledge or access to reliable sources of information, needing to have a variety of skills for monitoring at-risk pregnant women; and dealing with women who may not be open to complying with the health programs. We recommend increasing the capacity building of cadres regarding their knowledge and skills by conducting training sessions every 6 months, emphasizing the importance of effective communication training for cadres, and monitoring of dangerous pregnancies. There is a need to improve care practices in LBW prevention programs, especially given its high incidence in this setting and others similar to it.

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Author's Contributions

Conceptualization, A.Y.; methodology, A.Y.; formal analysis, A.Y.; investigation, A.Y; data curation, A.Y., A.P., M.A., S.S.; writing-original draft preparation, A.Y.; writing-rewiew and editing, A.Y., A.P., M.A., S.S. All authors contributed to the article and approved the submitted version.

Conflict of Interest

The authors have declared that no competing interest exists.

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