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ORIGINAL RESEARCH

Participatory Health Cadre Model to Improve Exclusive Breastfeeding Coverage with King's Conceptual System

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Objective: The purpose of this research is to develop a participatory health cadre model to enhance exclusive breastfeeding coverage through initial stages using the Imogene King model.

Methods: This study employs a mixed-methods approach with sequential exploratory designs. Qualitative research utilized in-depth interviews with informants including the head of the community health center, nutrition officers from the health center, the coordinator of Maternal and Child Health (MCH) midwives, village midwives, breastfeeding mothers, families of breastfeeding mothers, and health cadres. Quantitative research respondents consist of health cadres. The quantitative study utilizes a quasi-experimental method with a design paradigm known as the one-group pre and post-test design to measure health cadre perception on exclusive breastfeeding.

Results: This study yields elements from Imogene King that form a participatory health cadre model to enhance exclusive breastfeeding coverage, consisting of interaction, perception, communication, transaction, role, growth and development, time, and space. Transactions represent the objective integration of the health cadre participation model, as demonstrated by the behavioral shifts observed in mothers regarding breastfeeding their infants. The *t*-test results indicate that exclusive breastfeeding monitoring training is effective and successful in enhancing exclusive breastfeeding coverage (Sig. value = 0.000 < 0.05). In addition, the effectiveness of exclusive breastfeeding monitoring training falls within the category of good or high.

Conclusion: The research findings indicate the success of the participatory health cadre model in improving exclusive breastfeeding coverage.

Keywords: breastfeeding promotion, community health interventions, Imogene King model, maternal and child health

Introduction

The World Health Organization (WHO) recommends that to enhance infant immunity, infants should be exclusively breastfed for the first six months. Providing exclusive breastfeeding to newborns can reduce infant mortality.[1,2] Other factors considered as major causes of infant mortality include maternal complications during pregnancy, congenital abnormalities, prematurity and low birth weight, sudden infant death syndrome (SIDS), as well as various other causes such as acute respiratory infections, umbilical cord infections, and sepsis.[3–5] UNICEF and the World Health Assembly (WHA) establish the recommendation for exclusive breastfeeding for six months, a guideline adopted by various countries. In Indonesia, there are several regulations governing the practice of exclusive breastfeeding.[6,7]

The coverage of exclusive breastfeeding worldwide remains low, both in developed and developing countries. The coverage of exclusive breastfeeding in 2016 was 54.7% in the United States, 43.8% in Japan, 18% in Korea, 65.2% in Cambodia, 24.3% in Vietnam, 23.6% in Myanmar, and 41.5% in Indonesia. The WHO reports that suboptimal exclusive breastfeeding led to 800,000 infant deaths in 2016, cognitive developmental disorders, infections, increased risk of breast cancer, and ovarian cancer for

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mothers.[1,8,9] The low coverage of exclusive breastfeeding is influenced by several factors such as beliefs, attitudes in making decisions regarding breastfeeding or formula milk, socio-cultural factors, family and peer attitudes, support and involvement of healthcare professionals, as well as support from healthcare workers in the two weeks postpartum. Other studies indicate that factors contributing to low coverage of exclusive breastfeeding include age, occupation, education, low knowledge and attitudes of mothers, aggressive marketing of formula milk, lack of support from companies employing mothers with infants aged 0–6 months for exclusive breastfeeding, socio-cultural factors, inadequate availability of maternal and child health facilities, suboptimal educational activities, socialization, and campaigns related to exclusive breastfeeding, as well as healthcare professionals' lack of concern and advocacy for the infant's right to receive exclusive breastfeeding. Accurate information about exclusive breastfeeding by healthcare professionals should be provided as early as possible to support mothers in the practice of exclusive breastfeeding.[6,8,10,11] Information from healthcare professionals in providing counseling to enhance the knowledge and skills of mothers in breastfeeding is crucial to boost mothers' confidence in practicing exclusive breastfeeding. However, many healthcare professionals still struggle to effectively perform the role of exclusive breastfeeding counseling because they lack proper training. Even those who have received training may not optimally carry out exclusive breastfeeding counseling through interactions with health cadres using effective communication, as they may not have been adequately trained for such tasks.[12–16]

The implementation of the integrated exclusive breastfeeding program in Indonesia is regulated by Government Regulation Number 33 of 2012 concerning Exclusive Breastfeeding. This regulation outlines the responsibilities of the government, both at the district/city and central levels, in carrying out the exclusive breastfeeding program. The exclusive breastfeeding program is a promotion initiative encouraging breastfeeding as the primary source of nutrition for infants without any other food or drink for the first 6 months after birth. Its goal is to prevent nutritional deficiencies in infants, which can pose risks for malnutrition-related conditions such as stunting, wasting, and other chronic diseases in the future. This program is crucial as breastfeeding serves as the primary source of nutrition and helps protect against various infectious diseases, contributing to maintaining a balanced immune system.[17,18]

Besides the continued practice of substituting exclusive breastfeeding with formula milk, based on the data above, the monitoring of exclusive breastfeeding has not received sufficient attention from the government. For instance, consistent training for health cadres is lacking, often provided sporadically due to limited regional resources or village conditions not meeting self-imposed criteria set by local governments for training. As a result, activities are not comprehensive and cannot cover all areas. Therefore, a systematic, effective, and sustainable solution needs to be considered as an alternative for health cadre participation in monitoring exclusive breastfeeding through training that covers topics such as: (1) the importance of exclusive breastfeeding up to six months; (2) sustaining breastfeeding until two years or beyond; (3) monitoring toddler growth, specifically by completing and interpreting Growth Monitoring Charts; (4) meeting energy needs, iron, and vitamin A through locally based complementary feeding; (5) quantity, variety, and frequency of daily feeding; (6) feeding a sick child and during recovery; (7) selection of raw materials and preparation of hygienic and nutritious complementary feeding; (8) skills in providing information; (9) counseling skills, including building confidence and providing support, and skills in observing interactions between caregivers and children.[4,6,7]

It cannot be denied that health cadres play a crucial role in the success of various health programs, both promotive and preventive, including the exclusive breastfeeding program.[19–22] In society, health cadres have long been utilized to implement various health programs, such as in integrated health posts and monitoring the nutritional status of toddlers and elderly. However, the utilization of health cadres in the exclusive breastfeeding program has not been systematically and optimally implemented.[4] Despite the formal healthcare professionals who should be able to lead the exclusive breastfeeding program, they do not always have ample opportunities to carry out this initiative due to the numerous tasks they are responsible for. Therefore, the delegation of authority for this program may be feasibly given to health cadres. A study conducted in Magelang Regency, Indonesia, indicates that health cadres from health integrated posts can serve as role models and motivators for the exclusive breastfeeding movement.[20,21,23,24]

Various efforts have been made by the government to increase the coverage of exclusive breastfeeding through training and the provision of breastfeeding counselors. From 2007 to 2012, 3292 breastfeeding counselors were trained across 33 provinces in Indonesia. The implementation of various government programs to enhance the success of exclusive breastfeeding has been carried out. The execution of these programs follows a top-down approach, where programs are initiated from the government to the community through the proclamation of various initiatives involving

technocrats and relying on authority, jurisdiction, and discretion. In the implementation of the top-down approach, efficiency, rule enforcement, consistency in input-target-output, and involving the community in participation are emphasized.[25–27] Although every government program is executed in a top-down manner, the needs in each region may differ due to unique local conditions and situations. Therefore, each region requires participatory cadre training to facilitate the achievement of desired goals.

Meanwhile, implementation with the bottom-up approach, involving community participation through participatory planning, can have an impact on achieving goals.[28,29] Health cadres are the frontline in the community. To motivate health cadres to improve exclusive breastfeeding coverage, knowledge and skills in educating the community are essential. Therefore, participatory training is needed to enhance knowledge and requires a participatory approach. The participatory approach can increase knowledge, motivating cadres to contribute to the success of government-issued programs.[30–32] The stages of participation include planning, program implementation, and program evaluation, carried out collaboratively to determine every need.[7,33–35]

In Indonesia, the Exclusive Breastfeeding Transcultural Model Intervention, developed by Jurana in 2016 in Palu, yielded significant effects on exclusive breastfeeding practices over one month. The research results recommend the involvement of community figures in health education activities regarding exclusive breastfeeding. This study did not involve health cadres but rather community figures. Through breastfeeding advocacy, such as the National Childbirth Trust, a peer counselor training program can also provide support for the breastfeeding process.[28,36] To boost confidence, mothers require more support from healthcare professionals through information provision and counseling. Midwives play a crucial role in encouraging and confirming the needs of breastfeeding mothers.[10,16,37,38]

The government's efforts to address a public health issue, such as enhancing optimal coverage of exclusive breastfeeding, require an integrative model. One integrative model developed to address various health issues in the community is King's Conceptual System theory, commonly applied in developing community health nursing and psychiatry services, as well as a framework for addressing nursing problems. Elements within the King's theory include interaction, perception, communication, transaction, growth and development, time, and space.[39–42] Imogene King's theory illustrates the relationship between the personal system (individual), interpersonal system (nurse-patient), and social system (education system, healthcare system). King comprehends nursing models and theories using an open system approach in constant interaction with the environment. In this context, King proposes an interaction model to enhance the participation of health cadres in monitoring mothers providing exclusive breastfeeding to their infants. King's foundational assumptions about humans encompass the social, emotional, rational, reactive, control, goal-oriented, activity-oriented, and time aspects. This theory is adaptable to any changes, can be applied to explain or predict health issues, especially in monitoring exclusive breastfeeding through the interactive King's model by combining active participation methods of health cadres with clients in setting mutual goals, decision-making, and interaction to achieve client goals. Thus, collaboration between health cadres is crucial.[25,36,43–45]

King's Conceptual System has been applied in Latin America and the Caribbean to obtain an overview, explanation, and analysis of factors influencing the breastfeeding process, involving professionals in the success of breastfeeding. The elements within King's Conceptual System indicate its integrative nature.[39,40,46] For developing countries with large populations, such as Indonesia, a model involving community members' participation, such as health cadres, is required to optimize results. In this study, Cilacap Regency was chosen based on data from the Indonesian Ministry of Health in 2020, which indicates that exclusive breastfeeding coverage is still below the national average (66.69%).[47] Additionally, it falls within the scope of stunting focus locations.[48] The identified causes for this could be due to a lack of family support and working mothers. The development of a participatory health cadre model in the region is important. This approach allows local health cadres to gain invaluable insights into the community's cultural norms and practices, enabling them to effectively meet specific needs and preferences. Furthermore, this approach ensures the sustainability of breastfeeding promotion efforts, as local health cadres can continue providing support long after formal intervention programs have ended. Additionally, a participatory approach helps address health disparities by ensuring marginalized communities have access to support and resources, thereby promoting health equity and reducing breastfeeding rate disparities.

Therefore, this research aims to create a model involving the participation of health cadres to improve exclusive breastfeeding coverage. Health cadres are expected to bridge the gap between healthcare professionals and the community by assisting the community in identifying and addressing their own health needs. They can provide information to health

officials who may not directly reach the community, as well as encourage healthcare officials in the health system to understand and respond to community needs. Cadres can help mobilize community resources, advocate for the community, and build local capacity.[16,36,49] Based on this rationale, the objective of this research is to determine the support of health cadres in improving exclusive breastfeeding coverage through the development of a participatory model using the Imogene King Theory approach.

Methods

Research Design

This research adopts a mixed-methods approach with a sequential exploratory design,[50] conducted in two phases.[51] The first phase involves qualitative research with the aim of identifying the appropriate elements in the model to enhance exclusive breastfeeding coverage implemented by health cadres. The formation of this model includes three stages: the initial model, the improvement model, and the effective model. Once the effective model is established, the research proceeds to the second phase, conducting quantitative research to analyze the effectiveness among the developed model's elements.

In the qualitative phase, a descriptive paradigm is employed. Descriptive research aims to reveal and describe or explain an event so that the actual conditions can be known by producing descriptive data in the form of words or oral accounts from individuals and observable behaviors. This research fundamentally relies on observations of humans.[52] The qualitative data collection method involves in-depth interviews.[52] On the other hand, in the quantitative research aspect, a quasi-experimental method is employed. The research follows a design paradigm known as a one-group pre and post-test design on participants who are health cadres.[53] The research design involves a pretest conducted before administering the intervention to accurately assess the treatment's effects through posttest results, allowing a comparison with the pre-treatment conditions. The intervention received by the research participants involves training in monitoring exclusive breastfeeding through the participation of cadres using King's Conceptual System.

Setting and Samples

This research was conducted in the Cilacap Regency, Indonesia, starting from April 2021 to April 2022. The selection of this location is due to its classification as one of the specific stunting locations listed in the top 100 designated by the Ministry of Health of the Republic of Indonesia. The sampling technique employed is non-random sampling, specifically purposive sampling. Purposive sampling involves selecting samples based on a subjective judgment of the chosen population.[54] The qualitative research sample consisted of key informants involved in the implementation of the exclusive breastfeeding program, including decision-makers or policy influencers, program implementers, and program supporters. The informants in this study included a head of the community health center, a nutrition officer from the health center, a coordinator midwife for Maternal and Child Health (MCH), a village midwife, three health cadres, two breastfeeding mothers, and one family member of a breastfeeding mother, making a total of ten informants. Meanwhile, the quantitative research sample employed total sampling.[53] The quantitative research sample comprised respondents who met the inclusion criteria: health cadres working in the selected community health center area, aged 25–45, willing to provide intensive support with each cadre assisting one breastfeeding mother, and actively participating in the stunting program for a minimum of 2 years. Exclusion criteria included subjects unwilling to participate or unavailable during the study. The sampling resulted in a total sample size of 90 participants.

Preliminary Study (Qualitative Study)

At the beginning of the research, a bottom-up approach was employed, starting with persuasive actions through engagement with the research subjects, who were health cadres. Health cadres strongly support the exclusive breastfeeding program established by the government, but face challenges related to insufficient hard and soft skills, including interaction, communication, and proficiency in exclusive breastfeeding. Based on this, there was a desire among cadres to learn and enhance their knowledge and skills in supporting breastfeeding mothers. This formed the basis for implementing this research. In the initial stage, qualitative research was conducted through in-depth interviews to explore the perceptions of various informants regarding exclusive breastfeeding.

The results from these informants yielded sub-elements that were incorporated into a model. The model was developed and tested in stages. In the first stage, elements of the model applied by health cadres were identified, forming the initial model and a modification of Imogene King's Theory and participatory principles. After applying the initial model, a test model was implemented on the trial instrument subjects. Upon applying the test model, improvements were made to the sub-elements, resulting in a revised model. The final outcome, an effective model, was derived from the results of the revised model. This effective model was obtained through quantitative research to assess the success of the model in improving the coverage of exclusive breastfeeding. The model development process involved several stages: the initial model, the test model, and the effective model. Once the effective model was established, the researcher proceeded with quantitative research aimed at analyzing the effectiveness among the elements of the developed model.

After obtaining an effective cadre participation model, cadre members are trained to implement the effective cadre participation model to assess the success of its use. During the cadre training implementation, various speakers are brought into train cadre members with a participatory model approach. Cadre members undergo training for one week to acquire both hard skills and soft skills in monitoring exclusive breastfeeding, including knowledge training, skills, and counseling communication in monitoring. Every health cadre member is provided with a pocketbook for exclusive breastfeeding assistance.

Intervention (Quantitative Study)

The intervention conducted involves mentoring for the duration of this one-year study with 90 participants. This intervention is based on the results of model development in the preliminary study, where sub-elements identified in this phase contribute to the development of the initial model. Based on these findings, an initial model is constructed, integrating elements from Imogene King's Theory and participatory principles. The model undergoes testing, refinement, and improvement through stages, ultimately leading to the development of an effective model. Before the intervention, participants complete a pretest measuring their perception of exclusive breastfeeding. The scores obtained from this pretest will be used to assess the effectiveness of the model.

The intervention begins with a persuasive approach, acknowledging the commitment of cadres to the government's exclusive breastfeeding program. Emphasizing the challenges faced by cadres, including limitations in both hard and soft skills, serves as motivation to learn and improve. Health cadres engage in a structured training program covering crucial aspects of exclusive breastfeeding, addressing both theoretical knowledge and practical skills. This training program aligns with the developed model, ensuring its relevance and applicability to the roles and responsibilities of the cadres. Following the training, ongoing support mechanisms are established to assist health cadres in applying their newly acquired knowledge and skills. Regular monitoring and feedback sessions are conducted to address challenges and refine the intervention based on real-world implementation. The intervention anticipates positive outcomes, including: (1) increased knowledge and skills of health cadres in supporting exclusive breastfeeding; (2) improved coverage of exclusive breastfeeding in the Cilacap Regency; and (3) enhanced collaboration and communication between health cadres and the community.

Validity and Reliability

The qualitative research instrument consists of interview guidelines and recording tools. As the instrument, the researcher directly interacts with the informants, understanding and assessing various forms of field interaction. The researcher serves as a planner, executor, data collector, analyst, data interpreter, and reports the research results. In this context, in-depth interviews are conducted with informants using interview guidelines consisting of a series of questions related to the cadres' participation in improving exclusive breastfeeding coverage. The questions asked encompass all variables in the model. For example, concerning the interaction variable, the questions posed to health cadres are: "What form of interaction do you provide to breastfeeding mothers in practicing exclusive breastfeeding?" and "Who else is involved in carrying out this interaction?" On the same variable, the questions posed to breastfeeding mothers or stakeholders are: "How would you describe the interaction between health cadres and breastfeeding mothers that you have observed so far?" and "Do health cadres assist breastfeeding mothers in practicing exclusive breastfeeding?" The interview guidelines were developed based on the concept definitions derived from the literature review.[55] The questions in this in-depth

interview are explained in the concept definition table. The validity of the qualitative research instrument has been assessed by examining credibility, transferability, dependability, and confirmability of the data.

The quantitative research instrument consists of questions developed based on the study or research on the development of the King's model by adding participatory principles of health cadres. The quantitative research instrument includes a questionnaire and observation sheet comprising questions developed based on the elements obtained from qualitative research. This research instrument is structured based on indicators from each element of the model obtained and consists of 20 questions, each with a Yes or No answer format. For example, in items 1 and 2, the following questions are asked: "Do you provide information about the importance of exclusive breastfeeding to breastfeeding mothers?" "Do you provide information to breastfeeding mothers about issues related to breastfeeding?"

The instrument's validity is assessed using the Product Moment correlation, resulting in a calculated correlation coefficient (r) greater than the critical value (tabled $r = 0.30$) with $\alpha = 0.05$, indicating a significant correlation. Therefore, the variables of exclusive breastfeeding monitoring training pretest and posttest scores are considered valid. Reliability testing of the research instrument was conducted by comparing Cronbach's Alpha, with a minimum requirement of 0.6 or ≥ 0.6 for reliability. The reliability test results for exclusive breastfeeding monitoring training pretest and posttest scores, using two answer scales, yielded Cronbach's Alpha values of 0.810 and 0.676, respectively, all of which exceed 0.6. Thus, the variables of exclusive breastfeeding monitoring training pretest and posttest scores are considered reliable.

Data Analysis

The qualitative data analysis conducted in this study, following Miles and Huberman, involves data reduction, data display, and conclusion drawing/verification.[56] Data reduction is the process of selection, focusing attention on simplifying, abstracting, and transforming raw data that emerge from field notes. This process continues throughout the research, even before the data is fully collected, as evident from the research framework, study problems, and the data collection approach chosen by the researcher. Reducing data involves selecting, summarizing, or briefly describing data and classifying them into broader patterns.[57,58] The process of constructing theory by merging and mapping patterns into a meaningful form or arrangement will depict the researcher's understanding, interpretation, and meaning of the entire data. The modeling uses the theoretical framework of King's elements, incorporating participatory principles.

For quantitative data analysis, tests for data normality, homogeneity, and hypothesis testing were conducted using the SPSS program. The normality test employed the Kolmogorov–Smirnov test, while the homogeneity test utilized ANOVA. The hypothesis test employed the paired *t*-test as a comparative test for differences when both variables' data scales are quantitative (interval or ratio). The data consisted of pretest and posttest measurements assessing the change in perception of cadres who have undergone training as health cadres and have accompanied mothers in exclusive breastfeeding for six months. This test was employed to examine the significance of the difference between the two means at pre-posttest, with a significance value of 0.05.

The coverage of exclusive breastfeeding data is determined by comparing the number of successful mothers exclusively breastfeeding with the number of postpartum mothers at the program's onset, which occurred during the initial two months of May and June 2021. Those deemed unsuccessful in adhering to the program are individuals who did not practice exclusive breastfeeding during this period by providing the infant with food or drink other than breast milk.

Trustworthiness

Trustworthiness or credibility is a criterion to fulfill the truth value of the collected data and information.[59] The implementation of validity in qualitative research is carried out by extending the research period, conducting continuous interviews and observations until reaching a level of redundancy, carefully examining each piece of information obtained to differentiate meaningful from non-meaningful data. The results show high credibility because the findings achieved the goal of exploring the elements that play a role in the participation model. The researchers triangulate the data by asking the same questions posed during interviews to each participant or their close associates at different times. This aims to test the consistency of answers provided by participants. Member-check involves checking the data by providing interview transcripts to participants to align perceptions, asking if there is additional or modified information, and agreeing on the transcript results. Thus, based on this main criterion, it can be stated that the interview guide in this study

has a high value of data credibility.[59,60] The study also meets the criterion of transferability, indicating the degree of accuracy of research findings in assessing how far the findings of a study conducted in a specific group can be applied to another group in the same situation. For dependability, the study demonstrates consistency in the findings. Additionally, this research has confirmability, openly revealing the process and elements of the study, allowing others/other researchers to assess the findings.[59]

Ethical Consideration

The data collection was conducted after obtaining ethical approval from the Faculty of Medicine, Universitas Padjadjaran, with the approval number 273/UN6.KEP/EC/2021, from April 2021 to April 2022. Informed consent was obtained from all respondents after providing a detailed explanation.

Results

In-Depth Interview

Table 1 shows the results of interviews with ten informants regarding sub-elements summarized in the participatory model to support the guidance of exclusive breastfeeding mothers. The tested sub-elements include trust, cooperation, absorption, understanding, acceptance, openness, empathy, support, feedback, participation, attitude, expected behavior, specified rules, movement, changes in thinking, self-actualization, time intensity, obstacles, expectations, and actions.

Based on the interview records, it appears that the element of interaction, particularly in the sub-element of trust, is positively perceived by the participants. The statements indicate that there is trust and confidence in the advice and recommendations provided by the health cadres, leading to a sense of satisfaction among both the family members and

Table 1 In-Depth Interview

Element	Sub-Element	Interview Statements from Informants
Interaction	Trust	• I follow all the recommendations from the health cadres so that my breast milk is abundant and flows smoothly. • The family and breastfeeding mothers are happy when the cadres come to provide assistance and give guidance on breastfeeding.
	Cooperation	• When I meet breastfeeding mothers, if I face difficulties, yes, I involve healthcare professionals. I also encourage the breastfeeding mother's husband and other family members to participate because social support is crucial for the success of exclusive breastfeeding. • The family, especially the grandmother, provides encouragement and support to the breastfeeding mother to eat healthily and nutritiously. • The way to interact with breastfeeding mothers to increase awareness of exclusive breastfeeding is by providing adequate knowledge about the benefits and proper techniques of breastfeeding, as well as offering support from the husband, family, and the community.
Perception	Absorption	Exclusive breastfeeding, in my opinion, is very important because it enhances the baby's immune system and strengthens the bond between the mother and the baby.
	Understanding	In my opinion, exclusive breastfeeding has significant benefits for both mothers and infants. For mothers, exclusive breastfeeding can expedite postpartum recovery, reduce the risk of breast cancer, and enhance emotional bonding with the baby. For infants, exclusive breastfeeding provides optimal nutrition, boosts the immune system, and lowers the risk of infections and chronic diseases in the future.
	Acceptance	My efforts to raise awareness among breastfeeding mothers include providing adequate education about the benefits and proper methods of breastfeeding. I also strive to involve families and the community in supporting breastfeeding mothers. Additionally, I play a role in organizing health integrated post activities that focus on providing information and support to breastfeeding mothers.

(*Continued*)

Table 1 (Continued).

Element	Sub-Element	Interview Statements from Informants
Communication	Openness	I always provide the necessary information to breastfeeding mothers regarding exclusive breastfeeding. I explain the benefits of exclusive breastfeeding, the correct methods of breastfeeding, and the support that can be provided by family and the surrounding community.
	Empathy	The use of easily understood language and providing real examples of the benefits of exclusive breastfeeding can make it more understandable and encourage efforts to listen and understand the needs and concerns of breastfeeding mothers. This provides positive support and motivation.
	Support	The right way to ensure that mothers are confident in providing exclusive breastfeeding to their babies until the age of 6 months is by providing adequate education about the benefits and proper techniques of breastfeeding. It is also essential to involve family and the community in providing support. I play a role in organizing health integrated post activities that focus on providing information and support to breastfeeding mothers. Additionally, it is crucial to offer support from husbands, family, and the community to maintain the motivation and self-confidence of breastfeeding mothers to exclusively breastfeed their babies until the age of 6 months.
	Feedback	• Breastfeeding mothers reportedly receive questions from health cadres after being provided with information. The cadres ask whether they understand or not and present one to two questions based on what has been taught. • I was instructed to practice the breast massage technique that involves "kneading" (addressing blockages or congestion) by the cadre after she finished teaching.
Transaction	Participation	Yes, I provide physical guidance to the cadre to inform breastfeeding mothers about increasing exclusive breastfeeding. I provide a guidebook on empowering breastfeeding mothers in the exclusive breastfeeding program, containing information about the benefits of exclusive breastfeeding, the correct way to breastfeed, and the support that can be provided by the family and the surrounding community.
	Attitude	The cadres have already participated sufficiently by providing education and involving families and the community in offering support.
Role	Expected behavior	I provide the necessary information for breastfeeding mothers regarding exclusive breastfeeding. I explain the benefits of exclusive breastfeeding, the correct way to breastfeed, and the support that can be provided by family and the surrounding community.
	Specified rules	The method used involves providing a handbook for empowering breastfeeding mothers in the exclusive breastfeeding program. Additionally, an educational approach and participation in health integrated post activities, where I provide information and support to breastfeeding mothers, and involve family and the community in providing support.
Growth and Development	Movement	The cadres undergo training to enhance awareness of breastfeeding mothers in promoting exclusive breastfeeding. The training provides me with knowledge and skills to provide education and support to breastfeeding mothers, as well as ways to overcome the challenges often faced by breastfeeding mothers.
	Changes in thinking	My experience in monitoring babies receiving exclusive breastfeeding has been through home visits and health integrated post activities. I monitor the growth and development of babies and provide support and education to breastfeeding mothers on the correct way to provide exclusive breastfeeding.
	Self-actualization	There are records from the cadres about mothers who provide exclusive breastfeeding.
Time	Time intensity	Support is provided periodically to breastfeeding mothers regarding exclusive breastfeeding. I conduct home visits and health integrated post activities to provide information and support to breastfeeding mothers, as well as involving family and the community in providing support.
	Obstacles	The right time for the cadres to provide explanations to mothers for breastfeeding preparation is during pregnancy. This is because mothers gain sufficient information and preparation about the benefits and correct methods of exclusive breastfeeding. Additionally, health integrated posts and health education can also provide information and support to breastfeeding mothers.

(*Continued*)

Table 1 (Continued).

Element	Sub-Element	Interview Statements from Informants
Space	Expectations	My hope for the exclusive breastfeeding program is that all breastfeeding mothers can understand the importance of exclusive breastfeeding and implement it successfully. I hope this program can improve the health of both the baby and the mother, as well as strengthen the emotional bond between mother and child.
	Actions	The actions taken to ensure that mothers continue to practice exclusive breastfeeding for their babies involve providing adequate education about the benefits and correct methods of exclusive breastfeeding. I also offer support and motivation to breastfeeding mothers and involve families and communities in providing support.

breastfeeding mothers. The participants express happiness and appreciation for the assistance and guidance provided by the cadres, suggesting a positive relationship between the health cadres and the community members they serve.

In conclusion, the interview records reflect a positive and proactive approach towards promoting exclusive breastfeeding. Participants demonstrate a strong commitment to providing education, support, and motivation to breastfeeding mothers, emphasizing the importance of involving families and communities in the process. Challenges such as timing and access to information are acknowledged, but efforts are made to address them through training, home visits, and community activities. In summary, there is a shared expectation for the program to improve the health of both mothers and babies, strengthen the mother-child bond, and foster widespread understanding and implementation of exclusive breastfeeding practices.

Participatory Health Cadre Model

Figure 1 illustrates the developed participatory model, depicting the integration of elements from the Imogene King model. Interaction becomes a crucial foundation for enhancing cadre participation in achieving common goals for the improvement and increased coverage of exclusive breastfeeding. Effective interaction requires cadre members to utilize their sensory perceptions, including listening, seeing, feeling, touching, and smelling, in order to explore the needs and aspirations of breastfeeding mothers. This process enables them to gain a positive perception of how to absorb, understand, and accept the mothers' circumstances.

The ability of cadre members to communicate effectively in conveying perceptions can be achieved through openness, empathy, support, and receiving feedback from exclusive breastfeeding mothers. Open communication means being open and honest in receiving and providing information, including transparency about the health conditions of breastfeeding mothers.

In the process of growth and development, health cadre members aiming to improve exclusive breastfeeding coverage need to think critically to gain a deeper understanding of exclusive breastfeeding coverage. The understanding obtained sharpens the cadre's ability to think critically. This change in thinking can contribute to improved problem-solving and increased creativity, thereby influencing self-actualization. Self-actualization encompasses the development of talents and abilities, deep self-understanding, and a sense of achievement and personal satisfaction. Cadre members with strong self-actualization will enthusiastically participate in achieving the goal of increasing exclusive breastfeeding coverage among breastfeeding mothers. When the goal is achieved, satisfaction follows.

If there is strong perceptual strength in the interaction between cadre members and breastfeeding mothers, communication will occur, leading to roles in time and space, ultimately resulting in transactions. When health cadre members and breastfeeding mothers engage in transactions, the goal will be achieved. Health cadre transactions for participation involve activities where health cadre members provide basic services to the community.

Quantitative Analysis

Table 2 displays pretest and posttest scores for exclusive breastfeeding monitoring training. Pretest scores average 6.16 with a wider range and higher variability than posttest scores, which average 16.69. Both sets of scores show normal

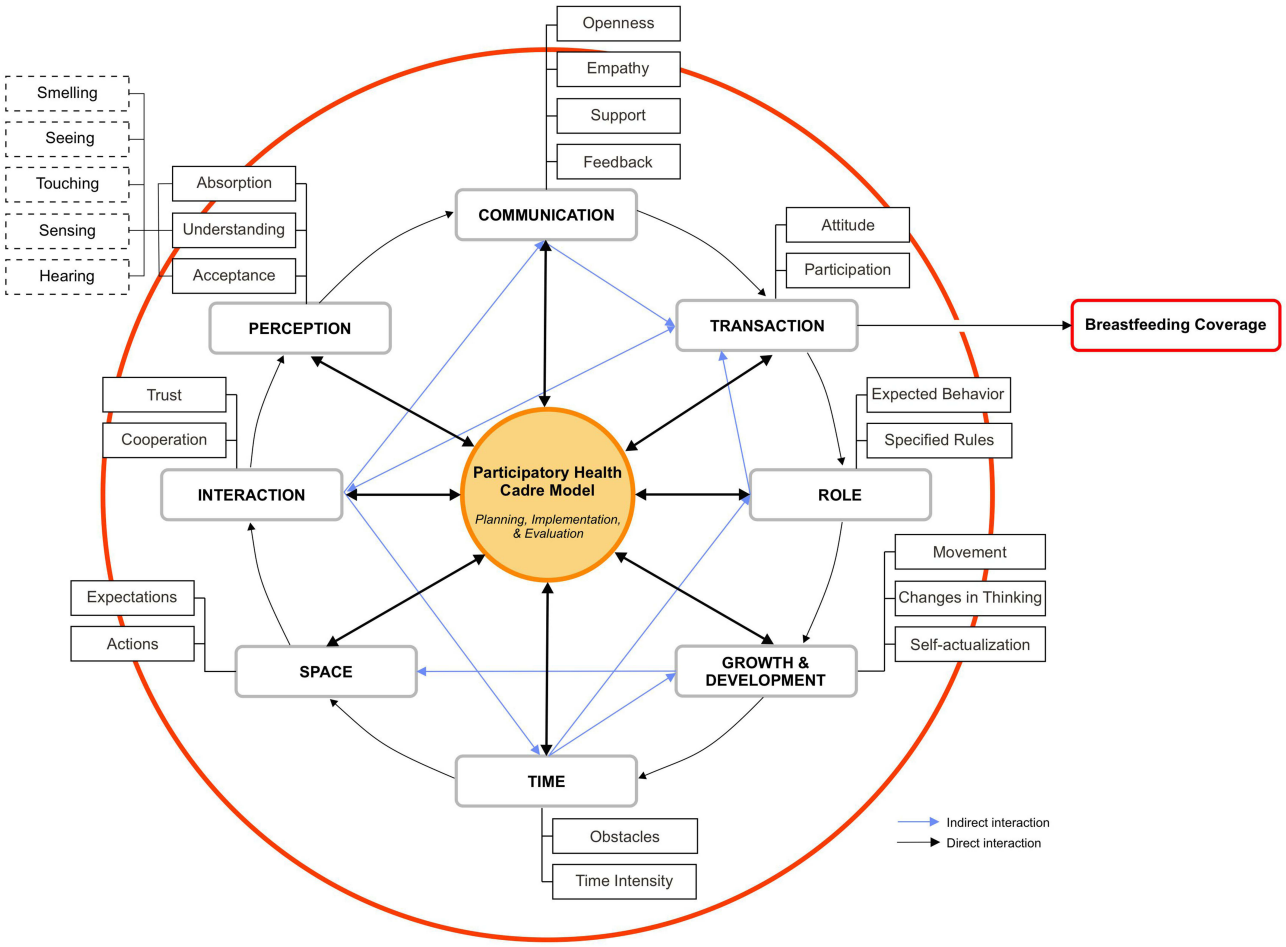

Figure 1 Proposed participatory model of health cadres to improve exclusive breastfeeding coverage.

distribution and homogeneous variances. The paired *t*-test indicates a significant increase from pretest to posttest, suggesting effective improvement in health cadre perception of exclusive breastfeeding following training. Furthermore, Table 3 shows the average N-Gain is 72.76%, ranging from 0.0 to 100%, suggesting that the exclusive breastfeeding monitoring training is highly effective.

Exclusive Breastfeeding Coverage

Table 4 indicates that despite support from health cadres, approximately 10.75% of mothers did not achieve exclusive breastfeeding. However, overall exclusive breastfeeding coverage across the three regions was 86.02%.

Table 2 Descriptive Statistics and *t*-Test Results

Variable	N	Descriptive Statistics					t-Statistics	
		Minimum	Maximum	Mean	Mean Different	Std. Deviation	t-Table	p-value
Pretest perception of health cadres regarding exclusive breastfeeding.	90	0	18	6.16	10.53	4.287	20.659	0.000
Posttest perception of health cadres regarding exclusive breastfeeding.	90	12	20	16.69		2.222		
Valid N (listwise)	90							

Table 3 N-Gain Test Results

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
N Gain	90	0.00%	100.00%	72.76%	0.23
Valid N (listwise)	90				

Table 4 Coverage of Exclusive Breastfeeding Mothers

Region	**Total Postpartum Mothers**		**Total**	**After Mentoring**		
	May 2021 (1st Month)	**June 2021 (2nd Month)**		**Achieved**	**Not Achieved**	**Refused to be Mentored**
I	16	17	33	28	5	0
II	14	15	29	24	4	1
III	15	16	31	28	1	2
Total	45	48	93	80 (86.02%)	10 (10.75%)	3 (3.23%)

Discussion

Both qualitative and quantitative findings highlight a positive and proactive approach towards promoting exclusive breastfeeding. Participants demonstrate a strong commitment to educating, supporting, and motivating breastfeeding mothers, emphasizing the involvement of families and communities. Challenges such as timing and access to information are acknowledged, but efforts are made to address them through various means, including training and community activities. The shared expectation is for the program to improve the health of mothers and babies, strengthen the mother-child bond, and enhance understanding and implementation of exclusive breastfeeding practices. Quantitative data analysis indicates a significant increase in health cadre perception of exclusive breastfeeding following training. This underscores the effectiveness of the exclusive breastfeeding monitoring training. However, there remains a portion of mothers who did not achieve exclusive breastfeeding despite support from health cadres. Nonetheless, the overall exclusive breastfeeding coverage across the three regions reflects positive progress towards meeting program goals.

Elements in the Model

In the interaction element, cadres need the ability to listen, observe, feel, touch, and smell using their sensory perceptions to uncover the needs and aspirations of breastfeeding mothers. This helps in forming a positive perception of how to absorb, understand, and accept the mothers' situations. Cadres who can attentively listen and be good listeners can respond effectively to clients. They also possess perceptions that can be conveyed to breastfeeding mothers, encouraging them to enhance exclusive breastfeeding. The communication of these perceptions is facilitated through effective communication channels.[61–63] In the perception element, the cadre's ability to communicate effectively to convey perceptions can be achieved through openness, empathy, support, and feedback from exclusive breastfeeding mothers.[64,65] Furthermore, in the communication element, cadre communication is characterized by openness, meaning being open and honest in receiving and providing information, including transparency about the health conditions of breastfeeding mothers. This ensures that communication is a two-way process with feedback, leading to a clear understanding for breastfeeding mothers and fostering sustainable solutions.[30,61,66] Cadres should exhibit empathy when communicating, as empathy involves the ability to sense the feelings, perspectives, and needs of others, particularly breastfeeding mothers in this context.[67,68]

The transaction element is defined as interaction with a specific purpose in achieving goals. It includes observing human behavior in interaction with the environment. In this research, it is found that the implementation of exclusive breastfeeding activities involves the transfer of knowledge and support, such as time and funding, effectively managed by

health cadres.[6,69–71] Several aspects of the attention provided by health cadres in the exclusive breastfeeding program include the distribution of physical guidelines, such as empowerment manuals for breastfeeding mothers in the exclusive breastfeeding program. These manuals contain information about the benefits of exclusive breastfeeding, the correct method of breastfeeding, and the support that can be provided by family and the surrounding community. Another tangible contribution made by health cadres in fulfilling their duties is their significant participation in the success of the exclusive breastfeeding program.[32,72,73]

In the role element, health cadres have expected roles and responsibilities to adhere to established rules to maintain harmony and balance within a group or organization.88–90 Roles serve as behavioral guidelines, outlining expectations and responsibilities associated with that role. When health cadres perform their roles effectively in enhancing exclusive breastfeeding coverage, it can contribute to the growth and development.[38,69,74] In addition, in the growth and development element, health cadres, in order to enhance exclusive breastfeeding coverage, need to think critically to gain a deeper understanding of exclusive breastfeeding coverage.[75,76] The understanding obtained sharpens the cadres' ability to think critically. This change in thinking can contribute to improved problem-solving and increased creativity, influencing self-actualization abilities. Self-actualization involves the development of talents and abilities, deep self-understanding, and a sense of achievement and personal satisfaction.[75,77,78] Cadres with good self-actualization will participate enthusiastically in achieving the goal of increasing exclusive breastfeeding coverage for breastfeeding mothers. If the goal is achieved, satisfaction will follow. The process of self-actualization requires space and time in its formation process.[78–80]

The space element is a valuable resource, especially for health cadres. Space can influence the expectations and actions of health cadres in enhancing the coverage of exclusive breastfeeding. This includes limited access to health facilities, which can reduce individuals' expectations regarding their ability to provide effective health assistance.[81–83] In the time element, this study indicates the allocation of time intensity provided by health cadres to mothers.[63,84] Through the exclusive breastfeeding support activities conducted by health cadres, there is an effort to dedicate time for health cadres to provide support to breastfeeding mothers, allowing for scheduled activities such as periodic assistance, integrated health post activities, and home visits. Another form of support is the provision of specific time to assist mothers in consulting when they experience changes.[85–87]

Model Suitability

Interaction is a powerful element influencing the participation of health cadres in various community programs and activities, including programs aimed at improving exclusive breastfeeding for lactating mothers.[88,89] Health cadres play a key role in community development. They are individuals actively involved in promoting positive change in their communities.[32,90] When health cadres interact positively with lactating mothers, they can build a trusting relationship that underlies active participation and collaborative ability between the cadres and lactating mothers.[38,91,92] Health cadres must be able to convey information in a language that is easily understood by lactating mothers. The transactions conducted by health cadres in efforts to increase the coverage of lactating mothers are closely related to participation and attitude. Attitude results from the interaction between individuals and their environment; it is also acquired through learning. Cadres' participation can begin with training. With the implementation of exclusive breastfeeding monitoring training, not only does the knowledge of the cadres increase, but it also transforms their attitude to become more responsible and empathetic, encouraging them to play a more active role.[69,84]

The role in this participation model illustrates that health cadres have involvement in providing information and educating the community to improve exclusive breastfeeding coverage. They participate in organizing the community in decision-making, contribute to planning and monitoring programs, including data collection and information monitoring. Additionally, they play an advocacy role, participating in representing the voice of the community in policy debates.[89,93] Expected behaviors in these roles are often related to the values and culture of the organization or community. Meanwhile, rules are often based on values and principles considered important by the community. A clear understanding of the relationship between roles, expected behaviors, and established rules is crucial to maintaining order and justice in society. Well-performed roles of health cadres in enhancing exclusive breastfeeding coverage can contribute to growth and development.[94–96] The process of growth and development is a lifelong journey involving physical, cognitive, emotional, and social development.[77,97] It is a complex and unique process for each individual, reflecting the interaction

between biological, social, and psychological factors. Growth and development often involve changes in thinking, moving, and behaving.

As individuals age and gain experience, they often undergo changes in their thinking and information processing. Changes in thinking are a natural part of the growth and development process, reflecting how individuals learn, adapt, and overcome challenges in life.[75,98] For health cadres who cannot fully commit to their roles due to limited time to contribute to health and community programs,[89,99,100] these changes in thinking can affect their level of participation over time, reducing their effectiveness in serving the community, such as improving exclusive breastfeeding coverage. Therefore, strategies are needed to address constraints that can impact the limited intensity of health cadre participation in efforts to enhance exclusive breastfeeding coverage. In addition to requiring time, space is also crucial in the participatory model.[74,87,101]

The role of space in the participation of health cadres is highly influential. There are two types of space: first, physical space, which is where health cadres perform their tasks. This includes the environment around the community where they carry out their roles, including transportation infrastructure and access to health facilities. Second, social space encompasses the social structure, culture, norms, and values of the community in which health cadres participate.[86,102] A conducive physical space, including easy access to health facilities and transportation, can facilitate the participation of cadres. Social space that supports participation, such as collaborative communities and a society encompassing social structures, norms, values, and culture existing in the community where health cadres participate, supports the role of cadres and can enhance the intensity of participation.[61,86,103]

Space can influence the expectations and actions of health cadre participation in improving exclusive breastfeeding coverage. This includes limited access to health facilities, which can reduce individuals' expectations of their ability to provide effective health assistance.[104–106] Lack of access to resources such as medicines, medical equipment, or health training can also diminish motivation for active participation. Additionally, poor access to health facilities and communities served by health cadres can limit their ability to move freely and provide health services.[104,107,108] This limitation can reduce their expectations of the effectiveness of their actions and hinder participation. Supportive social spaces can enhance individuals' expectations and motivation to participate as health cadres. Communities that provide support, appreciation, and understanding of the role of health cadres can increase positive expectations and motivation for them to contribute more actively.[66,85,92]

Model's Role in Boosting Exclusive Breastfeeding Coverage

According to the research findings, there is a significant improvement in the perception of health cadres after participating in the training program and accompanying exclusive breastfeeding mothers for six months. Additionally, the results indicate that the coverage value of the health cadre participation model has proven successful in achieving 86.02% of exclusive breastfeeding coverage in three regions in Cilacap Regency, compared to the local government target of 55%.[109]

All the health cadres have been trained to implement the eight elements of the conceptual system theory by King, combined with the participatory learning model. In addition to the increased coverage of exclusive breastfeeding, the success of this health cadre participation model lies in the enhanced community involvement. Breastfeeding mothers, especially first-timers, face various challenges in their breastfeeding journey. Practical support is received from healthcare professionals, but only in the first six weeks postpartum.[74] Considering the lack of experience, first-time breastfeeding mothers encounter more difficult challenges, leading to significantly negative impacts on their perceptions and practices of providing exclusive breastfeeding. Without adequate and timely practical support, there is a risk of failure in implementing exclusive breastfeeding. Providing information about breastfeeding is a strategy to help sustain the success of exclusive breastfeeding practices.[36,38,69]

The participation model encourages collaboration between health cadres and breastfeeding mothers in decision-making and care planning. This means that breastfeeding mothers play an active role in formulating their health care goals, designing appropriate plans, and making decisions collaboratively. This model creates a space for open communication and mutually beneficial engagement between cadres and breastfeeding mothers.[1,30] When breastfeeding mothers feel that their opinions are valued and they have control over decisions regarding their care, they are more motivated to

achieve health goals together. This aligns with Goal Attachment theory, indicating that decision-making is aligned with shared goals, leading to behavioral changes to achieve those goals.[110]

Breastfeeding mothers are unique individuals, and the interconnection between the King Model, Participation Model, and Goal Attachment theory must be tailored to each individual's needs and preferences. Some mothers may require more support and guidance, while others may be more independent in decision-making. Cadres need to be sensitive to these needs and preferences, adapting accordingly to specific situations and conditions.[31,36,89] In practice, health cadres must fulfill their role as facilitators who understand and appreciate individuals' commitment to health goals, accommodate breastfeeding mothers' participation in decision-making, and provide appropriate support based on a leadership model suitable for a specific situation. Thus, cadres play a crucial role in assisting breastfeeding mothers in achieving their health goals and enhancing the quality of healthcare provided.[84,111] The participation model for health cadres developed by the researcher is derived from the elements in King's Conceptual System theory, including interaction, perception, communication, transaction, growth and development, time, and space. This involves the participatory role of health cadres in efforts to improve exclusive breastfeeding coverage. The implementation of each program established by the government is carried out through planning, execution, and evaluation stages.[39,40,112]

The results of various studies indicate that exclusive breastfeeding programs are implemented by the government through various policies established with procedures. These procedures are based on the bottom-up principle, which involves the planning process carried out by the highest leaders, who formulate policies by issuing various regulations. One government regulation issued is Government Regulation Number 33 of 2012 concerning Exclusive Breastfeeding. This regulation governs the responsibilities of the government, both at the district/city and central levels, in the implementation of the exclusive breastfeeding program.[1,7,25] This study differs from previous research. In this study, the bottom-up method is employed, which involves an initial approach to understand existing issues. This model results in the active involvement of health cadres in the communities they serve, namely breastfeeding mothers, to enhance understanding and acceptance of exclusive breastfeeding practices.[113] This aligns with the application of participation theory, emphasizing the involvement of individuals in various activities and emphasizing the importance of a strategy that utilizes local, spatial, and bottom-up resources in monitoring breastfeeding mothers to achieve exclusive breastfeeding, thereby fulfilling government programs without sacrificing personal interests. This research applies interpersonal theory by employing an approach to ultimately achieve common goals through behavior or actions, such as mentoring.[44,84]

The results of this study are in line with the achievement of the goals of Imogene King, who assumes that humans, as a whole (human being), are open systems with consistency to interact with their environment.[114] This is evident in this research, which was conducted with a more personal and accessible approach, where health cadres successfully motivated mothers to initiate and continue exclusive breastfeeding. The cadre's attitude in providing services reflects a positive disposition, demonstrating responsibility in fulfilling their duties to improve community health, which can assist the government in the success of health programs.[25,84,104] Imogene King focuses on the interaction between humans and their environment, with the goal of assisting individuals and groups in maintaining their health. This aligns with the implementation of the research, where there is interaction between health cadres and breastfeeding mothers, fostering Dynamic Interacting Systems that include personal systems (individual), interpersonal systems (groups), and social systems (family and health service locations).[39,40,44]

Health cadres in this study are individuals trained to provide information, support, and monitor mothers in giving exclusive breastfeeding to their babies. Health cadres work directly with new mothers to provide clear information about the importance of exclusive breastfeeding for the first six months of a baby's life. They explain the long-term health benefits and psychological advantages for both the mother and the baby, including protection against infections. This aligns with the concept of interpersonal systems (groups) in Imogene King's theory, where individuals are members of society, have feelings, rationality, and the ability to react, accept, control, have specific purposes according to their rights and responses, and are oriented towards action and time.[44,114] Health cadres play a crucial role as a bridge between the community and professional healthcare, and they have a vital role in improving understanding and implementing health practices, including exclusive breastfeeding. The role of health cadres in increasing exclusive breastfeeding coverage is essential, as they are on the frontline providing direct support to mothers and families. The results of this research implicitly suggest that breastfeeding mothers are conscious, active, and capable of participating in decision-making.[95,115]

Conclusion, Limitation, and Implication

Limitations of this study may include potential biases in data collection methods, such as social desirability bias in qualitative interviews or response bias in quantitative surveys. Additionally, the generalizability of findings may be limited due to the study's focus on a specific geographical area or population group. Furthermore, the quasi-experimental design used in the quantitative phase may introduce confounding variables that could impact the validity of the results. Lastly, the study's reliance on self-reported data from participants could introduce inaccuracies or inconsistencies in reporting exclusive breastfeeding practices.

The elements of Imogene King that are appropriately applied for the participation of health cadres to improve exclusive breastfeeding coverage are interaction, perception, communication, transaction, role, growth and development, time, and space. The model of health cadre participation effectively enhances exclusive breastfeeding coverage through the implementation of the bottom-up system. The application of the bottom-up system distinguishes the results of this research from other studies because, historically, the implementation of exclusive breastfeeding programs has been carried out in a top-down manner through programs from the central government. In the created model, transactions are seen as the goal-attachment of the health cadre participation model, evident in the behavioral changes of mothers in breastfeeding their babies. Furthermore, there is success in the health cadre participation model implemented through the King's Conceptual System theory approach to enhancing exclusive breastfeeding coverage. The success of the implementation, particularly in the Indonesian context, is demonstrated by the high coverage of exclusive breastfeeding in the three regions in Cilacap Regency, reaching 86.02%, surpassing the target set by the local government, which is 55%. This indicates the effectiveness of the participatory health cadre model in enhancing exclusive breastfeeding practices within the local context.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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