M-Poma: Innovative Technology for Boosting Exclusive Breastfeeding Practices

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KEYWORDS	ABSTRACT
M-Poma, Exclusive breastfeeding, Technological innovation, Breastfeeding support, Mobile application .	**Background:** The Indonesian Health Survey data indicates that exclusive breastfeeding coverage is projected to reach 55.5% in 2023, with Aceh showing a lower rate of 49.9%. In Aceh Besar, the coverage was reported at 55.9% in 2022. Notably, women from low-income backgrounds are less likely to engage in breastfeeding practices by the second day postpartum compared to their higher-income counterparts. To address this disparity, the use of smartphone applications offering educational videos about breastfeeding and infant behavior has emerged as a preferred method, particularly among low-income mothers. **Objective:** This study aims to develop a mobile application called "POMA" (M-POMA) to enhance exclusive breastfeeding practices among infants in the Kuta Baro District of Aceh Besar. **Methodology:** A Research and Development (R&D) approach was employed to create the Android-based M-Poma application. The development process spanned two years: the first year focused on application design and functionality, while the second year involved training sessions for 25 midwives and 25 community health cadres. These training sessions were critical for testing the application and gathering user feedback. **Results:** Based on the first year of research, the M Poma application was developed through a collaborative process, including FGDs and in-depth interviews, to ensure the application meets the needs of the community. Year 2 training was conducted for cadres and midwives to provide their valuable input on the application. The M-Poma application has been developed to support exclusive breastfeeding, which is essential for improving infant health. Feedback from Focus Group Discussions (FGD) highlighted the need for content on exclusive breastfeeding, user profiles, and case examples. Training sessions with midwives and community health cadres confirmed that the application is user-friendly, featuring an attractive interface and clear educational materials. Respondents emphasized the importance of a simple login process, engaging visuals, and easily accessible content. The majority of participants found the application's features intuitive and appreciated the ease of data management within user profiles. **Conclusion:** While the M-POMA application has made considerable strides, there are still areas that require revision. We highly value the feedback provided by users and remain dedicated to enhancing the application to ensure it is both appealing and efficient.

1. Introduction

Globally, data indicates that three out of five babies do not receive breast milk within the first hour after birth(Cai et al., 2012; J. Khan et al., 2015; Lawn et al., 2005). Proper breastfeeding practices at the start of life are crucial, as they provide infants with immediate access to colostrum, which is rich in nutrients and antibodies. Breastfeeding is one of the most effective ways to ensure a child's health and survival(Labbok, 2020; Lawn et al., 2005; Pérez-Escamilla et al., 2016). Breast milk not only provides the ideal nutrition for infants but also protects them from various diseases and infections. Additionally, breastfeeding helps strengthen the emotional bond between mother and child, which is essential for the psychological development of the baby(Abolyan, 2006; Pérez-Escamilla et al., 2016).

However, despite the well-known benefits of breastfeeding, nearly two out of three babies worldwide do not receive exclusive breastfeeding for the first six months of life. According to recent data, only 41% of infants aged 0-6 months are exclusively breastfed. This indicates a significant gap in breastfeeding practices worldwide. According to the World Health Organization (WHO) in 2022, more than 820,000 children could be saved each year if all children aged 0-23 months were optimally breastfed.(Rollins et al., 2016; Victora et al., 2016a; Vu Hoang et al., 2020) This underscores the urgency of raising awareness and support for breastfeeding practices across all segments of society.(Nutr et al., 2022)

In Indonesia, data from the Indonesian Health Survey shows that exclusive breastfeeding coverage reached 55.5% in 2023. However, this figure varies significantly across different regions; in Aceh, the exclusive breastfeeding rate is reported to be only 49.9% (Survei Kesehatan Indonesia (SKI) 2023 - Badan Kebijakan Pembangunan Kesehatan | BKPK Kemenkes, n.d.; Victora et al., 2016a). In Aceh Besar, the exclusive

breastfeeding coverage in 2022 was 55.9%. These figures indicate that there are still significant challenges to improving breastfeeding practices in this region, particularly in raising awareness and providing mothers with access to relevant information. The importance of improving breastfeeding practices extends not only to the health of infants but also to the health of mothers.

Research has shown that enhancing breastfeeding practices can prevent approximately 20,000 deaths of children under five years old, as well as 20,000 deaths from breast cancer among mothers(Walters et al., 2016). The benefits of breastfeeding are not only experienced by infants but also by mothers. Recent epidemiological and biological findings indicate that the advantages of breastfeeding extend to mothers and children from various economic backgrounds, both low and high (Victora et al., 2016b). Studies have shown that low-income women are more likely not to provide exclusive breastfeeding on the second day after delivery compared to women from higher-income families(Wallingford, 2016). One strategy that can help increase exclusive breastfeeding rates is the use of technology, particularly smartphone applications. While smartphone apps that provide videos about breastfeeding can support exclusive breastfeeding efforts among low-income women, their use has not shown significant results among first-time mothers with low economic status.(Sulaeman et al., 2018) This highlights the need for a more holistic and integrated approach to supporting breastfeeding mothers. In today's modern era, internet access provides great opportunities for conveying health messages. The internet has become one of the most democratic institutions, unregulated by any specific authority. This is particularly important in many Western countries, where social trends are more transparent, and the majority of the population aged 14-64 are registered as internet users. Therefore, providing educational interventions during the breastfeeding period is crucial for fostering positive attitudes and empowering mothers to feel more confident in controlling exclusive breastfeeding behaviors. Subjective norms, such as recommendations from doctors, midwives, nurses, and other healthcare workers, play a vital role in nurturing and reinforcing mothers' intentions to breastfeed exclusively(Walters et al., 2016).

With the support of healthcare providers and community health workers, mothers can be more motivated to provide exclusive breastfeeding. In this context, the mobile application "Poma" (M-Poma) is particularly useful for increasing exclusive breastfeeding rates among infants. M-Poma is designed with local culture in Aceh in mind, making it more acceptable to the community. This application not only increases mothers' knowledge and motivation to provide exclusive breastfeeding but also allows for monitoring by midwives and health workers. Support from healthcare providers and community health workers, who serve as close friends to breastfeeding mothers, is essential in this effort. By utilizing the M-Poma application, mothers can easily access the information and support they need to succeed in breastfeeding. The name "Poma" derives from the word for "mother" in Acehnese, reflecting the application's goal of supporting mothers in providing the best for their children.

2. Methods

This research is classified as Research and Development (R&D) and was conducted over a period of two years, focusing on the development of the M-Poma application aimed at enhancing exclusive breastfeeding practices among mothers. In the first year, the research team conducted focus group discussions (FGDs) and in-depth interviews to gather qualitative data, utilizing 10 carefully crafted questions to elicit comprehensive insights from participants about their experiences, challenges, and perceptions regarding breastfeeding and the use of technology in supporting breastfeeding practices. Participants included mothers, healthcare providers, and community health workers, ensuring a diverse range of perspectives. After conducting the FGDs, the data were analyzed using NVivo software, facilitating a systematic coding process to identify key themes that informed the initial draft of the M-Poma application, which was subsequently submitted to the IT team for development into a functional application. Once the application was completed, a trial was conducted to assess its content and functionality, with a team of experts, including pediatricians, lactation consultants, and application developers, evaluating it to ensure it met educational and usability standards. Feedback from this trial led to valuable revisions aimed at enhancing the application's appeal and effectiveness. In the second year, the focus shifted to the implementation and training phase, where a series of training sessions were organized for 25 midwives and 25 community health cadres, equipping them with the skills necessary to effectively use the M-Poma application in their outreach efforts. This training included hands-on demonstrations and interactive discussions, allowing participants to familiarize themselves with the application's features. To evaluate the impact and effectiveness of the M-Poma application, descriptive analyses were conducted among the midwives and cadres, who were presented with seven questions related to their experiences and observations regarding the application. Data analysis in the first year involved qualitative methods, utilizing the focus group discussions and in-depth

interviews, while in the second year, the analysis shifted to a quantitative approach, focusing on descriptive statistics to evaluate the training outcomes and assess the midwives' and cadres' understanding, confidence, and perceived effectiveness in promoting exclusive breastfeeding among mothers.

3. Results

M-Poma Application Development

The development of the M-Poma application was initiated through a series of Focus Group Discussions (FGDs) aimed at gathering diverse ideas and insights to ensure the application was designed effectively to meet the needs of its users. These discussions provided a platform for participants, including mothers, healthcare providers, and community health workers, to share their experiences, preferences, and suggestions regarding breastfeeding and the use of technology in supporting breastfeeding practices. Following the FGDs, the input collected was meticulously processed using statistical analysis with the NVivo software, a powerful tool for qualitative data analysis. NVivo allowed the research team to systematically categorize and interpret the feedback, identifying key themes and trends that emerged from the discussions. The results of the statistical tests conducted with NVivo are summarized below
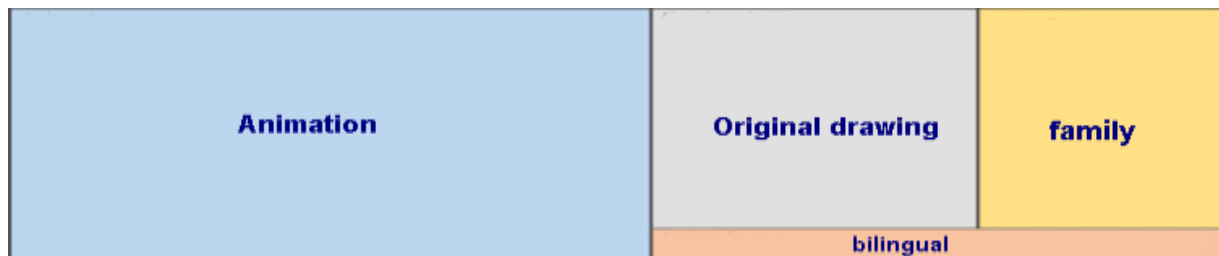

Fig 1 M-Poma Application Development: Insights from Focus Group Discussions

1.   Where the Application Appears

The analysis from the Focus Group Discussions (FGDs) revealed that most participants preferred the M-Poma application to be available on the Google Play Store. This choice aligns with the widespread use of Android devices among the target audience, making it easily accessible for downloads. Additionally, informants suggested that the application could also be hosted on a dedicated website. A web presence would provide a comprehensive resource hub, offering supplementary information about breastfeeding, user guides, and support materials.
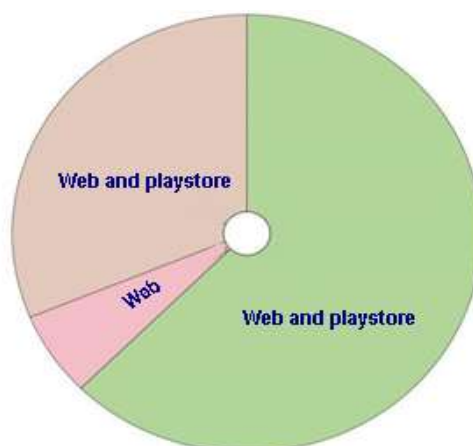

Fig 2 Accessibility Preferences for the M-Poma Application

Some participants recommended a hybrid approach, combining both the Play Store and a website. This strategy would maximize reach and accessibility, catering to users' varying preferences for accessing content. The M-Poma application aims to enhance user engagement and promote better breastfeeding practices within the community.

2.   What should appear on the application

Based on the analysis results, the majority of Focus Group Discussion (FGD) participants indicated that the M-Poma application should include essential information about exclusive breastfeeding. Key elements suggested for inclusion are a user profile outlining who can use the application—such as breastfeeding mothers, healthcare providers, and community health workers—along with the benefits of breastfeeding for both infants and mothers, as well as its positive impact on child development. Additionally, presenting current data and statistics related to breastfeeding would provide users with a broader context. Real-life case examples are also recommended to help users understand potential challenges and effective solutions. Lastly, incorporating relevant health history information would assist users in recognizing factors that may influence breastfeeding. By integrating these components, the M-Poma application aims to provide comprehensive guidance and support to mothers in their breastfeeding practices.
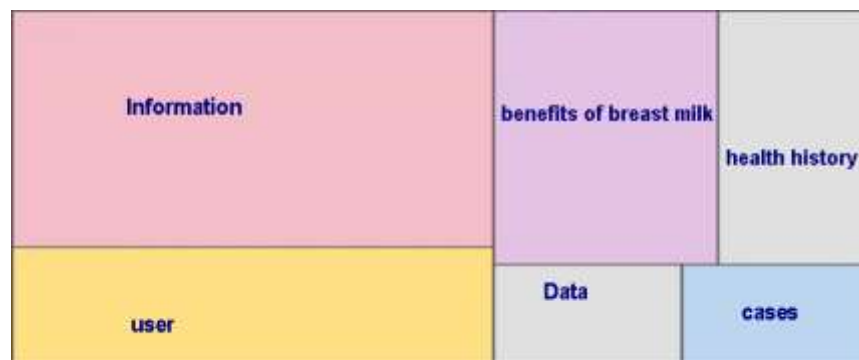

Fig 3 Insights from Focus Group Discussions

3.   What Is the Information Related to Exclusive Breastfeeding?

Based on the analysis results, the majority of Focus Group Discussion (FGD) participants emphasized the importance of including comprehensive data on exclusive breastfeeding and other relevant information in the M-Poma application. Key elements identified for inclusion are detailed information about who the users are, including breastfeeding mothers, healthcare providers, and community health workers.

Participants also suggested incorporating verses from the Quran that promote breastfeeding, as this would resonate with users on a cultural and spiritual level. Additionally, the application should provide general information about breastfeeding practices, follow-up case studies to demonstrate real-life applications, and information related to stunting—highlighting the critical connection between proper nutrition in infancy and long-term health outcomes. Lastly, including information about potential sanctions or consequences for not adhering to recommended breastfeeding practices could underscore the importance of exclusive breastfeeding. By integrating these diverse components, the M-Poma application aims to equip users with essential knowledge and resources to support effective breastfeeding practices.
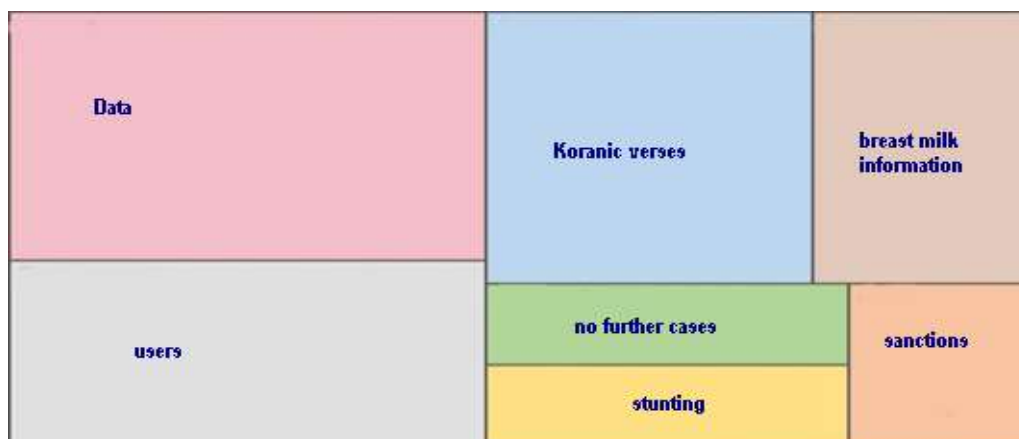

Fig 4 Key Information on Exclusive Breastfeeding for the M-Poma Application: Insights from FGDs

4.   What Midwives & Cadres Do

Based on the analysis results, the majority of Focus Group Discussion (FGD) participants highlighted that the information provided by midwives and cadres is typically conveyed in simple, accessible language, making it easier for mothers to understand. Participants emphasized the vital role midwives and cadres play in monitoring the growth and development of infants, as well as discussing the numerous benefits of breast milk. Additionally, they noted the importance of teaching mothers how to express breast milk effectively. Midwives and cadres are also responsible for maintaining a record of antenatal care (ANC) visits and conducting consultations to address any concerns related to breastfeeding. Furthermore, the materials they provide should align with the content of the M-Poma application, ensuring consistency in the messaging related to breast milk. By focusing on these responsibilities, midwives and cadres can significantly enhance the support they offer to mothers, ultimately promoting better breastfeeding practices and maternal-child health outcomes.
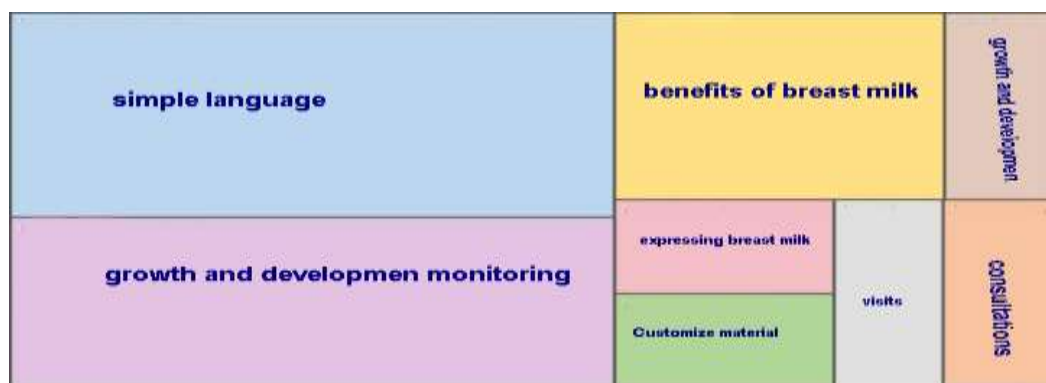

Fig 5 Roles of Midwives and Cadres in Supporting Breastfeeding: Insights from FGDs

5.   Monitoring Provided

Based on the analysis results, the majority of Focus Group Discussion (FGD) participants indicated that there is no need for significant differences in the monitoring practices carried out by midwives and cadres. Participants expressed that both midwives and cadres should utilize a consistent approach to monitoring, as this would promote uniformity in the care provided to mothers and infants. The emphasis on standardized monitoring practices ensures that all mothers receive the same quality of support, regardless of whether they are attended by a midwife or a cadre. This consistency is crucial for effectively tracking the growth and development of infants and addressing any breastfeeding challenges that may arise. By aligning their monitoring efforts, midwives and cadres can work collaboratively to foster a supportive environment for breastfeeding, ultimately enhancing maternal and child health outcomes.
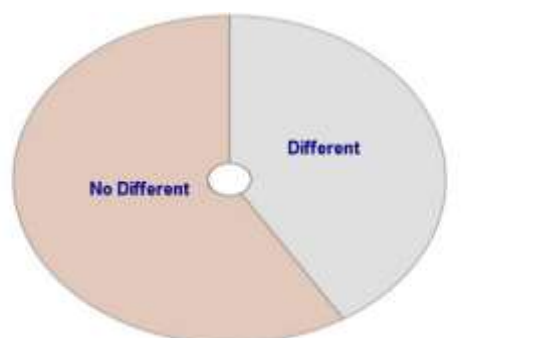

Fig 5 Consistent Monitoring Practices by Midwives and Cadres: Insights from FGDs

6.   An Initial Survey or Pre-Test Needs to Be Conducted

Based on the analysis results, the majority of Focus Group Discussion (FGD) participants expressed that there is no necessity for conducting an initial survey or pre-test before the M-Poma application is implemented. Participants felt confident that the application was sufficiently developed based on previous research and feedback from stakeholders. They believed that the comprehensive input gathered during the development phase

had adequately addressed potential user needs and preferences. As a result, participants suggested that moving directly to application use would be more efficient, allowing for real-time feedback from users rather than prolonging the process with preliminary testing. This perspective underscores the trust in the thoroughness of the application's design and the readiness of the target audience to engage with the platform without the need for additional pre-testing.
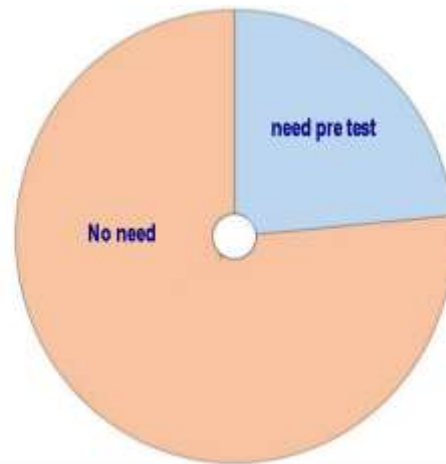

Fig 6 Rationale for Skipping Initial Survey or Pre-Test for the M-Poma Application: Insights from FGDs

7.   Consultation Room on the Application

Based on the analysis results, all Focus Group Discussion (FGD) participants unanimously agreed that a consultation room is an essential feature to be included in the M-Poma application. Participants emphasized the importance of having a dedicated space within the application where users can seek advice and support regarding breastfeeding and related concerns. This consultation room would provide mothers with direct access to qualified healthcare professionals, allowing them to ask questions, share their experiences, and receive personalized guidance. The inclusion of a consultation feature would not only enhance user engagement but also empower mothers by providing them with the resources they need to address challenges they may face during their breastfeeding journey. This feedback highlights the need for interactive support within the application, ensuring that users feel connected and supported throughout their breastfeeding experience.

Fig 7 Importance of a Consultation Room in the M-Poma Application: Insights from FGDs"

8.   Application Cover

Based on the analysis results, the majority of Focus Group Discussion (FGD) participants indicated that the closing section of the M-Poma application should incorporate slogans and motivational phrases. Participants emphasized that these elements would serve to inspire and encourage users as they navigate their breastfeeding journey. Additionally, they recommended that the application cover include rewards or incentives to further

engage users and recognize their efforts in promoting exclusive breastfeeding. Furthermore, it was suggested that the language used in this section should be concise and straightforward, avoiding overly lengthy or complex explanations. This approach would ensure that users can quickly grasp the key messages and feel motivated to apply what they have learned. By integrating these features, the application cover can effectively reinforce positive behaviors and support users in their breastfeeding endeavors.

Fig 8 Designing the Application Cover: Inspirational Features for the M-Poma App"

9.   Another Idea to Add to M-Poma

Based on the analysis results, the majority of Focus Group Discussion (FGD) participants proposed several valuable enhancements for the M-Poma application. One key suggestion was to include testimonials from mothers sharing their successful experiences with exclusive breastfeeding, which could serve to motivate and inspire other users. Additionally, participants emphasized the need for easy access to services provided by breastfeeding counselors within the application, allowing mothers to seek guidance and support as needed.

Furthermore, the ability to download consultation results and summaries could provide users with tangible records of their progress and discussions. Participants also recommended creating a dedicated space for submitting complaints, ensuring that users can voice their concerns and receive assistance. A "breastfeeding corner" featuring tips, resources, and community support could further enrich the user experience. Additionally, offering rewards in the form of certificates for achieving breastfeeding milestones would encourage continued engagement. Lastly, incorporating links to relevant organizations would facilitate access to broader resources and support networks. Collectively, these suggestions aim to enhance the functionality and user-friendliness of the M-Poma application, ultimately supporting mothers in their breastfeeding journeys.
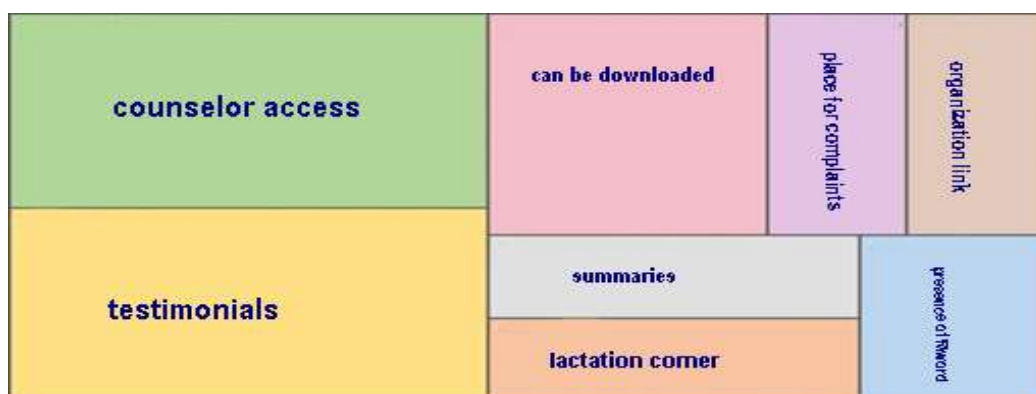

Fig 9 Enhancements for the M-Poma Application: Insights from Focus Group Discussion

After the analysis was completed, a draft of the M-Poma application was designed and subsequently submitted to the IT team for development into a functional application. Once the application was finalized by the IT team, the next step involved conducting a trial to assess its usability and content appropriateness. This trial was undertaken by a team of experts who meticulously evaluated the application, providing feedback and recommendations for improvement. The insights gathered from this expert team were crucial for refining the application, making it more user-friendly and appealing to the target audience.

The results of the interviews conducted with various informants yielded valuable input. For instance, Informant 1 suggested that the application should allow users to log in using their name and cellphone number instead of

email, as many people rarely use email for such purposes. They recommended a background color change from black to white, and suggested incorporating icons similar to those used in the Ministry of Health's application, which features a green and yellow color scheme. Informant 1 also noted that the Poma images currently appear sad and unattractive, which may deter users from engaging with the application. They emphasized the need for videos to play directly within the app, rather than resembling the YouTube interface. The material presented in the application should be concise and direct, avoiding excessive text. Additionally, the use of foreign language terms should be minimized; for example, "ongoing" could be replaced with "next." Furthermore, it was proposed that the application should feature a user account system to monitor exclusive breastfeeding in infants, which could be utilized by researchers, midwives, and community health cadres.

Informant 2 echoed many of the sentiments expressed by Informant 1, particularly regarding the need for a more user-friendly login process. They suggested that users should enter through the Ministry of Health's website rather than using email. To enhance visual appeal, they recommended using vibrant colors and making the material more engaging, as the current content was perceived as monotonous. Informant 2 also advocated for the removal of narration in the title background, suggesting that a lively color palette would greatly enhance user experience. They reiterated the importance of avoiding foreign language usage in the application's instructions.

Informant 3 contributed the perspective that logging in should be straightforward, advocating for a system where users provide their name, address, and date of birth to differentiate between users with similar names. They emphasized the need to incentivize users by offering rewards, thereby encouraging engagement with the application. To make the content more interactive, Informant 3 suggested using accessible language rather than scientific terminology. They also stressed the importance of keeping video durations short and ensuring that written content is presented in an easily readable font size. User experience trials with a focus group, such as pregnant women, were recommended to gather direct feedback on usability. Lastly, Informant 4 also expressed the need for an easy login process that does not require email. They emphasized that the Poma images should be visually appealing and suggested that the material should be presented in capital letters for better readability. The use of videos was again highlighted as a means to enhance the attractiveness of the application's content.

Midwife and Cadre Training

The research activity included comprehensive training sessions for midwives and community health cadres to ensure that the M-Poma application is effectively utilized and understood by both groups. The primary goal of this training was to provide participants with the necessary skills to navigate the application, enabling them to assist mothers in using it effectively. This training not only facilitated hands-on experience with the M-Poma application but also generated valuable feedback that contributed to its improvement, benefiting both the mothers using the application and the midwives who serve as administrators. The training sessions were conducted on August 28, 2024, for 25 midwives from the Kuta Baro Health Center, followed by a session on August 29, 2024, for 25 community health cadres from the Kuta Baro District in Aceh Besar Regency. These sessions were designed to be interactive, allowing participants to engage with the application directly, ask questions, and provide feedback based on their experiences The results of the data collection related to the midwife training outputs are summarized in the following table 1:

Table 1. Results of the analysis related to the ease of use of the M-Poma application as assessed by midwives during midwife training

Question	Category								Total	
	Easy		Very easy		Difficult		Very difficult			
	f	%	f	%	f	%	f	%	f	%
This application is easy to use	16	64	9	36	0	0	0	0	25	100
The user interface of this application is easy to understand and not confusing.	20	80	5	20	0	0	0	0	25	100
The presentation of material on the use of the M-Poma application by the speaker can be understood	20	77	6	23.1	0	0	0	0	26	104
The M-Poma application is easy to understand by using the forum feature.	19	76	6	24	0	0	0	0	25	100
Easily get material about maternal and child health using the education feature	20	83	4	16	0	0	0	0	24	96

Easily get material about maternal and child health using the education feature	18	72	7	28	0	0	0	0	25	100
The questionnaire questions are easy to understand and the display is pleasing to the eye.	18	72	7	28	0	0	0	0	25	100

Based on the data presented in Table 1, the majority of midwives provided positive evaluations of the M-Poma application, highlighting its user-friendly design and functionality. Specifically, many midwives noted that the application is easy to use, which is crucial for ensuring that both healthcare providers and mothers can navigate it without difficulty. This ease of use is particularly important in a healthcare setting, where time is often limited, and the ability to quickly access information can significantly impact patient care. Additionally, the midwives indicated that the application's interface is intuitive and easy to understand. The clarity of the design allows users to find the information they need without unnecessary confusion, making the application a valuable tool in their daily practice. This feedback suggests that the layout and organization of content within the application contribute to a seamless user experience, facilitating effective communication between midwives and the mothers they support.

Beyond overall usability, the midwives also appreciated the various integrated features within the application. They reported that these features are straightforward to operate, encouraging greater engagement and utilization of the application's capabilities. In essence, this functionality ensures that midwives can focus on providing care rather than struggling with complex technology. Moreover, the midwives found the educational material and questionnaires included in the application to be easy to understand. This aspect is critical, as it ensures that the information provided is accessible to all users, regardless of their prior knowledge or experience with breastfeeding. Clear and concise materials empower midwives to effectively communicate essential breastfeeding information to mothers, supporting better health outcomes. Finally, the aesthetic design of the application was also well-received. The midwives noted that the application's appearance is visually appealing, enhancing their overall experience while using it. A visually attractive interface can significantly improve user satisfaction and encourage frequent use, ultimately fostering a supportive environment for breastfeeding practices.

Table 2. Results of the analysis related to the development of the M-Poma Application assessed by Midwives in Midwife training

Question	Category			Total		
	Agree	%	Don't agree	%	f	%
This M-POMA application is in accordance with your needs	25	100	0	0	25	100
The M-POMA application is very easy to access anywhere and anytime	25	100	0	0	25	100
The appearance of the M-POMA application is very attractive	24	96	1	4	25	100
The features provided are very easy to understand	23	92	1	4	25	100
The material provided is very complete	24	96	1	4	25	100
The process of changing data in the M-POMA application is very easy in the profile feature.	23	92	1	4	25	100

Based on the data presented above, all respondents indicated that the application meets their needs and is easy to access. The majority of respondents expressed strong agreement regarding several aspects of the M-Poma application. They found the application's appearance to be very attractive and the interface easy to understand. Additionally, respondents praised the completeness of the educational material provided within the application, noting that it effectively addresses their informational needs. They also highlighted the user-friendly nature of the data change process within the profile feature, which they found straightforward and efficient. This positive feedback underscores the application's effectiveness in serving its intended audience and fulfilling its purpose in supporting breastfeeding practices.

Table 3 Results of analysis related to ease of use of the M-Poma application assessed by cadres in cadre training

Question	Category								Total	
	Easy		Very easy		Difficult		Very difficult		Total	
	f	%	f	%	f	%	f	%	f	%
This application is easy to use	14	56	11	44	0	0	0	0	25	100
The user interface of this application is easy to understand and not confusing.	19	76	6	24	0	0	0	0	25	100
The presentation of material on the use of the M-Poma application by the speaker can be understood	20	80	5	20	0	0	0	0	25	100
The M-Poma application is easy to understand by using the forum feature.	19	76	6	24	0	0	0	0	25	100
Easily get material about maternal and child health using the education feature	20	80	5	20	0	0	0	0	25	100
Easily get material about maternal and child health using the education feature	17	68	8	32	0	0	0	0	25	100
The questionnaire questions are easy to understand and the display is pleasing to the eye.	15	60	9	36	1	4	0	0	25	100

Based on the table above, the majority of cadres reported that the application is easy to use. They found the user interface to be intuitive and straightforward, making navigation simple and not confusing. Respondents noted that the educational material provided within the application is also easy to understand, which is essential for effective engagement. Furthermore, they highlighted that the features are user-friendly and facilitate a smooth experience. The materials and questionnaires are readily accessible and comprehensible, ensuring that users can obtain the information they need without difficulty. This feedback reflects the application's effectiveness in meeting the needs of its users and supporting their roles in promoting breastfeeding practices.

Table 4 Results of analysis related to the development of the M-Poma Application assessed by Cadres in Cadre training

Question	Category				Total	
	Agree	%	Don't agree	%	f	%
This M-POMA application is in accordance with your needs	23	92	2	8	25	100
The M-POMA application is very easy to access anywhere and anytime	24	96	1	4	25	100
The appearance of the M-POMA application is very attractive	24	96	1	4	25	100
The features provided are very easy to understand	25	100	0	0	25	100
The material provided is very complete	23	92	2	8	25	100
The process of changing data in the M-POMA application is very easy in the profile feature.	25	100	0	0	25	100

Based on the data presented above, all respondents indicated that the existing features of the application are easy to use, with the profile feature allowing for straightforward data changes. Additionally, the majority of respondents expressed agreement with several key statements about the M-Poma application. They noted that the application aligns well with their needs, emphasizing its accessibility from anywhere and at any time. Furthermore, respondents found the application's appearance to be very attractive, enhancing their overall user experience. They also appreciated the completeness of the educational material provided, which supports their understanding and engagement. This positive feedback underscores the effectiveness of the M-Poma application in catering to the needs of its users.

4. Discussion

Exclusive breastfeeding is crucial for enhancing the health of infants, necessitating various community efforts to expand its reach. To achieve this, technology can play a vital role in facilitating these initiatives. One effective approach is the development of mobile applications, among which the M-Poma application stands out. Based on the training outcomes, several valuable inputs were gathered that can be utilized to enhance future iterations

of the application. The M-Poma application serves as a powerful tool to promote exclusive breastfeeding among infants. In addition to the M-Poma application, there are several other applications designed to support exclusive breastfeeding. For instance, the M-Health application, which is backed by a curriculum focused on exclusive breastfeeding, has been shown to improve mothers' knowledge and skills in this important area. Exclusive breastfeeding is crucial for enhancing the health of infants, necessitating various community efforts to expand its reach. To achieve this, technology can play a vital role in facilitating these initiatives. One effective approach is the development of mobile applications, among which the M-Poma application stands out. Mobile health applications can improve knowledge and skills before and after training.(Bellad et al., 2023)Likewise, a study conducted in the Tigray region, Ethiopia, found that SMS-based interventions can increase exclusive breastfeeding in the first 3 months after birth compared to standard care.(Gebremariam et al., 2023). Mobile breastfeeding applications can be used by parents and caregivers to effectively monitor infant breastfeeding behavior and other health data. Monitoring conducted through mobile applications is expected to support and promote breastfeeding practices.(Dinour & Pole, 2022). Breastfeeding support received after giving birth in hospital and continued using a mobile phone when the mother is at home can maintain exclusive breastfeeding after giving birth in hospital.Center for Woman and Child Health (CWCH), Savar, Bangladesh.(Jerin et al., 2020)Similarly, research conducted in Melbourne, Australia showed that mothers who received telephone advice on breastfeeding in the first 3 weeks, 1 month, 3 months and 6 months were able to increase exclusive breastfeeding and improve the nutritional status of their babies.(Fan et al., 2023). The EMA (Ecological Momentary Assessment) application is an appropriate method to track the proportion of breastfeeding among participants who have complete data in the application after the first 8 weeks of the baby's life.(Demirci & Bogen, 2017)Another application to support breastfeeding in China is through the social networking platform We-chat. We-chat provides breastfeeding information and support, the use of this application has the potential to increase breastfeeding in China.(Tang et al., 2020; Wu et al., 2019). The study showed that respondents, both midwives and cadres, mostly answered that the knowledge material in the Poma application was complete. According toLeite et.alKnowledge information in the application needs to include references so that the reliability of the knowledge can be recognized and can provide a sense of security and greater self-confidence for mothers in seeking up-to-date knowledge(Leite et al., 2024). The M-Poma application also includes educational videos related to the effects of giving bananas to babies and songs containing invitations and motivation for mothers to only give breast milk to newborns up to 6 months of age. Research that provides education through videos is expected to increase exclusive breastfeeding to babies. The Philani Exclusive Breastfeeding Intervention Application (MOVIE) is designed to assist community health workers in providing education using the Philani Movie video which contains 13 educational videos. Using these videos can increase exclusive breastfeeding for 1 and 5 months in the Western Cape, South Africa.(Adam et al., 2021). Respondents conveyed the need to add material related to the impact if babies do not receive exclusive breastfeeding to the application. Exclusive breastfeeding has benefits to prevent death and illness in babies due to infectious diseases, such as diarrhea and ARI, fever and malnutrition.(Abdulla et al., 2022; M. N. Khan & Islam, 2017). In addition, research in Sweden shows that babies who get Exclusive Breastfeeding for at least 4 months or more can reduce the occurrence of hospitalization in babies due to infectious diseases. There is a decrease in the risk of digestive tract and respiratory tract infections in the early stages of birth if babies get breast milk until the age of 4 months.(Videholm et al., 2021). In addition, respondents with a midwife background also stated that there needs to be material related to support provided by fathers in breastfeeding. The role of fathers in supporting mothers to breastfeed is very important to note. Several studies have shown that fathers who are involved in breastfeeding practices can increase breastfeeding in their babies. An RCT study showed that fathers who receive education about breastfeeding will provide support for mothers and can positively influence breastfeeding practices and increase exclusive breastfeeding.(Panahi et al., 2022)Involving fathers in breastfeeding promotion programs can increase exclusive breastfeeding at 1, 4 and 6 months.(Bich et al., 2019). The M-Poma application has been developed to support exclusive breastfeeding, which is essential for improving infant health. Feedback from Focus Group Discussions (FGD) indicated that the application should include information on exclusive breastfeeding, user profiles, case examples, and resources related to stunting. Training sessions for midwives and community health cadres confirmed that the application is user-friendly, featuring an attractive interface and easily understandable materials. Input from midwives and cadres highlighted the importance of a simple login process, engaging visuals, and accessible educational content. The majority of respondents felt that the application's features are easy to use and appreciated the straightforward data management within user profiles. Overall positive feedback indicates that the M-Poma application effectively meets the needs of its users. M-Poma applications, such as the M-Health application, also facilitate exclusive breastfeeding by enhancing mothers' knowledge and skills through structured curricula. These technological interventions collectively

represent a significant effort to promote exclusive breastfeeding, improve maternal and child health outcomes, and ensure that healthcare providers are prepared to support mothers in their breastfeeding journeys.

5. Conclusion and future scope

The M-Poma application has been developed through a collaborative process that incorporated community feedback, ensuring that it effectively supports exclusive breastfeeding, a critical factor for improving infant health. Training sessions with midwives and community health cadres confirmed the application's user-friendly design, attractive interface, and clear educational materials, all of which contribute to a positive user experience. Participants emphasized the importance of a simple login process and accessible content, with many finding the features intuitive and the data management straightforward. Despite these achievements, there remain areas for improvement. User feedback is highly valued, guiding ongoing revisions to enhance the application's appeal and efficiency. The commitment to continuous improvement underscores the potential of M-Poma to make a significant impact on exclusive breastfeeding practices within the community.

Ethical statement

This study was performed with approval from the Ethics committee of the Health Polytechnic of the Ministry of Health Aceh

Reference

[1] Abdulla, F., Hossain, M. M., Karimuzzaman, M., Ali, M., & Rahman, A. (2022). Likelihood of infectious diseases due to lack of exclusive breastfeeding among infants in Bangladesh. PLoS ONE, 17(2 February). https://doi.org/10.1371/journal.pone.0263890

[2] Abolyan, L. V. (2006). The breastfeeding support and promotion in Baby-Friendly Maternity Hospitals and Not-as-Yet Baby-Friendly Hospitals in Russia. Breastfeeding Medicine : The Official Journal of the Academy of Breastfeeding Medicine, 1(2), 71–78. https://doi.org/10.1089/BFM.2006.1.71

[3] Adam, M., Johnston, J., Job, N., Dronavalli, M., Le Roux, I., Mbewu, N., Mkunqwana, N., Tomlinson, M., McMahon, S. A., LeFevre, A. E., Vandormael, A., Kuhnert, K. L., Suri, P., Gates, J., Mabaso, B., Porwal, A., Prober, C., & Bärnighausen, T. (2021). Evaluation of a community-based mobile video breastfeeding intervention in Khayelitsha, South Africa: The Philani MOVIE cluster-randomized controlled trial. PLoS Medicine, 18(9), 1–25. https://doi.org/10.1371/journal.pmed.1003744

[4] Bellad, R. M., Mahantshetti, N. S., Charantimath, U. S., Ma, T., Washio, Y., Short, V. L., Chang, K., Lalakia, P., Jaeger, F. J., Kelly, P. J., Mungarwadi, G., Karadiguddi, C. C., Goudar, S. S., & Derman, R. J. (2023). A training curriculum for an mHealth supported peer counseling program to promote exclusive breastfeeding in rural India. International Breastfeeding Journal, 18(1). https://doi.org/10.1186/s13006-023-00546-4

[5] Bich, T. H., Long, T. K., & Hoa, D. P. (2019). Community-based father education intervention on breastfeeding practice—Results of a quasi-experimental study. Maternal and Child Nutrition, 15. https://doi.org/10.1111/mcn.12705

[6] Cai, X., Wardlaw, T., & Brown, D. W. (2012). Global trends in exclusive breastfeeding. International Breastfeeding Journal, 7(1), 1–5. https://doi.org/10.1186/1746-4358-7-12/FIGURES/2

[7] Demirci, J. R., & Bogen, D. L. (2017). Feasibility and acceptability of a mobile app in an ecological momentary assessment of early breastfeeding. Maternal & Child Nutrition, 13(3), 1–11. https://doi.org/10.1111/mcn.12342

[8] Dinour, L. M., & Pole, A. (2022). Evaluation of Breastfeeding App Features: Content Analysis Study. JMIR Pediatrics and Parenting, 5(4). https://doi.org/10.2196/37581

[9] Fan, W. Q., Chan, C., Paterson, S., Foster, K., Morrow, M., Bourne, D., & Ashworth, J. (2023). Weekly Proactive Telephone Breastfeeding Standard Care by Lactation Consultants in the First Month Postpartum Prolongs Breastfeeding for Up to 6 Months. Nutrients, 15(9). https://doi.org/10.3390/nu15092075

[10] Gebremariam, K. T., Mulugeta, A., & Gallegos, D. (2023). Theory-based mHealth targeting fathers and mothers to improve exclusive breastfeeding: a quasi-experimental study. International Breastfeeding Journal, 18(1). https://doi.org/10.1186/s13006-022-00537-x

[11] Jerin, I., Akter, M., Talukder, K., Talukder, M. Q. E. K., & Rahman, M. A. (2020). Mobile phone support to sustain exclusive breastfeeding in the community after hospital delivery and counseling: A quasi-experimental study. International Breastfeeding Journal, 15(1). https://doi.org/10.1186/s13006-020-00258-z

[12] Khan, J., Vesel, L., Bahl, R., & Martines, J. C. (2015). Timing of Breastfeeding Initiation and Exclusivity of Breastfeeding During the First Month of Life: Effects on Neonatal Mortality and Morbidity—A Systematic Review and Meta-analysis. Maternal and Child Health Journal, 19(3), 468–479. https://doi.org/10.1007/S10995-014-1526-8/METRICS

[13] Khan, M. N., & Islam, M. M. (2017). Effect of exclusive breastfeeding on selected adverse health and nutritional outcomes: A nationally representative study. BMC Public Health, 17(1). https://doi.org/10.1186/s12889-017-4913-4

[14] Labbok, M. (2020). Chapter 3. Breastfeeding in Public Health: What Is Needed for Policy and Program Action? Beyond Health, Beyond Choice, 36–50. https://doi.org/10.36019/9780813553160-005/XML

[15] Lawn, J. E., Cousens, S., & Zupan, J. (2005). Lancet Neonatal Survival Steering Team. 4 million neonatal deaths: When? Where? Why? Lancet, 365(9462), 891–900. https://doi.org/10.1016/s0140-6736(05)71048-5

[16] Leite, R. de A. M., Pedron, C. D., Bonatto, V. F., Machado, E. de O., Wachter, D. A., Michielin, F. da C., Bubols, J. P., Vizini, S. T., Santos, S., & Chassot, M. D. (2024). Criteria for evaluation of breastfeeding mobile applications: A scoping review. In Eyes on Health Sciences V.02. Seven Editora. https://doi.org/10.56238/sevened2024.001-001

[17] Nutr, A., Prentice, A. M., & Prentice @, A. (2022). Breastfeeding in the Modern World. Annals of Nutrition and Metabolism, 78(Suppl. 2), 29–38. https://doi.org/10.1159/000524354

[18] Panahi, F., Rashidi Fakari, F., Nazarpour, S., Lotfi, R., Rahimizadeh, M., Nasiri, M., & Simbar, M. (2022). Educating fathers to improve exclusive breastfeeding practices: a randomized controlled trial. BMC Health Services Research, 22(1). https://doi.org/10.1186/s12913-022-07966-8

[19] Pérez-Escamilla, R., Martinez, J. L., & Segura-Pérez, S. (2016). Impact of the Baby-friendly Hospital Initiative on breastfeeding and child health outcomes: a systematic review. Maternal & Child Nutrition, 12(3), 402–417. https://doi.org/10.1111/MCN.12294

[20] Rollins, N. C., Bhandari, N., Hajeebhoy, N., Horton, S., Lutter, C. K., Martines, J. C., Piwoz, E. G., Richter, L. M., & Victora, C. G. (2016). Why invest, and what it will take to improve breastfeeding practices? The Lancet, 387(10017), 491–504. https://doi.org/10.1016/S0140-6736(15)01044-2

[21] Shaping health insights: WHO's support for the Indonesia Health Survey 2023. (n.d.). Retrieved October 7, 2024, from https://www.who.int/indonesia/news/detail/11-01-2024-shaping-health-insights--who-s-support-for-the-indonesia-health-survey-2023

[22] Sulaeman, E. S., Murti, B., Setyawan, H., & Rinawati, S. (2018). Exclusive Breastfeeding Behavior Model in Rural Central Java, Indonesia: The Application of Theory of Planned Behavior. Global Journal of Health Science, 10(10), p35. https://doi.org/10.5539/GJHS.V10N10P35

[23] Survei Kesehatan Indonesia (SKI) 2023 - Badan Kebijakan Pembangunan Kesehatan | BKPK Kemenkes. (n.d.). Retrieved October 7, 2024, from https://www.badankebijakan.kemkes.go.id/hasil-ski-2023/

[24] Tang, L., Lee, A. H., Binns, C. W., Duan, L., Liu, Y., & Li, C. (2020). WeChat-based intervention to support breastfeeding for Chinese mothers: protocol of a randomised controlled trial. BMC Medical Informatics and Decision Making, 20(1). https://doi.org/10.1186/s12911-020-01322-8

[25] Victora, C. G., Bahl, R., Barros, A. J. D., França, G. V. A., Horton, S., Krasevec, J., Murch, S., Sankar, M. J., Walker, N., Rollins, N. C., Allen, K., Dharmage, S., Lodge, C., Peres, K. G., Bhandari, N., Chowdhury, R., Sinha, B., Taneja, S., Giugliani, E., … Richter, L. (2016a). Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. The Lancet, 387(10017), 475–490. https://doi.org/10.1016/S0140-6736(15)01024-7

[26] Victora, C. G., Bahl, R., Barros, A. J. D., França, G. V. A., Horton, S., Krasevec, J., Murch, S., Sankar, M. J., Walker, N., Rollins, N. C., Allen, K., Dharmage, S., Lodge, C., Peres, K. G., Bhandari, N., Chowdhury, R., Sinha, B., Taneja, S., Giugliani, E., … Richter, L. (2016b). Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. Lancet (London, England), 387(10017), 475–490. https://doi.org/10.1016/S0140-6736(15)01024-7

[27] Videholm, S., Wallby, T., & Silfverdal, S. A. (2021). Breastfeeding practice, breastfeeding policy and hospitalisations

for infectious diseases in early and later childhood: A register-based study in Uppsala County, Sweden. BMJ Open, 11(5). https://doi.org/10.1136/bmjopen-2020-046583

[28] Vu Hoang, D., Cashin, J., Gribble, K., Marinelli, K., & Mathisen, R. (2020). Misalignment of global COVID-19 breastfeeding and newborn care guidelines with World Health Organization recommendations. BMJ Nutrition, Prevention & Health, 3(2), 339. https://doi.org/10.1136/BMJNPH-2020-000184

[29] Wallingford, J. (2016). Breastfeeding in the 21st century. The Lancet, 387(10033), 2087. https://doi.org/10.1016/S0140-6736(16)30547-5

[30] Walters, D., Kakietek, J. J., Eberwein, J. D., Pullum, T., & Shekar, M. (2016). Breastfeeding in the 21st century. The Lancet, 387(10033), 2087. https://doi.org/10.1016/S0140-6736(16)30546-3

[31] Wu, Q., Huang, Y., Van Velthoven, M. H., Wang, W., Chang, S., & Zhang, Y. (2019). The effectiveness of using a WeChat account to improve exclusive breastfeeding in huzhu county qinghai province, China: Protocol for a randomized control trial. BMC Public Health, 19(1). https://doi.org/10.1186/s12889-019-7676-2