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# Engaging Mothers and Community Health Workers: An Online Maternal and Children’s Health Education in Kampung Lio, Indonesia

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## Abstract

To raise awareness and understanding of maternal and children’s health, a team from Faculty of Medicine, Universitas Indonesia, Indonesia, conducted a program called *Tinggi Cerdas*. It is a community development program in Kampung Lio, Depok, West Java. This article evaluates the impacts of activity related to the participant’s awareness and knowledge about maternal and children’s health. The program was developed and conducted as an online program due to the COVID-19 pandemic situation, from September to December 2021. The program was developed with four different topics through online communication, equipped with an educational booklet for the mothers and a PrimaKu® application for health workers. Such approaches were employed to provide the community with better health awareness and understanding, as well as an instrument for the health workers to monitor the condition of the participants. Community health workers (CHWs) were given a workshop about the application to help them in raising mothers’ awareness to monitor their children’s growth and development. To examine the impacts of the program, pre- and post-tests were used to evaluate the impact on the participants’ knowledge—the mothers’ and CHWs’. The result of the program’s assessment suggests that mothers’ knowledge and awareness about children’s and maternal health are improved, particularly when the application was also utilized by the CHWs in Kampung Lio. The participants are satisfied with the program, implying the program should be repeated. Despite the limitations, health education for mothers and CHWs could be carried out successfully. Insights and reflections are provided in this study to encourage readers to develop a more effective program in the future.

## Keywords:

maternal and children’s health education; online teaching; PrimaKu®; community health workers; COVID-19; community development program

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## 1. Introduction

This article examines the impacts of *Tinggi Cerdas* (in Indonesian Language, *Tinggi* means tall, *Cerdas* means smart), a community development program related to the participants’ awareness and knowledge about maternal and children’s health in Kampung Lio, an urbanized context. The community program consists of health education for mothers and the community health workers (CHWs) to monitor the mothers’ awareness in raising their children. It attempts to improve the awareness and knowledge of the

community, particularly through activating the mothers, so that child stunting, which still prevails, can be reduced.

Stunting is defined as a condition in which a child's height-for-age is below  $-2$  standard deviation in the WHO Child Growth Standard Chart and is one of the measurable indicators of growth failure during the first 1,000 days of life (Beal et al., 2018; de Onis & Branca, 2016). The first 1,000 days of life, or the period from conception and gestation to the age of two, is an important period in one's life (Agosti et al., 2017; Bettiol et al., 2021). During this period, very rapid growth and development of the human brain and other organs occur (Derbyshire & Obeid, 2020; Martorell, 2017). A lack of maternal and children's essential nutrition, along with insufficient stimulation during the first 1,000 days of life, could lead to stunting, which has long-term effects on cognitive skills and a higher risk of developing diseases later in life (Martorell, 2017; Moreno Villares, 2016).

Since stunting is not treatable, one of the strategies recommended by the WHO to overcome this problem is by engaging in promotive and preventive measures. It can be through programs aiming to raise awareness and understanding by addressing stunting with community-based activity. This has been practiced widely and is shown to increase knowledge, attitude, and practice in promoting good health (Widyahening et al., 2021).

This study examines the community development program conducted by students from the Faculty of Medicine, Universitas Indonesia (UI), to address such problems in Kampung Lio, a village in Depok City, West Java, Indonesia. From a community diagnosis conducted earlier, the initial assessment shows that more than 30% of people still have a misunderstanding about stunting and the nutrition fulfilment required to support the child and foster maternal health. In response to that, *Tinggi Cerdas* becomes a program, whose objective is to raise people's knowledge and awareness of balanced nutrition as an initial effort to improve children's and maternal health and prevent stunting.

Ever since the COVID-19 pandemic started, it has brought negative impacts, especially on people's economic conditions due to unemployment and reduced income, which affected food insecurity indirectly and restricted health access (Akseer et al., 2020; Gummerson et al., 2021; Pak et al., 2020). This problem was also faced by the people in Kampung Lio, including the children and mothers, leading to an increase in child and maternal health-related problems. Therefore, this program was urgently needed with some modifications to comply with the pandemic context and to fit with the characteristics of the community.

A shift from offline activity to online required the UI team to formulate a suitable program that responds to the needs of the community. The *Tinggi Cerdas* program was originally to be held around September to December every year. However, due to the COVID-19 pandemic, the program could not be conducted as it used to be. A study by Sonoda and Salter (2022) found that health education delivered routinely can increase the community's continuing health literacy. Thus, it is important to maintain the sustainability of the program in the community. This paper illustrates how the UI team tried to formulate a new method of community development activities in children's and maternal health while trying to accommodate the participants' preferences. Further, there will be an explanation of how this online activity impacts participants' knowledge about children's and maternal

health through an assessment as an initial effort to help reduce children's and maternal health-related problems.

## **2. *Tinggi Cerdas* as an Online Educational Program**

Three phases were planned for the *Tinggi Cerdas* program in Kampung Lio. The first is the preparation phase, consisting of preliminary research of the community, finding suitable approaches and techniques for the online training program, drafting training materials for the participants, and recruiting and training the volunteers from Universitas Indonesia and local participants, consisting of mothers and CHWs. The second is the implementation of the program through online activities and the third phase is the evaluation of the program by the participants.

### ***Phase 1: Preparation***

In March 2020, the beginning of COVID-19, the UI team started a brainstorming process to find a suitable online format for the community project, as it was predicted that the pandemic situation would not get better in the foreseeable future. Therefore, the method had to be switched to online events. Our team started by asking about the condition of the *Posyandu*—a place where children's growth and development are measured every month—and then continued to advocate our program's plan. The community health workers (CHWs) of the local community agreed to cooperate, so our team finalized the activities and started to draft an e-booklet. The booklet was prepared with explicit information and illustrations, as several studies conducted by Bobek & Tversky (2016), Collier (2011), Norris (2012), Park and Zuniga (2016), and Schubbe et al. (2020) found that an illustration could help give a better understanding of a term or concept whether in general or doctor–patient settings. After the preparation was complete, the UI team started to collect community data (e.g., names, phone numbers, pregnancy status, and age of the children). As many as 26 volunteers from the university were recruited and asked to join an online training, so they understand the issue raised by this project and how to carry out the activities.

### ***Phase 2: Implementation of Tinggi Cerdas***

The *Tinggi Cerdas* program conducted by the UI team and volunteers was held once a month, monitoring the health conditions of the children in Kampung Lio through the mothers. Since Kampung Lio is well-known for its stunting cases, it was important to involve more participants in the community. Thus, the program consisted of two main activities—engagement with the mothers and activation of the CHWs of the Kampung Lio—and was planned to be conducted within 4 months. To engage with the mothers, the team prepared four different topics for each month (Figure 1 and Figure 2), which were arranged to suit the stage of child development. The monitoring activity was conducted via WhatsApp communication. The UI team members and volunteers explained the material with the help of the e-booklet.

Meanwhile, the activation of the CHWs was conducted after the monthly activity for mothers had finished. This CHWs training introduced PrimaKu® Application Training—an app from the Indonesian Pediatric Society that helps mothers monitor their children's growth and development. The app was introduced so that the CHWs can better assist the

mothers in monitoring their children. The training of the CHWs was conducted via an online meeting, consisting of a presentation and workshop on how to use the application.



Figure 1. Preview of *Tinggi Cerdas* e-booklet

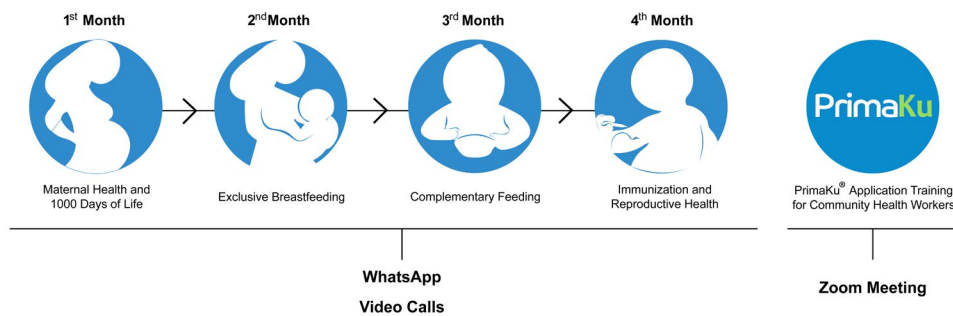


Figure 2. Topics and activity overview of *Tinggi Cerdas*

### Phase 3: Evaluation

To assess the program, the UI team collected data from participants—the mothers and the CHWs—through pre- and post-tests regarding their level of knowledge and satisfaction with the whole program. The first assessment is designed to measure the mothers’ understanding of the activity material, reflecting their knowledge before and after the activities. Each test consisted of five true-or-false questions. To improve the knowledge of the mother, the assessment is also accompanied by the volunteers, so if there was a need from the mothers regarding the activity material, the volunteers could provide clarification on the correct answers. After the whole program, the satisfaction of the mothers was asked by employing five questions using two Likert scale questions and three open-ended questions.

The next assessment was conducted to measure the CHWs’ knowledge of child nutrition and the use of the PrimaKu® application assessment through pre- and post-tests. Aside from the evaluation, the satisfaction of the CHWs’ with the program was also asked. Lastly, a similar satisfaction questionnaire for the volunteers was also conducted, to know their satisfaction level with their experience in participating in the *Tinggi Cerdas* program.

### 3. Results and Discussion

During the first phase of the program (the preparation), some obstacles occurred, particularly related to the preliminary data collection of the community and the interest of the participants. Participant recruitment was very challenging since the UI team had not done any online activity before, so the data were scattered. Our team was able to collect 114 mothers' data with the help of CHWs and proceeded to start contacting the mothers. Later, there were some difficulties again because some of them did not have a WhatsApp account, some were duplicates, and several of the mothers did not respond.

In the end, in August 2020, the team was able to recruit 26 mothers who would attend the program. A similar situation happened in another study conducted by Hall et al. (2021) which stated that unresponsiveness from other parties in the program could happen possibly because all communication was limited to virtual interaction only. This result is aligned with another study by Marsh et al. (2021) and Plunk et al. (2022) which found that the rapid changes in the activity method of community engagement programs due to the COVID-19 pandemic from in-person to virtual meetings produced some technical difficulties around such issues as limited experience in using video conferencing alongside limited knowledge of digital technology.

The program gained a varied response and interest from the community every month. In the first month, there were 13 participants, nine participants in the second, eight participants in the third, and five participants in the last activity (Table 1). Even though participant numbers decreased with each subsequent activity, the UI team kept doing all the activities to support the spirit of each participant who persevered willingly with this program to the end. Most of the mothers quit the activity for unknown reasons, and some of them stopped joining due to different priorities (e.g., financial difficulties and family issues).

Table 1. Profile of the participants

Participants' Characteristics	n (N = 13)	%
Pregnant women	1	7.7
Women with children under 2 years old	2	15.4
Women with children between 2 and 5 years old	10	76.9

Meanwhile, CHWs activity was attended by four participants out of a total of 20 CHWs in Kampung Lio. It was difficult to reach them to join the activity that was held via the Zoom meeting. Most of them were unable to join for unknown reasons, and some were unable to join due to events conflicting in terms of timing. This indicates low interest in joining such an online program.

The condition can be also confirmed by Haleem et al. (2020) and Ranjitkar et al. (2022) that the COVID-19 pandemic affected daily life including social and economic matters which led some participants to prioritize those things. Repeated topics from the previous year's activities and limited access to technology, including WhatsApp, were also some of the reasons why only a few participants managed to join the program initially. A study by Plunk et al. (2022) found that to maintain community participation in such a



program, there should be a commitment to provide supporting facilities including proper smartphones, internet access, or adequate cellular data since most of the participants have only limited internet data plans.

The following is the result of the assessment of the program implementation in Kampung Lio. As mentioned before, basically, there are two kinds of assessment—the improvement of knowledge of the participants and the satisfaction of the participants regarding the program.

### 3.1. Measuring the knowledge level of the participants of the online program

The measurement of this aspect was conducted through the pre- and post-tests of the mothers as participants and the CHWs using questionnaires. The first inquiry was to assess the level of knowledge of the mother participants regarding the given topic monthly—(1) first 1,000 days of life and stunting in children; (2) exclusive breastfeeding practices; (3) complementary feeding; and (4) immunization and reproductive health. The second one was to assess the knowledge level of the CHWs related to monitoring mothers’ and children’s health through PrimaKu® app.

#### *Assessment from the mother participants*

Topic 1: First 1,000 days of life and stunting in children.

The pre- and post-test questionnaires consisted of five questions related to the first 1,000 days of life and stunting in children. Table 2 shows the distribution of the right answers to the pre- and post-test questions. It shows an increase in the post-test scores’ mean value compared to the pre-test scores’ mean value from the answers from 13 mother participants.

Table 2. Distribution of the right answer at the pre- and post-test of the first activity

Question	Pre-test		Post-test	
	n = 13	%	n = 13	%
(1) The first 1,000 days of life start when the baby is born	3	23	7	53.8
(2) Undernutrition in the first 1,000 days of life will cause a delay in the brain’s growth	11	84.6	13	100
(3) Diarrhea and being infected by intestinal worms will cause stunting	9	69.2	13	100
(4) Being worried during pregnancy is normal	13	100	12	92.3
(5) Pre-eclampsia can be prevented	7	53.8	12	92.3

It can be seen that there is an increase in the proportion of the participants who answered questions (1), (2), (3), and (5) of the post-test correctly. The table also showed all participants answered questions (2) and (3) correctly, which stated, “Diarrhea and being infected by intestinal worms will cause stunting” and “Undernutrition in the first 1,000 days of life will cause a delay in the brain’s growth.” One of the possible reasons for this result is that those statements are explicitly written in the booklet and are supported with an illustration. However, for question (4), which stated, “Being worried during pregnancy is normal,” there was a decrease in the number of participants who answered correctly

in the post-test (100% to 92.3%) which may be because the number of new information caused them to become worried and, therefore, think that being worried is not normal.

Topic 2: Exclusive breastfeeding practices.

The second assessment involved nine mothers as participants. The tests contained five questions related to exclusive breastfeeding practices. Table 3 shows the distribution of the right answer to the pre- and post-test questions of the second activity. It shows an increase in the post-test scores' mean value compared to the pre-test scores' mean value.

Table 3. Distribution of the right answer at the pre- and post-test of the second activity

Question	Pre-test		Post-test	
	n = 9	%	n = 9	%
(1) A 0–6-month-old to 1-year-old baby is allowed to be given honey	6	66.7	7	77.8
(2) The portion of side dishes for breastfeeding mothers is one-third of half a plate	7	77.8	7	77.8
(3) A sign that the baby is getting enough breast milk is that the baby urinates more than 6x/day with non-concentrated urine	8	88.9	7	77.8
(4) The first breast milk that is yellow-colored is not good for the baby	9	100	9	100
(5) Eating sea fish makes the breast milk fishy	9	100	9	100

Table 3 above shows that only one out of five questions, question (1), had an increase in the number of participants who answered correctly in the post-test compared to the pre-test. However, question (3), which stated, “A sign that the baby is getting enough breast milk is that the baby urinates more than 6x/day with non-concentrated urine,” had a decreased number of participants who answered correctly in the post-test. The reason for this could be human error that caused participants to forget numbers more easily as compared to forgetting concepts. Questions (2), (4), and (5) had no difference in the number of participants who gave the correct answer in the pre- or post-test, which could be caused by a lack of concentration by participants while listening to the activity program. Another reason may be that the volunteer might not have emphasized the important points of the educational materials.

Topic 3: Complementary feeding.

The third assessment evaluates the knowledge of eight participants. Table 4 shows an increase in the post-test scores' mean value compared to the pre-test scores' mean value.

Table 4 indicates that there were increases in every question's total number of participants who answered correctly on the post-test, compared to the pre-test, except for question (3). In question (3), which stated, “An increase in body weight that is not optimal is the beginning of failure to thrive which can progress to stunting,” every participant answered correctly in both the pre- and post-test. The reason for this may be the initial level of knowledge of mothers in Kampung Lio about stunting in children was relatively adequate since it was the fourth year of a community development



program. It can also be seen that every question in the post-test was answered correctly by all the participants, except for question (2), which stated that vegetable protein is more important than animal protein for complementary foods. This result could be the consequence of non-explicit information regarding complementary foods' protein needs in the booklet, which only stated that animal protein containing higher iron is more important, and not compare it with vegetable proteins.

Table 4. Distribution of the right answer at the pre- and post-test of the third activity

Question	Pre-test		Post-test	
	n = 8	%	n = 8	%
(1) After reaching the age of 6 months, infants start to be given complementary feeding but should not continue to be breastfed exclusively until they reach the age of 2 years old	7	87.5	8	100
(2) Vegetable protein (such as tempeh, tofu, and beans) is more important than animal protein (chicken liver, beef, eggs, and fish) for complementary foods	4	50	7	87.5
(3) An increase in body weight that is not optimal is the beginning of failure to thrive which can progress to stunting	8	100	8	100
(4) The bad taste of complementary foods is one of the causes of children having difficulty eating	7	87.5	8	100
(5) When eating, children should not be watching TV, playing, or running around	5	62.5	8	100

#### Topic 4: Immunization and reproductive health.

The assessment of the fourth topic involved five mothers. Table 5 shows an increase in the post-test scores' mean value compared to the pre-test scores' mean value.

Table 5 shows an increase in correctly answered questions, which were questions (1), (2), (4), and (5) in the post-test compared to the pre-test. A significant increase from no correct answers in the pre-test to 100% of participants answering correctly in the post-test can also be seen in question (4), which stated, "Breast self-examination is carried out after every menstruation starting at the age of 20 years." These data show that after the activity, there is an upgrade in participants' knowledge compared to before the activity, which may be caused by the information that is contained explicitly in the activity booklet. Information regarding the tutorial of doing breast self-examination is also provided in the booklet, therefore, perhaps causing the participants to remember the information more easily, and detailed illustrations on medical concepts and procedures can give a better understanding of and adherence to the information given to patients (Collier, 2011; Haragi et al., 2019; Jacob et al., 2021).

All four activities (100%) show an increase in the post-test score compared to the pre-test score. Out of 20 questions given throughout four activities, the number of participants who answered correctly in 13 questions (65%) showed an increase, decreased in two questions (10%), and showed no changes in another five questions (25%).

Table 5. Distribution of the right answer at the pre- and post-test of the fourth activity

Question	Pre-test		Post-test	
	n = 5	%	n = 5	%
(1) Immunizations are not safe during a pandemic	4	80	5	100
(2) Vaccination is not necessary because all diseases can be prevented by ensuring sanitation and hygiene	2	40	3	60
(3) After urinating, cleaning the genitals is done from the back to the front	4	80	4	80
(4) Breast self-examination is carried out after every menstruation starting at the age of 20 years	0	0	5	100
(5) The IVA test is an important method for the early detection of cervical cancer, with a method that is cheap, easy, and fast	3	60	4	80

*Assessment from the CHWs participants*

This part of the program assesses the knowledge of local CHWs regarding stunting in children and the PrimaKu®, a digital app created by Ikatan Dokter Anak Indonesia (Indonesian Pediatric Society) that serves as a platform to educate parents regarding immunization, growth and development, nutrition, and various other aspects of children's health. The results of this activity were assessed using pre- and post-tests. The results of the pre-test carried out before the activity showed that the average score attained by the four CHWs who responded to the questionnaire was 75%.

Table 6. Pre- and post-test questionnaires for community health workers

<b>1. How can we detect stunting or poor nutrition in children at an early age?</b>
a. Stunting cannot be detected
b. Measure children's growth regularly
c. Give drumstick tree leaves to children regularly
<b>2. The PrimaKu® application is supported by</b>
a. The Indonesian Pediatric Society
b. Perhimpunan Dokter Spesialis Gizi Klinik Indonesia
c. Perkumpulan Obstetri dan Ginekologi Indonesia
<b>3. What are the functions of PrimaKu®?</b>
a. Growth chart, immunization schedule, child development, health article
b. Mother's nutrition, pregnancy graph, consultation schedule
c. Consultation schedule, pharmaceuticals shop, online physician consultation
<b>4. What are the benefits of using PrimaKu®?</b>
a. Paid app to enjoy full benefits
b. Medicine can be purchased via the app
c. Mothers can use the app independently from their own houses
<b>5. What are the steps in creating a PrimaKu® account?</b>
a. Registration—insert child identity—insert child data
b. Registration—open home page—exit
c. Registration—insert child data—insert child identity

The results of the post-test showed an increase in the average score to 80%. This showed that the activity was quite successful in increasing the knowledge of the CHWs regarding children's nutrition and the use of the PrimaKu® application to support the growth and development of a healthy child. It contained five multiple-choice questions. The questions can be seen in Table 6.

### 3.2. Measuring the satisfaction level of the participants

The measurement of this aspect was conducted on the mothers, the CHWs, and the volunteers as the participants using questionnaires at the end of the sessions. At the end of each session, the committee asked the mothers' opinions regarding the overall quality and experience of the *Tinggi Cerdas* program. This questionnaire consisted of five items that are: (1) On a scale of 1–5, does the *Tinggi Cerdas* program provide significant benefit to you? (2) Explain the rationale for your answer to question number 1; (3) On a scale of 1–10, how would you rate the overall *Tinggi Cerdas* program; (4) Explain the rationale for your answer to question number 3, and lastly; (5) Please provide any comments and inputs regarding the *Tinggi Cerdas* program.

A total of five participants provided their opinions through the evaluation questionnaire. All five participants gave a score of five for question (1). Reasons for satisfactory responses to question (1) include the following: a high degree of relevance to everyday challenges in raising a child, a digital form of the educational booklet is easier to use than a physical copy, and participants feel that they have gained substantial knowledge regarding raising a child. Of the five participants, 2 (40%) gave a score of nine out of 10 for question (3), and 3 (60%) gave a score of 10 out of 10 for question (3) giving an average score of 9.6 out of 10. Reasons for such responses included the following: committee members were able to explain relevant materials in a comprehensible manner and the event was carried out in an orderly manner.

Despite initial doubts and fears of failure in creating an online health education program, it was surprising to see such positive feedback from participants regarding the program and how the participants felt that the program provided a tangible benefit concerning parenthood. Furthermore, it was not predicted that most participants would also enjoy the *Tinggi Cerdas* program online, particularly regarding how the online educational booklet turned out to be easier to use. This is in line with the results of studies that argued the possible benefits of online health education reviewed by Win et al. (2015), such as improved knowledge acquisition and health education levels, increased individual awareness, and easier access to educational material. Another study by Marsh et al. (2021) also found that tailor-made supporting facilities such as an educational booklet based on the education and literacy level of the targeted age group could help accomplish the program's goals.

Going forward, the participants made several suggestions for the improvement of *Tinggi Cerdas*, such as extending the reach of the program and including even more participants, having a deeper discussion regarding the topics of immunization and reproductive health, and being able to create another offline *Tinggi Cerdas* program where participants can meet face to face again. This is in line with a study by Marsh et al. (2021) where community members enjoyed the program but preferred in-person activity.

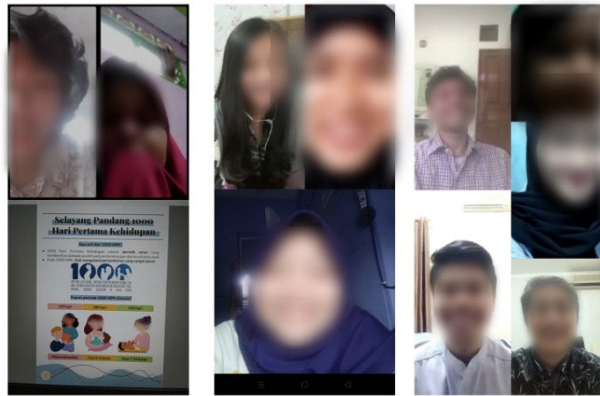


Figure 3. Photos of our volunteers and participants during the online activity

The participating CHWs completed a satisfaction evaluation questionnaire at the end of the activity to measure their overall satisfaction with this program. This questionnaire consisted of three items containing a statement to which the CHWs responded on a scale of 1 (fully agree) to 4 (fully disagree). The items of the questionnaire were (1) the event went according to schedule; (2) methods were adequate; and (3) committee performance was satisfactory. Overall, all three participants gave a score of three out of four in items (2) and (3). Furthermore, two participants rated the overall event with a score of eight out of 10, and one participant rated the overall event with a score of seven out of 10. The feedback that was received consisted of recommendations to carry out the event during the afternoon instead of the evening for convenience and to increase the scope of the materials, such as how to measure children's growth appropriately. Training for local CHWs is important since health promotion led directly by a community member is more effective (O'Mara-Eves et al., 2015).

Aside from assessing the satisfaction of the participants, this study also evaluated the satisfaction of the volunteers regarding their experience of participating in the *Tinggi Cerdas* program. Of the volunteers, 52.6% believed that the once-a-month activity program was adequate, while 57.9% of volunteers believed that the use of pre- and post-tests as means of evaluation, as well as the use of WhatsApp video calls to carry out the activity, is adequate. This highlighted the adequacy of the methods and technologies used in this *Tinggi Cerdas* program and that it is suitable to be carried out by pre-clinical students. These findings support that of Runtu et al. (2021), which showed how students who participated in community development programs have enhanced effective communication, which provides a foundation for self-development toward becoming professional physicians (Gülpınar & Özçelikay, 2021; Runtu et al., 2021).

The questionnaire also consisted of a domain that evaluates the educational booklet used in the *Tinggi Cerdas* program. From this domain, 73.7% of volunteers believed that the content of the educational booklet was both adequate and engaging for the participants. Moreover, 68.4% of volunteers believed that the use of an educational booklet helped them greatly to carry out the activity. The results of this domain of the questionnaire show that the use of an educational booklet in an online health education event carried out by students is highly beneficial. As stated in another study conducted by Runtu et al. (2021), the involvement of medical students in community development projects can develop their

communication skills in out-of-class settings. As a learning method, using an educational booklet can help medical students practice their communication skills in health education.

#### 4. Conclusion and Recommendations

Based on the explanation above, the impact of the community development program can be seen through several assessments, seeing it as one of the stepping stones for decreasing stunting. The programs needed to shift from previously offline to online due to the COVID-19 pandemic situation, as an attempt to maintain the sustainability of the program. Therefore, workshop materials, methods and techniques were adjusted with the condition of Kampung Lio, aiming to increase the mothers' knowledge and awareness about children and maternal health.

In conclusion, based on the results of the tests, the UI team succeeded in promoting the mothers' knowledge about children and maternal health. To make the program more sustainable, a program for the CHWs was also created. Seeing the higher post-test scores compared to pre-test scores, it can be said that the program also thrived in introducing the CHWs to the PrimaKu® mobile application to maintain children's growth and development.

This study demonstrated that despite the pandemic, it is still possible to conduct an online community development program that aims to empower local communities while preventing the spread of COVID-19. This paves the way for future development concerning methodologies around maternal health education, providing an example of how technological advancement can be used to intensify the frequency and quality of maternal health education. This would allow future community empowerment to target a more diverse range of communities, including those that are not located close to a public health facility. All in all, this should increase the maternal education level, a factor which is known to be significantly associated with addressing the prevalence of stunting as explained by Amaha and Woldeamanuel (2021).

The authors hope that this study will provide insights to its readers on how online community development may be carried out. Furthermore, the writing of this paper allowed the authors to reflect on several weaknesses of an online community development program and hope that this would encourage readers to improve current methods and deliver a more effective program.

For further studies and programs, it is recommended to have more detailed planning to retain the participation of all stakeholders until the last activity, for example, by building an intrapersonal bond between volunteers and participants. It is also recommended to use validated knowledge, attitudes, and practice questionnaires to assess the activity's impact on participants' knowledge regarding the issue. In addition, another suggestion would be to ensure the program is integrated with the primary health care program to maintain the program's sustainability.

The project in this case report has some strengths and limitations. The results show the long-term effects of the activities as the *Tinggi Cerdas* program is already in its fourth year with both offline and online methods. At this point, *Tinggi Cerdas* could also program online activities with more participants.

However, the small number of participants during online activities meant the data might be not representative enough. Since the participants were women with smartphones and internet access, they might have had a more prior knowledge and been better with answering the questions, compared to the participants who do not have access to any of those. Another limitation is that this project was carried out in Kampung Lio with a small and homogeneous education and income level, so we still do not know if it applies to a bigger population. Furthermore, the questionnaire had not been validated at the time it was used. Therefore, further research is necessary.

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