

Kakak tumbuh kembang (KUMBANG): Engaging medical students for screening and detecting growth and developmental delays in children

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ABSTRACT The current COVID-19 situation has disrupted routine growth and developmental screening programs for children delivered by the Community Health Centers (Puskesmas). The KUMBANG project aims to provide a 'new normal' alternative in screening for children's growth and development by involving medical students and using online platforms. This study aimed to assess the project's reach in screening growth and developmental delays while also exploring the project's effectiveness through parents' perspectives. Collaborating with the Center for Indonesian Medical Students' Activities (CIMSAs) Universitas Gadjah Mada, we recruited and trained 33 volunteers. Volunteers screen for children's development through an online platform, while the community volunteer cadres measure children's growth through COVID-safe offline appointments. We analyzed children's growth using the WHO Anthro Survey Analyzer and children's development according to the Kuesioner Pra Skrining Perkembangan guidelines. Parents' perspective on this project was assessed through a survey. A total of 92 under-five years old children from four Posyandu in Puskesmas Gondokusuman participated in the project. Around 29% (27/92) of the children had nutritional problems, either underweight, stunted, wasted, or a combination. Meanwhile, 34% (29/84) of children were at risk of developmental delays, of which five were suspected to have developmental delays, while 24 had dubious results. Parents reported that this method is sufficiently effective in screening for children's development and were comfortable with the online screening, since it is more COVID-safe. Parents also felt comfortable communicating with volunteers and believed that the medical students could provide valid and reliable information. In conclusion, KUMBANG project offers a good alternative for screening children's growth and development during the current disrupted routine screening. Involving medical students could help in service delivery, since health professionals are relatively occupied with COVID-19 management. The online method used in this project should be considered as a prospective option for routine screening.

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1. Introduction

Growth and developmental delays have been an issue affecting millions of children around the world. These problems affect not only the children but also the caregivers and families, causing an overall

decreased quality of life for all parties involved. Furthermore, the impacts also last for short- and long-term, contributing to lower human capacities in the future.¹⁻³

In regard to those concerns, the integrated health service post (Pos pelayanan terpadu/Posyandu) has been the mainstay approach by the Indonesian government to address growth and developmental delay issues. Through Posyandu, health cadres would conduct routine screening at the community

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level while also delivering public health programs such as offering free health consultations. In terms of growth and development, one of the tools is a screening book given to pregnant mothers. This book consists of charts that could help mothers and health cadres screen for growth and developmental delays in children aged 0 - 6 years old.⁴ However, it was found that health cadres only focus on filling-out the growth chart, often causing children at risk for developmental delays to be undetected and miss the opportunity for a better outcome through earlier intervention.⁵

The current ongoing Coronavirus Disease 2019 (COVID-19) pandemic has severely disrupted lives and people's way of living globally since 2020, especially for health service deliveries. One of the most affected services has been Posyandu, specifically the Indonesian integrated health and nutrition services on the community level that mainly target maternal and child health. Since the implementation of physical distancing measures in 2020, many Posyandu routine checkups have been cancelled up until today. This disrupts some of the essential services for child health: routine growth and development screening and monitoring.^{6,7} This disruption could hinder the achievement of one of the health priorities set by the Indonesian government, which is the eradication of stunting. Therefore, we introduced the KUMBANG Project, a portmanteau of Kakak Tumbuh Kembang, which means 'older siblings' of growth and development. This program aims to help mitigate Posyandu disruption by providing additional screening and educational seminars involving medical students using a COVID-safe approach. This program consists of two phases: recruiting and training medical student volunteers to screen growth and developmental delays in children and performing screening, education, and follow-ups to parents and children through online delivery.

A previous study in the same field conducted in 2007 found that around 36% of the children screened were at the moderate or high risk of developmental delays.⁸ Health cadres were also found to be less aware when it comes to developmental landmarks compared to growth landmarks.⁵ Therefore, to rectify this discrepancy, screenings are done to help raise

awareness of parents and health cadres and detect children at risk of developmental delays. Medical students are introduced to perform the screening and communicate with parents to work on growth and developmental delay issues. In addition to the benefits for the community, this form of community outreach has proven successful to retain knowledge, skill, and communicating in the sociocultural context that would help with the medical students' future careers.⁹

Yogyakarta is one of the major cities in Indonesia, mainly known as the city of education. However, despite this endearing title, Yogyakarta is also the city with the highest social inequality in Indonesia based on the Gini ratio.¹⁰ This raised the concern regarding its already low developmental index score compared to the average of Indonesia that the number might be even lower in areas with low socioeconomic status.¹¹ On top of that, a sociocultural stigma might lead to denial of children's developmental growth issues, such as believing that when children walk first, they will talk later and vice versa, which is a common misperception. This causes the normalization of early signs of developmental delays, which is a concerning issue.

This study aimed to assess the project reach in detecting children with nutritional problems and at risk of developmental delay and exploring the project effectiveness through parents' perspectives. Furthermore, the study results will help us better understand the applicability of the project and advocate relevant stakeholders regarding alternative approaches to Posyandu during this pandemic situation.

2. Method

2.1. Project design

A collaboration between the Center for Indonesian Medical Students' Activities Universitas Gadjah Mada (CIMSA-UGM) and Capella Project Foundation, a non-governmental organization focusing on children's growth and development, was conducted prior to the project planning. The roles of the students in the project were vital since they were expected to be the volunteers in organizing and conducting the project. A total of 33 medical students signed up for

Table 1. Sample characteristics

Characteristics	n	Percentages
Age in months		
6 to 12	13	14.1%
13 to 24	20	21.7%
25 to 36	28	30.4%
37 to 48	22	23.9%
49 to 59	9	9.8%
Sex		
Male	41	
Female	51	
Posyandu		
Manisjangan 18	20	21.7%
Manisjangan 20	30	32.6%
Sere 11	20	21.7%
Handilem 13	22	23.9%
	92	100%

the volunteer role and participated in the volunteers' briefing and training and the project execution phase. Volunteers were expected to be actively engaged throughout the project under the supervision of the project steering committee, including a representative from CIMSA-UGM, Project Officer of KUMBANG, and an advisor from the University of Melbourne as the funder of the project.

Prior to the project execution, all volunteers were trained by pediatricians in the form of a two-days seminar and two-hours workshop and they took part in pre-and-posttest sessions. Training material included children's growth and development and early detection of delay in children's growth and development. Volunteers were grouped in a pair of two and responsible to interview five to six parents. To accommodate volunteers' and parents' schedule, volunteers were asked to contact parents and organize the interview in their own flexible time. All consumables spent by the volunteers were reimbursed by the project committee.

2.2. Study setting, study population, and sample

This study used a cross-sectional design and was conducted in March-April 2021 in four Posyandu under the working area of Gondokusuman Primary Health Center (Pusat Kesehatan Masyarakat/Puskesmas), Yogyakarta City. The study population included parents of under-five years old children living in the City. The selection of study location (Puskesmas) was

based on convenience sampling and assisted by the Department of Health, Yogyakarta. All parents living in the four working areas of the selected Posyandu were eligible to participate in the study. Inclusion criteria consisted of children aged 0-59 months living in the study area and had no apparent illness, assessed by history taking. Exclusion criteria were: parents who did not agree to participate and who disagreed to sign the informed consent form.

Children of parents who agreed to participate underwent demographic assessment, anthropometric measurement, and developmental screening. Anthropometric measurement was performed offline by community cadres, either one-on-one in the children's home or in a COVID-safe protocol appointment in the Posyandu area, depending on the cadres and local leaders' decision. This measurement assessed the children's weight and length or height. Children's weight and length were measured using an Onemed OD 231B Baby Scale, while children's height was measured using a stadiometer. In addition, developmental status was screened using the prescreening developmental questionnaire (Kuesioner Pra Skrining Perkembangan/ KPSP) as cited in the national guideline to stimulate, detect, and intervene for children's growth and developmental aspects (Stimulasi, Deteksi, dan Intervensi Dini Tumbuh Kembang Anak/SDIDTK) guideline.¹²

Developmental aspects were screened online by volunteers, using either the WhatsApp video call, voice call, or chats. This screening was performed in separate sessions from the anthropometric measurements, since volunteers were expected to have the children's nutritional status data already and be able to explain to the parents about the interpretation during the interactive session. Lastly, an online survey was conducted to gather parents' perspectives on the effectiveness of the project. A self-reported and straightforward questionnaire using a Likert scale (1 to 5) was constructed specifically for the study and distributed among the participants.

2.3. Variables

Children's growth variables include weight-for-

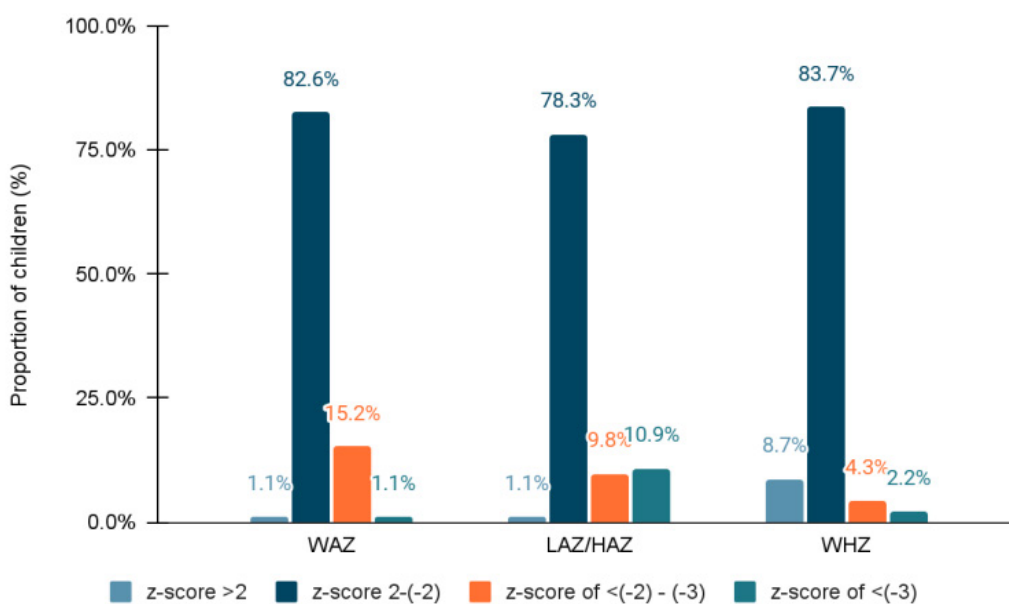


Figure 1. Prevalence of children according to their nutritional status z-score.

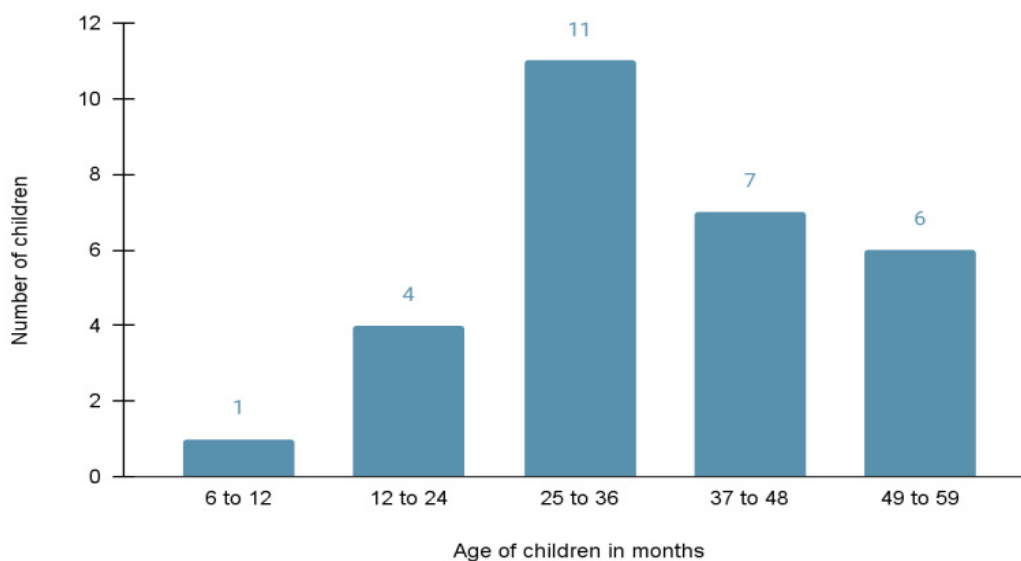


Figure 2. The distribution of children who were at risk of developmental delay according to their age groups.

age z-score (WAZ), height/length-for-age z-score (HAZ/LAZ), and weight-for-height/length z-score (WHZ). For each of the variables, the z-score was then categorized according to the World Health Organization (WHO) interpretation of nutritional

status.¹³ Z-scores that were in the range of -2 to 2 were considered normal, while z-scores which were less than -2 and -3 were called underweight for WAZ, stunted for HAZ/LAZ, and wasted for WHZ. Meanwhile, if z-scores were less than -3, the child

Table 2. Parents perspectives in the project

Statements	Agree (%)	Neutral (%)	Disagree (%)
Developmental screening through an online platform is sufficiently effective in determining the development status of my child.	88%	4%	8%
Developmental screening through online platform makes me feel safe and comfortable because I can still understand the development status of my child without having to go to the Puskesmas/Posyandu.	41 51		
I feel that the volunteers who interviewed me have asked the questions in a kind and polite manner.	100%	0	0
I feel that the volunteers interviewing me can provide valid and reliable information about my child's development.	96%	4%	0%
I feel that in the future, screening for child development should only be done through online media instead of face-to-face sessions (e.g. Posyandu).	44%	24%	32%

would be considered severely underweight for WAZ, severely stunted for HAZ/LAZ, and severely wasted for WHZ. For developmental status, the range of the results score would be in 0-10 and categorized into 'in accordance with age' if the score was 9-10, 'dubious result' if the score was 7-8, and 'suspected of having developmental delay' if the score was less than and equal to 6.¹² Parents' perspectives were examined according to the questionnaire results. Responses of 1 and 2 were considered 'disagree', while responses of 3 to 5 were considered 'neutral' and 'agree', respectively.

2.4. Analysis

The data were analyzed using descriptive statistics. Growth data were analyzed using an open-access survey analyzer developed by the WHO, called the WHO Anthro Survey Analyzer. This tool was used to assist in transforming growth data into the respective z-scores for each of the anthropometric indicators (WAZ, LAZ, and WHZ) for all participants. Meanwhile, the developmental results and parents' perspectives were analyzed using Microsoft Excel.

3. Result

A total of 92 under-five years old children participated in this project. The majority of the children were in the age group 25 to 36 months (30.4%), followed by 37 to 48 months (23.9%), and 13 to 24 months

(21.7%). The proportion of children according to the sex was approximately equal, with the percentages of male and female children being 44.6% and 55.4%, respectively. Around one-third of the participants came from Posyandu Manisjangan 20, while the remaining equally came from other Posyandu. The summary of the sample characteristics can be found in Table 1.

Among 92 participants, there was a total of 27 children who had problems in their nutritional status, either being underweight, stunted, wasted or the combination of those problems. In detail, there were 16.3% of children who were underweight, 20.7% of children who were stunted, and 6.5% of children who were wasted. This summary is presented in Figure 1.

Only 84 children could be screened for their development status, while the remaining parents of the eight children could not be contacted. The proportion of children who were at risk of developmental delays were 29/84 children (34.6%), of which five were suspected to have developmental delays (KPSP score of less than or equal to six), while 24 had dubious results (KPSP score of 7-8). According to their age, most of the children at risk of developmental delays were in the age group 25 to 36 months, 37 to 48 months, and 49 to 59 months, as seen in Figure 2.

According to the parent's responses to the questionnaire, the majority of parents reported that developmental screening conducted through online

media platform was sufficiently effective (88%), they felt more COVID-safe since they did not need to go outside (80%), perceived that volunteers could ask kindly and politely (100%), and perceived that volunteers could provide reliable information (96%). However, only 44% of parents showed interest in online methods as the only method to perform developmental screening in the future. The summary of the parents' perspectives can be seen in Table 2.

4. Discussion

The prevalence of children who have nutritional and developmental problems during the screening in our study are relatively high. Approximately one-third of children in the study area had either nutritional problems or developmental delays. These cases could be undiagnosed, since the routine Posyandu sessions are currently disrupted. Implementing a community empowerment program as executed in the KUMBANG project could be an alternative to the usual Posyandu and potentially answer the issues mentioned above.

The United Nations International Children's Emergency Fund (UNICEF) reported that due to the current COVID-19 pandemic, around 84% of Posyandu in Indonesia are disrupted/postponed, and some are substituted by parents self-reporting to the community cadre regarding their children's last nutritional status.¹⁴ In addition, children's developmental status is commonly omitted from screening by parents and not reported by the current screening method. It is important to note that parents' self-reports of their children's nutritional status are highly prone to bias, since they are more likely to not use standardized technique and measurement tools. Parents also reported that it is inconvenient for them to measure their children's anthropometric parameters by themselves because not all parents have the measurement tools or understand how to assess their children's growth and developmental status.¹⁵

By involving medical students as volunteers in the screening process, the work burden among health professionals who are currently occupied with COVID-19 management could be relieved. Because medical students are considered as

trained laypeople, it is expected that screening performed by the volunteers was done in a more standardized manner than the parent's self-reported measurement. In addition, they could also provide other relevant information needed by parents during the online interactive screening.

Our project's offline and online approach also minimizes the possibility of COVID-19 transmission by ensuring that the contact time was done efficiently. Parents' perspective on this project supports the prospective plan of implementing the KUMBANG project, since they report that KUMBANG has been sufficiently effective in screening for children's status. In addition, the acceptance response reflected in the survey also implies an excellent promise to use KUMBANG as an alternative option to the existing Posyandu method.

As a response to the current pandemic situation, the role of distant medical health service delivery, or commonly called telehealth, is receiving more attention than ever.¹⁶ A telehealth which is specifically designed to improve child health, has also been invented in many developing countries to connect many parents with child and family health nurses without meeting in person. For instance, Conti et al. has developed a remote surveillance protocol to detect and intervene in autism spectrum disorder through online interviews and parent-child play videos.¹⁷ TeleHealth Kids, an internet-based program for children with developmental disabilities in an Ohio rural area, showed high parental satisfaction after using telemedicine since it reduced travel cost and time lost from work.¹⁸ Another study on developmental disorder in the Philippines showed promising results in teletherapy. Parents' satisfaction was positively associated with family participation and effective communication during teletherapy, increasing parents' empowerment and making them more aware of their children's needs. Some challenges include time constraints and instructions that were hard to follow.¹⁹ Similar to our KUMBANG project, the Communicating Healthy Beginnings Advice by Telephone (CHAT) project in Australia targets the marginalized and low-income population from pregnancy to two years of age. The approach is potentially beneficial to build rapport with the

provider meeting community needs despite its limitations on physical examination.¹⁶

Multiple factors contribute to the parents' decision of whether they will seek services to assess their children's nutritional and developmental status during the COVID-19 pandemic, including existing predisposing factors: attitude, belief, and sociodemographic characteristics; enabling factors: health information accessibility, health systems, affordability, and self-efficacy; and need-for-care factors: health status, perceived risk, and perceived severity.²⁰ Moreover, health services remodeling and proactive execution could increase telehealth implementation and buy-ins from providers.²¹ Therefore, during the planning phase of the KUMBANG project, a stakeholder engagement was performed, in order to ensure that the project can run smoothly. Nonetheless, long-term continuous engagement is important to keep the project going; thus, integrating the project into the existing health systems and medical curriculum can further improve the program's sustainability and increase medical students' awareness of child growth and development.^{16,21}

The reach of the KUMBANG project in detecting children with nutritional problems and developmental problems can be evaluated by comparing with previous literature. The current data on children's nutritional status in Yogyakarta city in 2019 showed lower proportions of children with nutritional problems in all growth parameters than our study. For underweight and stunted, our study reported twice the proportion for the same parameters in 2019, which are 16.3% (city report was 8.5%) for underweight and 20.7% (city report was 11.3%) for stunted.²² Meanwhile, the prevalence of wasted children in our study was not broadly different to the one shown in the city report, of which we found a 5.1% proportion, while the city report also showed a 5.1% proportion for wasted children in Yogyakarta.²²

In addition to that, our study further showed a considerably higher proportion of children at risk of developmental delays compared to the national basic health report (Riset Kesehatan Dasar/Riskesdas). Riskesdas reported that approximately 13% of children aged 36-59 months were developmentally

delayed in Yogyakarta province.¹¹ This is significantly lower than the prevalence that we found, showing that approximately a third (34%) of under five years old children in the study area were at risk of developmental delays. The different findings between the national survey and our study might be due to different tools (KPSP vs Multiple Indicator Cluster Survey (MICS) as well as different survey population (Riskesdas did not perform developmental surveillance for children under 36 months).

When compared to a study that used the same screening tool (KPSP), we found that the prevalence is relatively similar, of which the authors found that 36% of the children screened were at risk of developmental delays (KPSP score of less than or equal to 8).⁸ Even though the prevalence is relatively high, screening for developmental status still does not receive much attention compared to growth screening. This was reflected in the 2018 Riskesdas, which showed that only 37.2% of children in Yogyakarta city were monitored for their developmental milestones, which is lower than the national average surveillance for developmental screening, with 45.6%.²³

To the best of our understanding, this was the first study that assessed the applicability of a mixed intervention of an online and offline child' growth and development screening, in terms of the project reach and how parents perceive the effectiveness. The KUMBANG project also poses as an innovative way to bridge the disrupted child health services during this pandemic time. However, there are some limitations on this study. Firstly, it is worth noting that this study was conducted in a short period and was limited to parents with access to Internet services in urban areas in Yogyakarta. This might bias the real situation where parents might have different socioeconomic status or limited access to gadgets. Therefore, it would be beneficial to expand the study to a more general population to have a broader understanding of the project. Secondly, there might be social desirability bias where parents tend to overrate their children's ability. This might lead to information bias that influences the results of the study and eventually alters the real prevalence of developmental delays in the area. Thirdly, the KPSP is actually designed to be

used in an offline setting; thus, further research and adjustments need to be conducted to make the KPSP suitable for online screening. Lastly, this quantitative cross-sectional study was not able to analyze why 12% of the respondents felt online screening was not effective enough or why more than half of the respondents preferred face-to-face sessions. Hence, future qualitative study may help address the remaining questions.

5. Conclusion

Our study found that involving medical students in routine growth and developmental screening could help health professionals and potentially be embedded in routine children monitoring. The KUMBANG project also has shown a good reach in detecting children with nutritional problems and at risk of developmental delays. This project further received a good acceptance response from parents and has the potential to be embedded as routine care for children. Furthermore, medical students also provide a valid and reliable source of information to parents, making it more comfortable for parents to talk about their children's condition. Lastly, the online screening method could minimize the potential risks of COVID-19 transmission and should be considered as a prospective option for routine screening during the pandemic.

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Conflict of interests

The Student Engagement Grant, the University of Melbourne funded this project but had no conflict of interests in the study design, execution, and article writing.

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