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KEY MESSAGES

- This article presents the findings from a rapid assessment of the effectiveness of a digital platform to counsel parents and caregivers of children with wasting in East Nusa Tenggara, Indonesia.
- Information provided to parents and caregivers in written, visual and audio formats via an innovative digital platform improved their knowledge of wasting symptoms, measurement and treatment.
- The participants described the information as clear and found the videos particularly helpful in understanding how to measure mid-upper-arm circumference and interpret the results, when to seek treatment and when to administer ready-to-use-therapeutic-food. However, digital-literacy and connectivity challenges restricted the use of the platform for a few participants.

An innovative digital information platform tackling wasting in Indonesia

Background

Indonesia is home to approximately 2.2 million severely wasted (weight-for-height z-score < -3) children under five years of age (Ministry of Health, 2018). In response to low coverage and the quality of facility-based treatment (Bait et al, 2019), the Indonesian Ministry of Health, with support from UNICEF, began implementing community-based treatment of severe wasting in the East Nusa Tenggara (NTT) province in 2016. This includes child screening via mid-upper-arm circumference (MUAC) measurements, visible thinness and bilateral oedema, followed by home-based care for severely wasted children who are without medical complications but with appetite. Home-based care involves providing ready-to-use therapeutic food (RUTF) and antibiotics, as well as weekly visits to health centres for health check-ups, growth monitoring and counselling on optimal feeding practices. This approach has improved coverage and treatment for severely wasted children. However, the ongoing COVID-19 pandemic, and the accompanying social and mobility restrictions, have caused major disruptions to treatment services and increased food insecurity which may exacerbate the burden of child wasting in Indonesia (Akseer et al, 2020).

In a previous article published in Field Exchange, we demonstrated how caregivers were able to effectively take MUAC measurements as part of a pilot family-centred screening programme in the NTT province in Indonesia (Oddo et al, 2022). Mobile health (m-health) interventions have also been shown to increase health-related knowledge in low- and middle-income countries (LMIC) (Lee et al, 2016). Thus, to further mitigate the disruption of wasting treatment services during the pandemic, UNICEF, in partnership with the Government, designed, implemented and evaluated an innovative digital information platform (i.e., chatbot) to counsel parents and caregivers of children with wasting in NTT. This article presents the findings from a rapid assessment of the effectiveness of the

digital platform in increasing wasting-related knowledge and explores the participants' perceptions of the tool.

Programme description Digital information platform

Beginning in August 2020, UNICEF developed an online information platform through the WhatsApp Messenger application using chatbot software. The platform provides basic information on child wasting (e.g., symptoms, causes and consequences), MUAC measurement and RUTF. These three information topics (referred to as "menus" in Figure 1) were presented in written, visual (i.e., pictures and videos) and audio formats. Between August 2020 and February 2021, approximately 450 participants in the NTT province accessed the tool. Of these, 41 participants (~9%) were asked and agreed to participate in a rapid assessment, described below.

Rapid assessments

A series of rapid assessments was undertaken to determine the effectiveness of the digital platform including (1) individual pre- and post- knowledge tests and (2) semi-quantitative interviews administered to a convenience sample of parents and caregivers in three districts in the NTT province, including Kupang municipality, Kupang district and Timor Tengah Selatan (TTS) district. In partnership with local primary healthcare centres, the convenience sample of participants was identified according to the following criteria: being a parent or caregiver of a child under five years of age, having no prior exposure to the chatbot, having an android-based phone and mobile data and residing in the local area. Priority was given to any caregiver with a child who was undergoing, or had recently completed, treatment for moderate or severe wasting.

The programme participants were administered a 15-minute pre-test consisting of 10 questions related to the topics covered in the chatbot such as risk factors, symptoms, treatment and the consequences of wasting. Each



Vanessa Oddo is an Assistant Professor in the Department of Kinesiology and Nutrition, University of Illinois Chicago.



Airin Roshita is a Nutrition Specialist at UNICEF Indonesia.



Julia Suryantan is a National Consultant at UNICEF Indonesia.



Blandina Rosalina Bait is a Nutrition Specialist at UNICEF Indonesia.



Messerassi Ataupah is the Head of the Provincial Health Office of East Nusa Tenggara, Indonesia.



Jee Hyun Rah is the Chief of Nutrition at UNICEF Indonesia.

Figure 1 Example pictures from chatbot



MUAC = mid-upper-arm circumference; RUTF = ready-to-use therapeutic food

correct answer was awarded 1 point with seven of the 10 questions having more than one correct answer (equating to a maximum score of 23). Participants were then instructed on how to use the chatbot service and asked to access it regularly for one to two weeks.

After accessing the chatbot for one to two weeks, the participants were administered with the same test. They were also invited to participate in semi-quantitative interviews. The interviews consisted of quantitative questions related to the participants' overall experience (5-point Likert scale of very poor to excellent), perceived usefulness (4-point Likert scale of very useful to not very useful), the menu formats used (video, picture, audio) and which menu they perceived as most relevant. Open-ended questions aimed to gather more in-depth information on the participants' perceptions about the chatbot and any difficulties experienced in accessing and using the service. Selected quotations were extracted to illustrate the caregivers' responses.

Results

The pre- and post-tests and semi-quantitative interviews were completed by 41 participants (19 males and 22 females) (Table 1). Participants were 18–51 years of age, most had a wasted child and 63% had a senior high school education or higher.

The median knowledge score increased by 9 points between the pre- (9 points; range: 2-

14) and post-tests (18 points; range 10-22). Approximately 75% of the participants rated the overall programme as “excellent” and 71% perceived the chatbot tool as “very useful”. Most participants (80%) rated the menu on basic information as the most relevant. Nearly all the participants (>95%) used the picture and audio services and 88% of the participants used the video service.

In open-ended questions, we identified three key themes that characterised parents and caregivers' perceptions of the chatbot tool: understanding, usefulness and guidance. The participants described the language as simple and the information provided on symptoms, treatment and consequences of wasting as clear and easily understandable, especially when this was accompanied by videos, pictures and audio. For example, a video on MUAC helped the participants to understand the purpose of taking MUAC measurements, how to take measurements at home and how to interpret the results, as well as providing guidance on when to report their child to a health worker. One caregiver recalled: “...we can watch the MUAC measurement video, and it makes MUAC measurement easy” (Female, 30 years old). The chatbot also helped the participants to better understand how to administer RUTF (e.g., using smaller, more frequent portions). The results also suggested that increasing caregivers' understanding helped to overcome sensitivity

around the topic with one caregiver recalling: “Often when we talk about severe wasting (gizi buruk), it can offend other people, but by sharing this service (with family and friends), they can access the information themselves and understand about severe wasting” (Male, 29 years old).

Consistent with the ratings, in open-ended responses, most participants described the different menus as useful, irrespective of children's nutritional status. Several participants referred to learning about the existence of a specific food to treat severe wasting: “It is particularly useful. Now I know the benefits” (Male, 29 years old). Additionally, some participants appreciated that they would now be able to offer guidance to others on how to measure MUAC and about RUTE: “I can measure my child's MUAC, and when in Posyandu (local health posts) I can also guide other mothers” (Female, 29 years old).

Some participants needed additional guidance on accessing the chatbot which required help from family members and greater digital literacy. For example, a few participants lacked familiarity with operating the android device or were unable to access the audio or video services due to the limited availability of mobile data or connectivity issues. One participant noted that, due to literacy challenges, he needed his child to read him the information, despite the availability of audio, and that he relied on the pictures and videos.

Successes and challenges

This study aimed to rapidly assess a digital information platform designed to support parents and caregivers of children with wasting during the COVID-19 pandemic. After using the chatbot for one to two weeks, caregivers demonstrated greater knowledge of wasting symptoms, measurement and treatment. Caregivers perceived the information provided by the platform as understandable and useful. Some participants also appreciated that they



Caregiver reviewing online educational materials, Indonesia, 2020

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were now able to offer guidance to others on the topics covered. However, a few participants (< 10%) were challenged by digital literacy and connectivity issues.

These findings are consistent with prior research showing that m-health interventions can increase health-relevant knowledge in LMICs and that caregivers are able to measure MUAC once trained (Alé et al, 2016; Lee et al, 2016). Little evidence is available on the perceived usefulness or effectiveness of m-health interventions related to caregiver screening for child wasting. However, findings from this assessment are consistent with those from a prior study in which caregivers found SMS-based screening for malnutrition to be acceptable and engaging (Achieng et al, 2020; Tickell et al, 2020). These authors also reported challenges related to digital literacy.

The participants suggested that offline access may reduce connectivity challenges and allow

them to regularly access the information without mobile data. However, the participants were able to view the pictures, videos and audio in WhatsApp without a mobile connection once these had been downloaded. Future instructions will better explain how to download and access the information offline. Health workers will also provide initial digital support to users. In addition to being popular and informative, the inclusion of audio, pictures and videos helped to expand reach to populations with lower literacy.

Although the service had a fairly wide reach, being accessed by at least 450 participants between August 2020 and February 2021, the small total number of participants and the use of convenience sampling in the rapid assessment limited the generalisability of the findings to other users, districts and socio-demographic groups. Since most participants were caregivers of children receiving wasting treatment at the time of the study, they may have been previously

exposed to information provided in the chatbot. It is also possible that the participants' responses were subject to social desirability bias. Finally, data collection methods were limited by social distancing and mobility restrictions as a result of the COVID-19 pandemic.

Conclusions and next steps

There is an urgent need to reduce the burden of malnutrition among children under five years of age in Indonesia. Although this digital chatbot platform was designed to mitigate disruptions to treatment services due to the COVID-19 pandemic, its continued use has the potential to reach a wider audience. Following the initial pilot, this platform has been introduced in seven provinces across Indonesia and has been accessed by over 5,000 individuals. When introduced in new provinces, participants were given additional information on how to continue accessing the downloaded videos, audio and text to mitigate digital literacy challenges. Next steps include incorporating additional menus or information related to feeding practices, preventing relapse from severe wasting, checking for bilateral pitting oedema and, potentially, including informative game-based approaches. Further evaluation will be conducted to understand the usability of the tool across the various settings.

For more information, please contact Vanessa Oddo at voddo@uic.edu

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Table 1 Parent and caregiver characteristics and perceived usefulness of chatbot by district

	N (%) or median (range)			
	TTS district (N=14)	Kupang district (N=12)	Kupang municipality (N=15)	Total (N=41)
Characteristics				
Participant gender				
Male	6 (43%)	6 (50%)	7 (47%)	19 (46%)
Female	8 (57%)	6 (50%)	8 (53%)	22 (54%)
Median respondent age (years)	31 (21-51)	30 (23-47)	33 (18-42)	30 (18-51)
Level of education				
Less than senior high school	6 (43%)	2 (17%)	7 (47%)	15 (37%)
Senior high school graduate	7 (50%)	7 (58%)	3 (20%)	17 (41%)
University	1 (7%)	3 (25%)	5 (33%)	9 (22%)
Nutritional status of child				
Severe wasting ¹	0 (0%)	1 (8%)	9 (60%)	10 (24%)
Moderate wasting ²	12 (86%)	9 (75%)	6 (40%)	27 (66%)
Normal	2 (14%)	2 (17%)	0 (0%)	4 (10%)
Child wasting treatment				
On treatment	-	1 (100%)	6 (67%)	7 (70%)
Finished treatment	-	0 (0%)	3 (33%)	3 (30%)
Knowledge score and usefulness				
Median pre-test score ³	8 (4-13)	8 (2-10)	9 (3-14)	9 (2-14)
Median post-test score ³	16 (11-21)	14 (10-21)	21 (17-22)	18 (10-22)
Overall perception of chatbot				
Good	7 (50%)	3 (25%)	0 (0%)	10 (24%)
Excellent	7 (50%)	9 (75%)	15 (100%)	31 (76%)
Overall chatbot usefulness				
Very useful	6 (43%)	9 (75%)	14 (93%)	29 (71%)
Useful	8 (57%)	3 (25%)	0 (0%)	11 (27%)
Not useful	0 (0%)	0 (0%)	1 (7%)	1 (2%)
Most relevant menu:				
Basic information	12 (85%)	11 (92%)	10 (67%)	33 (80%)
Information on MUAC	1 (7%)	0 (0%)	1 (7%)	2 (5%)
Information on RUTF	1 (7%)	1 (8%)	4 (27%)	6 (15%)
Used video service	12 (86%)	9 (75%)	15 (100%)	36 (88%)
Used picture service	14 (100%)	12 (100%)	15 (100%)	41 (100%)
Used audio service	12 (86%)	12 (100%)	15 (100%)	39 (95%)

MUAC = mid-upper-arm circumference; RUTF = ready-to-use therapeutic food; TTS = Timor Tengah Selatan

¹ weight-for-height z-score < -3

² weight-for-height z-score < -2

³ quantitative pre- and post-test on wasting, MUAC and RUTF was administered to a larger sample of chatbot users (N=10 questions, four on basic information, three on MUAC and three on RUTF).