



AISCH 2022

The 3rd AI Insyirah International Scientific Conference on Health

THE URGENCY OF DEVELOPING AUTOMATED AUDIO SYSTEM FOR HEALTH EDUCATION TOOLS FOR DENGUE FEVER PREVENTION

Ainur Rachman^{1,2}, Tukimin^{1*}

¹Departement of Health Science, Lincoln University College, Malaysia

²Departement of Public Health, Universitas Muhammadiyah Kalimantan Timur, Indonesia

*¹ Correspondence : tukimin@lincoln.edu.my

ABSTRACT

Background: Dengue fever keeps increasing every year, so to reduce the incidence of dengue fever, prevention efforts are needed with health promotion efforts in the community. So far, health promotion has been running by gathering residents, and therefore it is necessary to have an automatic way of health education that can be targeted directly at residents. Objective: To investigate an urgency of automated audio system tools as a way to prevent dengue fever. Method: Qualitative research method and focus group discussion was employed in this study. Some experts and residents were invited as subjects of the tool, and eleven key informants were employed to decide the proper model for the tool. Result: The results of interviews showed that the tool was approved with some conditions such as considering the proper design, duration, and the placement of the tool at residents' homes. Conclusion: the automated audio system tool could be used for health education that works automatically to spread information related to dengue fever prevention for the community, so they could do the prevention at home.

Key word : automated audio systems

INTRODUCTION

The contributor to the high incidence of dengue fever in Southeast Asia is Indonesia. The number of dengue fever cases in Indonesia was fairly high with 137,000 per year with an average of 11,416 per month in 2019, and there were 68,753 cases of dengue fever in June 2020. The cases increased from the previous year with an average of 11,458 per month. The number of dengue fever cases was 11,416 per month on average in 2019, whereas there were 11,458 cases in 2020. (1)

The Indonesian Ministry of Health strive to prevent dengue fever in Indonesia by spreading information about eradicating dengue mosquito nests through written brochures as well as gathering people for espionage. Environmental control is also implemented by introducing the 3M (plus) program, namely, draining, closing and burying. Draining the tub once a week, closing the water reservoir tightly, and burying and getting rid of used items that can potentially hold water (2). Biological control is conducted by keeping betta fish that are put into ponds that can eat dengue mosquito larvae (advantages and disadvantages). In addition, chemical control is also run by sprinkling abate on (3) water reservoirs so that the water does not become a breeding ground for dengue mosquito larvae and also doing fogging around houses, which is spraying to kill adult mosquitoes. (4)

The Ministry of Health has been providing information to the public through espionage in which people were invited to gather in a place and were educated about the prevention of dengue fever (5). The attendants were only representatives of family members, while other family members were not present in the espionage, so they did not receive information about dengue fever preventions.

We can suppress dengue fever by eliminating the breeding places of the *Aedes aegypti* mosquito in and around houses. Thus, we need a method so that information related to dengue fever prevention could directly reach all family members. Due to the limited number of health workers, hectic schedules, and expensive accommodation made it difficult to conduct espionage program (6). Therefore, we need an automatic espionage method that can directly target all family members at home called automated audio system tool, which is able to conduct espionage at a predetermined time according to the agreement of family members, so that family members can receive direct information, and this tool will be able to continuously conduct espionage within the agreed time and period. Therefore, the purpose of this research was to create a tool that could conduct an automatic espionage system to be placed at home as the main target for the prevention of dengue fever. This tool later on was to be used in a sustainable manner that could provide continuous information, so that people's behaviour could change and prevent dengue fever.

METHOD

This study adopted a qualitative research in order to develop a proper automated audio system for health promotion tools through interviews of experts and members of society to determine a proper tool design approved by society.

Sampling Techniques for Qualitative Data

This study used non-probability sampling technique namely purposive sampling in which the data sources were selected due to certain considerations, for example, the person was considered to know best about what we expected (7). In this study, we wanted to develop a good health education tool to increase knowledge, attitudes and behaviour about dengue fever. In terms of developing an automated audio system for health promotion tools, it was necessary to sample data sources, namely electrical engineering experts, health promotion experts, economists, epidemiologists, implementers of health promotion programs at Public Health Centers and the community as the targets of this tool. On the other hand, it was expected that the automated audio system for health promotion tools became really good and useful for users, so information and suggestions related to development of the tool were collected by conducting a forum group discussion(FGD)(8)

Techniques of Data Analysis of Quantitative Research

The data analysis of quantitative study can be conducted by such ways as follows:

a. **Data Reduction**

The data from the interviews were quite large, so it was necessary to reduce the data by summarizing and selecting main information, focusing on important things, looking for

themes and patterns, so the reduced data would provide a clearer picture and make it easier for researchers to collect further data.

b. Data Display

In this study, the presentation of the data was done by describing data briefly in the form of text and narrative. Thus, in displaying the data, the researcher would understand what had been made from the automated audio health promotion system tool and what aspects should be developed from the tool.

c. Conclusion

The conclusion of this study was a new tool that has never been found before which could be well utilized in increasing knowledge, attitudes and behaviour of society in preventing dengue fever.

RESULTS AND DISCUSSIONS

Qualitative Research Findings

Data Collection of this qualitative research included the Forum Group Discussion (FGD), which was held on Saturday, September 11th, 2021 at Universitas Muhammadiyah Kalimantan Timur at 09:30 to 11:30 of local time with a total of 11 participants. The FGD was expected to provide inputs on the manufacture of automated audio system tools that would be made for health promotion as a way of dengue fever prevention, which could be approved by the community.



Figure 1 Documentation of Forum Group Discussion (FGD)

List of FGD Participants

The forum group discussion (FGD) was attended by experts in related fields to collect information and suggestions for the development of automated audio system tools, which would be implemented in the society for health promotion especially for dengue fever prevention. The list of participants for the FGD is presented on the following table

Table 1 FGD Participants

No	Names	Expertise	Total
1	Nida Amelia, SKM, M.PH	Health Promotion of Universitas Muhammadiyah Kalimantan Timur	1 person
2	Dr. Budi	Community Service of Health Department for Samarinda	1 person
3	Fatkul Hani Rumawan ST.MT	Electrical Engineering of Mulawarman University	1 person
4	Ibu Karina Putri Alamanda M.Psi	Psychologists of Universitas Muhammadiyah Kalimantan Timur	1 person
5	Ibu Eliza Antiqua Amd.Kep	Community Service of Public Health Center in Air Putih	1 person
6	Anisa Marini SKM	Health promotion of Public Health Center in Air Putih	1 person
7	Azha Latief MM	Economist	1 person
8	Yudi Trihartono	Chief of RT 59 Air Putih	1 person
9	Prihandoyo	Resident of RT 59 Air Putih	1 person
10	M.Adam Saputra	Resident of RT 59 Air Putih	1 person
11	Agung Dwi Anggono	Resident of RT 59 Air Putih	1 person

The participants of the forum group discussion consisted of seven experts who gave suggestions related to the development of the tool, starting from the agreement on the tool development, design and duration, placement, as well as contents of dengue fever prevention based on the regulation of Ministry of Health that would be spread to society as the target of the tool development.

Table 2 Agreement on the Development of Automated Audio System Tool

Agreement Excerpts of Tool Development	Code	Theme
Participant 1 (Experts on Community Service)		Agreement on Tool Development
<p><i>“If we look at the current condition, the use of media for understanding a disease prevention is really necessary. And, we realize that visuals and audios are better than reading, so I do agree with the development of the automated audio system tool. Moreover, Samarinda has entered the rainy season and in fact it often rains in Samarinda, so usually the team from the heath promotion of public health centers will provide espionage, either by gathering residents or by traveling by car, but indeed by traveling with cars many residents do not pay attention, or by gathering residents, not all residents attend and convey to their family, so the tool will be very useful”</i></p>	<p><i>So the tool will be very useful</i></p>	
Participant 2 (Experts on Electrical Engineering)	<p><i>I do agree because the tool has never been made before</i></p>	
<p><i>: Regarding agreement of the tool development, I do agree because the tool has never been made before although the basic tool has been ready with the timing system.</i></p>		
Participant 3 (Experts on Health Promotion)	<p>I agree (the development of the tool)</p>	
<p>I agree (the development of the tool) because I had experience in visiting a hospital abroad. The concept (implemented in that hospital) is almost identical with Mr Ainur’s with slight difference. The prevention has been directly addressed to the patients. Button are attached on some parts in hospitals, so if patients need helps from health workers, they just need to push the button and the health workers will respond. The button can be used anytime when patients need to know something such as health promotion or information related to disease prevention.</p>		
Participant 4 (Experts on Economy)	<p>So, according to economic aspects, I do agree (development of the tool), either from society economy or government economy</p>	
<p>When I am asked whether we need this tool, I will say ‘yes’. Why? Because talking about costs related to health, disease prevention is better. Why? Curative costs for treatment are so high. So, if we focus on the prevention as early as possible, the cost will be lower. So, according to economic aspects, I do agree (development of the tool), either from society economy or government economy, for instance, reducing national health insurance budgets.</p>		
Participant 5 (Experts on Epidemiology of Public Health Center)	<p>So, with this audio tool, it will be really helpful for health promotion practitioners to conduct espionage into community</p>	
<p>: I am just the program holder. My basic field is nursing. I agree that this tool could help our jobs at public health centres and health promotion such as espionage to community. So far, the espionage program is usually conducted at integrated service posts, and most of the participants are mothers with babies and other residents, only to make jokes to one another, so the program does not run effectively. So, with this audio tool, it will be really helpful for health promotion practitioners to conduct espionage into community. I agree.</p>		

Participant 6 (Experts on Health Promotion of Public Health Center)

So, we really agree for this tool. Thank you.

Good morning. I am Annisa, the program holder of health promotion in Air Putih Public Health Center. I agree with this tool because since the pandemic, we had not been able to gather many people, so if it provides spots for espionage program, it would surely ease our jobs. We can even adapt the contents. So, we really agree for this tool. Thank you. Best regards.

Best regards.

Participant 7 (Experts on Psychology)

For the first session of this discussion, I would like to

: Well. Hello? Good morning everyone. For the first sessions of this discussion, I would like to say that I agree (development of the tool). Then, for other suggestions, Mr Ainur could consider them because for me with the assisting tools, it would be better.

say that I agree (development of the tool).

with this tool, you can add more what is called dengue fever espionage. Yes, I agree for that, for this tool.

Participant 8 (Chief of RT 59)

Dengue fever as well as the disease that is currently afflicting, Covid, once again surprising me that dengue fever has more cases, moreover there is always mosquito spray program conducted in the society. So, my response to this tool is that I totally agree because prevention is better than cure. In RT 59, we have a WhatsApp Group that we use to share information. However, with this tool, you can add more what is called dengue fever espionage. Yes, I agree for that, for this tool.

Thank you for the opportunities. I think for our community, they may agree with that

Participant 9 (Resident 1)

Thank you for the opportunities. I think for our community, they may agree with that on condition the placement should be really effective.

Participant 10 (Resident 2)

Thank you for giving me opportunities to speak up here. As a resident, I really agree with this helpful tool. I also agree with chief of RT 59 that the language should be easier for us to understand. Then, the duration should also be adjusted.

Peserta 11 (M3)

: The point is that I agree because at least it can prevent us from doing more sins. Usually, when elders tell us, we argue with them. So, with this tool, I think we are likely familiar to listen, so we do not commit sins. That is all.

The point is that I agree because at least it can prevent us from doing more sins

Intepretation: All of the FGD participants agreed on the development of automated audio system tool.

Excerpts on Tool Design

Participant 1 (Expert on Community Service)

: The design should be small, so we can place it on the living room or in every bedroom. It is fine with on / off buttons; however; it is okay if you provide 2 modulations, so it can run automatically as well as manually with on / off button.

Participant 2 (Expert on Electrical Engineering)

: I think I prefer to call it automated Plus. Why? Plus means that the buttons are available as requested. For example, our neighbour never turns their tool on or they do not even have the tool, so we turn ours on. It means automated plus as requested.

Participant 3 (Expert on Health Promotion)

: By looking at the title, I am really excited to see the effectiveness of this tool. So, I prefer automated because people will be exposed to this tool, so we can really measure its effectiveness in reducing dengue fever cases or not.

Participant 5 (Experts on Epidemiology on Public Health Center)
I agree with automated system, so they do not do betting.

I agree with automated system, so they do not do betting.

Participant 4 (Expert on Economy)

I follow the discussion and agree with the forum.

I follow the discussion and agree with the forum.

Participant 6 (Expert on Health Promotion of Public Health Center)

It should be automated because whether you like it or not you keep listening to it, but if it is manual we may forget to turn it on because we are sometimes busy. But, if the scheduled has already been decided, whether you like it or not, you have to listen to it.

It should be automated because whether you like it

or not you keep listening to it

Participant 7 (Expert on Psychology)

Participants listen to suggestions from FGD participants and agree with automated design.

Participants listen to suggestions from FGD participants and agree with automated design.

Participant 8 (Chief of RT 59)

Participants listen to suggestions from FGD participants and agree with automated design.

Participant 9 (Resident 1)

Participants listen to suggestions from FGD participants and agree with automated design.

Participant 10 (Resident 2)

Participants listen to suggestions from FGD participants and agree with automated design.

Participant 11 (Resident 3)

Participants listen to suggestions from FGD participants and agree with automated design.

Interpretation: All of the FGD participants agree on the development of the tool by using automated audio system technique.

Placement of the Tool	coding	theme
-----------------------	--------	-------

Everyone agrees that the tool should be placed based on their preferences, whether it was the living room or the kitchen. However, it was confirmed that not all of them have a living room, so the rest of them could use their kitchen instead. They then agreed and nodded to show their agreement.

Interpretation: All participants agreed to keep tools in a house as requested by house owners.

Duration	Coding	theme
----------	--------	-------

Participant 1 (Expert on Community Service)

I think 2 minutes is too fast; if it's in Thailand, that would be fine because the IO is higher there. I believe 5 minutes should work nicely for us. Because we work three times a week, they could listen in 15 minutes in a week." Every day at 8 am, it starts, and it will start over again at exactly 8 am tomorrow.

Participant 2 (Expert on Electrical Engineering)

Agree! There will be an opening and closing sound for 5 minutes. And the final one is three time for everyone, between 07.00 to 08.00 a.m.

Participant 3 (Expert on Health Promotion)

According to the previous studies I read, it is typically conducted monthly specially to measure a health promotion media because of the minimal behaviour target that should receive the information 12 consecutive times, or 3 times per week, 4 times per month, for a total of 12 times.

Participant 4 (Expert on Economy)

Decision made! There will be an opening and closing sound for 5 minutes. And the final one is three time for everyone, between 07.00 to 08.00 a.m.

Participant 5 (Expert on Epidemiology of Public Health Center)

Decision made! There will be an opening and closing sound for 5 minutes. And the final one is three time for everyone, between 07.00 to 08.00 a.m."

Participant 6 (Expert on Health Promotion of Public Health Center)

If it is only for a month, three times per week would be nice, but this depends on the residents, even if they request that would be possible too.

If it is only for a month,

three times per week is

sufficient

Participant 7 (Expert on Psychology)

Decision made! There will be an opening and closing sound for 5 minutes. And the final one is three time for everyone between 07.00 to 08.00 a.m.”

Participants nodded for 5 minutes, 3 times a week

between 07.00 to

08.00 a.m.

Participant 8 (Chief of RT 59)

The residents agreed to have it 3 times per week sir. “Decision made! There will be an opening and closing sound for 5 minutes. And the final one is three time for everyone, between 07.00 to 08.00 a.m.

Residents’ agreement 3

times a week sir! between

07.00 to 08.00 a.m.

Participant 9 (Resident 1)

“Decision made! There will be an opening and closing sound for 5 minutes. And the final one is three time for everyone, between 07.00 to 08.00 a.m.”

Participants nodded for 5 minutes, 3 times a week between 07.00 to

08.00 a.m.

Participant 10 (Resident 2)

“Decision made! There will be an opening and closing sound for 5 minutes. And the final one is three time for everyone, between 07.00 to 08.00 a.m.”

Participants nodded for 5 minutes, 3 times a week between 07.00 to

08.00 a.m.

Participant 11 (Resident 3)

“Decision made! There will be an opening and closing sound for 5 minutes. And the final one is three time for everyone, between 07.00 to 08.00 a.m.”

Participants nodded for 5 minutes, 3 times a week between 07.00 to

08.00 a.m.

Interpretation: All FGD participants agreed to a 5-minute session three times per week between 07.00 to 08.00 a.m., with a 30-second break at 07.30 a.m.

Tabel 3 Data Extraction Findings

Data findings	Code	Theme
All of the FGD participants agreed for the development of automated audio system tool	Agreement on the tool development	The development of automated audio system tool
All of the FGD participants agreed for the development of automated audio system tool using automated audio system	The tool design	The development of automated audio system tool
All participants agreed to place the tool in accordance with the residents' requests.	The tool placement	The development of automated audio system tool
All FGD participants agreed to a 5-minute session three times per week at 7.30	Duration	The development of automated audio system tool

Qualitative Findings

All FGD participants agreed on the development of an automated audio system tool for automatic espionage at residents' homes, which will turn on and off automatically when placed at residents' homes and used as a research sample in a 5-minute session three times per week at 07.30 a.m.

The result of the development of an automated audio system tool

The tool was developed in collaboration with electrical engineering experts, and the FGD with the experts resulted in design, duration, and frequency in a week. The design is shown as follows:

Tool Display

The automated tool is displayed as follows:

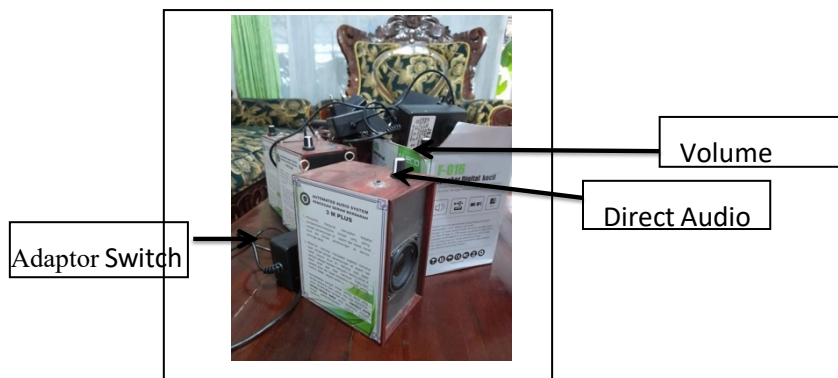


Figure 2 Automated Audio System Tool

DISCUSSION

The qualitative research was completed with experts and residents as the target on the tool, resulting in the automated tool to be used for espionage for residents related to dengue fever prevention (9). The tool's design was developed simply and continually to ensure that it will function automatically and the residents will not have to bother themselves. As a result, residents can simply listen to the espionage content because most people nowadays engage in virtual activities that do not require direct attendance (10). The tool was placed based on residents' requests so that its presence would not bother them, as we all know that most people only have

a simple house with no living room or bedroom, and some people do not even have a house at all. Dengue fever espionage was agreed upon by experts and residents to take place twice a week for 5 minutes each. In fact, information delivery could be both overwhelming and boring. In conclusion, the experts believe that delivering the information twice a week would be ideal, and this was confirmed by the residents.

CONCLUSION

The automated audio system tool could be used for health education by automatically disseminating information about dengue fever prevention to the community, allowing them to do the prevention at home.

REFERENCES

1. Mukaromah VF. kasus DBD 2019 dan 2020. 2020; Available from: <https://www.kompas.com/tren/read/2020/06/22/193500165/melihat-kasus-dbd-pada-2019-dan-2020-saat-pandemi-virus-corona>
2. Patil CD, Borase HP, Patil S V, Salunkhe RB, Salunke BK. Larvicidal activity of silver nanoparticles synthesized using Pergularia daemia plant latex against Aedes aegypti and Anopheles stephensi and nontarget fish Poecillia reticulata. Parasitol Res. Germany; 2012 Aug;111(2):555–62.
3. Nuntaboot K, Wiliyanarti PF. Community social capital on fighting dengue fever in suburban Surabaya, Indonesia: A qualitative study. Int J Nurs Sci. Elsevier; 2017;4(4):374–7.
4. Kementrian Kesehatan RI. InfoDatin Situas Demam Berdarah Dengue. Vol. 31, Journal of Vector Ecology. 2018. p. 71–8.
5. Faridah L, Rinawan FR, Fauziah N, Mayasari W, Dwiartama A, Watanabe K. Evaluation of health information system (HIS) in the surveillance of dengue in Indonesia: lessons from case in Bandung, West Java. Int J Environ Res Public Health. MDPI; 2020;17(5):1795.
6. Azfar M, Omarulharis S, Azfar H, Maryam A, Hafizah S, Adibah BAH, et al. Knowledge, attitude and practice of dengue prevention among sub urban community in Sepang, Selangor. Int J Public Heal Clin Sci. 2017;4(2):73–83.
7. Acharya AS, Prakash A, Saxena P, Nigam A. Sampling: Why and how of it. Indian J Med Spec. 2013;4(2):330–3.
8. Mishra L. Focus group discussion in qualitative research. Techno Learn. New Delhi Publishers; 2016;6(1):1.
9. Wilder-Smith A, Tissera H, AbuBakar S, Kittayapong P, Logan J, Neumayr A, et al. Novel tools for the surveillance and control of dengue: findings by the DengueTools research consortium. Glob Health Action. Taylor & Francis; 2018;11(1):1549930.
10. Baniyadi T, Ayyoubzadeh SM, Mohammadzadeh N. Challenges and practical considerations in applying virtual reality in medical education and treatment. Oman Med J. Oman Medical Specialty Board; 2020;35(3):e