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A Pharmacist Education Initiative Apoteker Cilik to Improve Medication Safety Knowledge among Elementary School Students in Gresik, Indonesia

Khoirotin Nisak,[1]* Zamrotul Izzah,[1,2] Aniek Setiya Budiatin[1]
[1]Department of Pharmacy Practice, Faculty of Pharmacy, University of Airlangga, Surabaya, Indonesia
[2]Department of Pharmacy, Faculty of Pharmacy, University of Airlangga Teaching Hospital, Surabaya, Indonesia

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Abstract Pharmacists have the responsibility to ensure that medicines are obtained, used, stored, and disposed in the best and safest way particularly by a vulnerable population such as children. Pharmacists should adapt to a child's level of health understanding to engage children in medication education. Therefore, a pharmacist-led program tailored to children in community settings was initiated in two elementary schools in Gresik, SD Muhammadiyah 1 Gresik and SD Muhammadiyah Manyar. An animated film Apoteker Cilik was shown to students of grade 4, 5, and 6 to promote the proper management of medications in line with the national campaign DAGUSIBU and to acquaint with the roles of pharmacists. A short questionnaire consisting of six questions related to medication use and safety (how to get, use, store, and dispose medicines) was utilized to assess the level of children's knowledge. There was a significant difference between levels of knowledge before and after the program ($p < 0.05$) although some schoolchildren already had good baseline knowledge of medications. This local initiative may contribute to improving medication awareness, so more educational programs using colourful visuals and interactive games may be conducted with this vulnerable population as children will bring their medication-taking behaviour throughout their adult lives.

1. INTRODUCTION

A pharmacist is a healthcare professional who works with medicines and provide them to patients. The role of a pharmacist involves educating and empowering diverse populations to take an active role in managing their medications (McGivney et al., 2007). They have the responsibility to ensure that medicines are obtained, used, stored, and disposed in the best and safest way. This is in line with a national program "Gerakan Keluarga Sadar Obat" initiated by the Indonesian Pharmacists Association to improve medication knowledge, awareness, and attitudes of people in managing their medications (Ikatan Apoteker Indonesia, 2014). Furthermore, the campaign known as DAGUSIBU promotes the proper management of medications in every household to ensure that medicines are obtained, used, stored, and disposed in the best and safest way.

A study in Cilacap, Indonesia, showed that the behaviours of people in storing medications were conventional without paying attention to proper conditions, and they still kept expired medicines due to their good physical appearances (Wasito, Pratiwi, Wibowo, & Solihat, 2018). A survey among people of the Greater Malang area has revealed that 58% of those people had a fair level of knowledge in managing leftover, damaged, and expired medication (Pramestutie, Hariadini, Ebtavanny, Illahi, & Ilmi, 2021). Another survey in Gresik area demonstrated that knowledge about medication use for asthma was lacking, especially in identifying the medicine choice (21%) and inhaler use (48%) (Puspitasari, Prabawati, & Rosyid, 2021).

Gresik has an area of 1,191.25 square kilometres, one-third of which is a coastal area. Gresik and Manyar districts

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*Corresponding author : Khoirotin Nisak
Department of Pharmacy Practice, Faculty of Pharmacy, University of Airlangga, Jl. Dr. Ir. H. Soekarno, Surabaya 60115, Indonesia
Email: khoirotin-n@ff.unair.ac.id

are among the coastal areas which have many factories and could contribute to various health problems for all age groups from children to elderly people, e.g. respiratory and skin diseases (Dinas Kesehatan Kab Gresik, 2015). Therefore, there is a need to implement educational programs regarding medications particularly for children who are prone to health care problems. Pharmacists are well-positioned to educate them about medication use and safety. Furthermore, developing and implementing a pharmacist-led program tailored to children in community settings may help pharmacists gain more confidence in providing medication education and counselling to young age patients. SD Muhammadiyah 1 Gresik located in Kroman, Gresik district, has students from lower to middle income families while SD Muhammadiyah Manyar located in Manyar district has more students from middle to upper income families. Therefore, the community empowerment activities could be organized in these local elementary schools to start promoting health equality in all social classes.

However, there are challenges for pharmacists to engage children in medication education, including maintaining the attention of children while trying to convey important medication information, particularly with younger age groups with limited attention spans or lower levels of comprehension, and simplifying medication counselling to suit a child's level of understanding (Abraham et al., 2017). Therefore, pharmacists should adapt to these conditions by speaking in a pleasant communicative tone, using minimal medical jargon, having a friendly personality, and providing kid-friendly materials that have colourful pictures, minimal text, and clear and easy to understand information (Abraham, Brothers, Alexander, & Carpenter, 2017).

A concept of Apoteker Cilik has been introduced for the schoolchildren to acquaint them with the pharmacy profession from an early age and to enhance the existence of pharmacists in the community (Anidya, Taufikurrakhman, Akbar, & Ningsih, 2013). In 2018, a pharmacist education initiative Apoteker Cilik was implemented to promote DAGUSIBU in children by using a comic book and a puppet show (Zaki, 2018). This initiative could help children understand about medicines and how to use them appropriately starting at an early age. It is important for them to learn that medicines can make them feel better, but they are also bad for them when they are not needed or not properly used. Hence, this early training might also affect their medication-taking behaviour throughout their adult lives (De Maria, Lussier, & Bajcar, 2011). Therefore, the education initiative was continued using different approaches and aimed to promote the proper medications management and explain the role of pharmacists to the elementary school students.

2. METHOD

2.1 Program setting

The pharmacist education initiative Apoteker Cilik was delivered in two elementary schools in Gresik, SD Muhammadiyah 1 Gresik and SD Muhammadiyah Manyar. The community empowerment activities were held in August and September of 2019.

2.2 Pharmacist education initiative Apoteker Cilik

The authors have initiated a pharmacist education program Apoteker Cilik since 2018. This program aims to train and educate young people about medication use and safety in line with the national pharmacist campaign DAGUSIBU by the Indonesian Pharmacists Association.

The adventure story of Apoteker Cilik presented in a colourful comic book entitled "Petualangan si Acil" (Figure 1) and a puppet show were created by the authors, and both the adventure story and the comic script of Apoteker Cilik have a copyright stipulated in a decree issued by the Indonesian Ministry of Justice and Human Rights (No. 000116197 and No. 000118968). The story of "Petualangan si Acil" is composed of messages on how to get medicines, where to buy them, how to use them properly, how to store them, and how to dispose unused, unwanted, or expired medicines in the best and safest way as well as the roles of a pharmacist in medication management. It also emphasizes that children should not share their medicines with friends, neighbours, or other family members before having a consultation with healthcare professionals. There are three main characters in the story, namely Acil who is a curious and helpful boy, Pak Dodo who is a patient, and a Pharmacist.

The story and characters in the comic were subsequently adapted in a colourful animated film with the same title by an animation specialist in Malang, Indonesia, in mid-2019. The film "Petualangan si Acil" has a duration of approximately four minutes with the story of Pak Dodo who is suffering from cold symptoms and buying medicine carelessly from a shop. Later, he finds out that the medicine has broken and expired. Acil comes and offers a help to Pak Dodo, and they go to a pharmacy and ask the proper medicines and information from the pharmacist on duty. This animated film also has a copyrighted stipulated in a decree by the Indonesian Ministry of Justice and Human Rights (No.000151025).

Figure 1. The adventure story "Petualangan si Acil" is developed using colourful visuals for the pharmacist education initiative Apoteker Cilik

2.3 Data collection

The education program Apoteker Cilik was delivered to all students in grade 4, and 5 at the two targeted elementary schools. The program was held on several different days within two months according to the time availability of each school.

The education program was opened with an opening speech by a teacher representative from each school, followed by an introduction given by the program organising team. The team introduced the roles of pharmacist and explained the purpose of the pharmacist education initiative Apoteker Cilik to the students. Before the students watched the animated film, they were asked to fill an anonymous pre-test questionnaire related to DAGUSIBU knowledge in 30 minutes. Following this, the animated film "Petualangan si Acil" was played twice to strengthen students' understanding on the messages delivered. An interactive session with questions from the students continued with interactive games and door prize drawing were facilitated by the program team. At the end of program, each student was asked to complete an anonymous post-test questionnaire in 30 minutes. The program was closed by thanking the students and their teachers. In total, the program run for approximately three hours.

The anonymous questionnaires consisting of questions related to DAGUSIBU knowledge were created and developed by the authors. Both questionnaires have six multiple choice questions emphasizing on how to obtain medications from proper places (question no. 1), use medications (questions no. 2, 3, 5), store medications according to the instructions provided (question no. 6), and dispose of unused medications in proper manners (question no. 4). The students' answers to these questionnaires were assessed with a score of 1 for every correct answer and a score of 0 for every incorrect answer.

2.4 Data collection

The outcome of the program was the students' knowledge of DAGUSIBU. Therefore, the level of this knowledge was evaluated before and after the education program based on the total score of both questionnaires. The number of correct answers were converted into percentage (%) and presented in a table. A paired samples t-test was used to compare the pre- and post-test scores with a significant value of $p < 0.05$.

3. RESULT AND DISCUSSION

There were 216 students participating in the pharmacist education initiative program delivered at two elementary schools in Gresik, Indonesia. Among them, there were 115 students (53 %) of Grade 4 and 5 from SDMM Gresik, and 101 (46.75%) of Grade 4 and 5 from SD MUTU Gresik.

The education program was delivered successfully by the program organizing team, and the students participated actively during the sessions (Figure 2). A total of 216 questionnaires were collected before and after the program (Table 1). There was a significant difference in the medication-related knowledge of the students before and after receiving the education ($p < 0.05$).

Figure 2. The implementation of the pharmacist education initiative Apoteker Cilik for the elementary school students

The education program was delivered successfully by the program organizing team, and the students participated actively during the sessions (Figure 2). A total of 216 questionnaires were collected before and after the program (Table 1). There was a significant difference in the medication-related knowledge of the students before and after receiving the education ($p < 0.05$). Overall, DAGUSIBU-related knowledge improved after the students attended the program although some students already had good baseline knowledge on how to get, what to know, and how to dispose medicines before they joined the program. At the end of program, all students could correctly answer the question about the proper place to obtain medications. Meanwhile, there was a slight decrease (around 10%) in the number of students correctly answering the question about what to know before using the medicine. A slight increase was seen in students answering the questions related to drug storage and disposal. There was more than 70% increase in the number of students choosing the right answer for the definition of red dot in the drug classification.

The findings revealed that schoolchildren knew more about medications than previously expected and showed an interest in learning about medication safety. The animated film "Petualangan si Acil" is suitable for educating students as they are able to learn the values and knowledge delivered by the story and its main characters. These suggest that the program has an added value as a community empowerment activity.

Our findings are consistent with previous programs of Apoteker Cilik conducted in Jombang, Malang, and Makassar (Andriana & Putri, 2020; Atmadani & Hidayati, 2020; Wahyuningsih, 2021). They found that DAGUSIBU-related knowledge of schoolchildren improved after attending the program. Those education programs were delivered through educational videos, interactive games, and singing a song about a young pharmacist. The pharmacists involved also reported increased confidence in providing pharmacy services after participating in such community-based programs.

Local initiatives rather than formal training courses play a vital role in raising awareness of the community, including children. They should be empowered with proper health education in order to grow up as rational users of medicines in the future. More educational programs

may be conducted with this vulnerable population as children begin to self-medicate. Children start to form opinions about medications from six years of age, and this continues into adulthood (De Maria, Lussier, & Bajcar, 2011); studies show that self-medication with OTC medications begins between 11 and 12 years of age (Abel, Johnson, Waller, Abdalla, & Goldsmith, 2012).

However, several knowledge gaps and misconceptions about medications exist among children as they have limited medication knowledge (Abraham, Feathers, Mook, & Korenoski, 2019). They reported that children feared medications because they perceive the medications harmful resulting from the inappropriate use of them. The word "drugs" was confusing for children because there are "good drugs" and "bad drugs". They were often confused by the difference between OTC drugs and prescribed medications, brand names and generic products, and with various drug classification. Therefore, there is a need for more medication education programs to be developed and implemented for children.

The education program Apoteker Cilik provides advantages, such as providing information about medications in the form of an animated film or interactive games that are more visually appealing to younger people and can encourage conversations between them and the pharmacists (Abraham, Alexander, et al., 2017). Continuing advances in the technology animation can provide an effective and positive approach for delivering key information with realistic animated characters (Croft, Rasiah, Nesbitt, & Cooper, 2018). In addition, an animated film does not require special operators and is suitable for a remote learning material. Educating the community could enable pharmacists to practice useful skills in educating patients, hone teaching abilities, and practice interaction skills with children, all of which can be valuable in clinical settings. Pharmacists can improve their communication skills with children and contribute to enhancing medication awareness among young people.

Nevertheless, this program also had some limitations. Its implementation was only in two elementary schools in a city, and it may limit the generalizability of the findings to a wider population. Delivering the animated film through social media platforms can be an option to spread the benefits for more children and their parents or guardians. The program was evaluated through a short questionnaire which might not reflect all relevant knowledge of medication use and safety. Moreover, the story of the animated film can be improved that is to cover more issues on the safety use of medications.

4. CONCLUSION

The education program Apoteker Cilik may improve knowledge related to medication use and safety among elementary school students. Further strategies such as improving the story of the film and using social media platforms to disseminate the program can bring impact to a wider population.

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CONFLICT OF INTERESTS

There is no conflict of interest in this manuscript entitled "A Pharmacist Education Initiative Apoteker Cilik to Improve Medication Safety Knowledge among Elementary School Students in Gresik, Indonesia '' declared by all the named authors. Moreover, the named authors has been read and approved the manuscript. During the editorial we confirmed that process of this manuscript, the corresponding author will be the contact person.

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ATTACHMENT

Table 1. Results of the questionnaire on the level of knowledge of students from two elementary schools in Gresik, Indonesia

No.	Questions	Correct answers (%)		Topic
		Pre-test	Post-test	
1	Where can we obtain medications?	98.5	100	Get
	a. at the pharmacy			
	b. at a laboratory			
	c. in a market			
2	What should be checked before we take medications?	96.3	87.9	Use
	a. drug classification			
	b. expiry date			
	c. price			
3	What is the drug classification for antibiotics?	40.2	47.1	Use
	a. green dot (free medicines or over-the-counter drugs)			
	b. blue dot (limited free medicines)			
	c. red dot with a letter 'K' (prescription drugs)			
4	How do you dispose unused medicines?	72.1	97.8	Dispose
	a. give them to neighbours in need			
	b. crush and throw them in the rubbish bin			
	c. burn them along with trash			
5	What does the red dot with the letter 'K' mean?	29.6	52.2	Use
	a. prescription drugs			
	b. limited free medicines			
	c. over-the-counter drugs			
6	Where is the proper place to store a liquid medicine (e.g., syrup)?	64.8	86.8	Store
	a. in a refrigerator			
	b. on a drug shelf			
	c. in a wardrobe			