Abdullah, K., Jelita, S.D. & Putri F
Fisiomu.2025,Vol 6(1): 111-115
DOI : https://10.23917/fisiomu.v6i1.7741

Accessibility and Quality Study of Breathing Exercise Applications for Children with Cerebral Palsy (SETITI)

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Submition : 2023-12-19; Accepted : 2024-12-27; Published : 2025-01-01

ABSTRACT

Introduction: Cerebral palsy is a chronic condition of movement and posture disorders in children. Children with CP have the potential to experience decreased lung volume due to limited physical activity. So far, breathing exercises have been carried out using conventional media such as whistles, blowing out candles, and the like. A breathing exercise application was created using an Android device called SETITI (*sebul tiup-tiup*). This application aims to increase children's motivation with modern media, increase practicality in training children with CP to breathe deeply and monitor the results of blowing with numbers that appear on the device screen. The level of accessibility and quality of the application is not yet known so it needs to be researched. This research aims to determine the level of accessibility and quality of the SETITI application. **Methods:** 17 parents with CP children downloaded the app and tried it on their children. The child is asked to blow into the device's microphone and feedback will appear from the device screen in the form of a moving animation and the sound of applause if the child is successful. After that, parents fill out a questionnaire about the accessibility and quality of the application during use. **Results:** 100% of parents stated that this application was easy to access and easy to use, had good picture and sound quality, and motivated children to practice breathing. **Conclusion:** the SETITI breathing exercise application has very easy accessibility, is easy to use, and has good picture and sound quality. It is necessary to increase the choice of screen displays in the form of children's favorite cartoon characters.

Keywords: *Cerebral palsy, Breathing exercise, Android application*

INTRODUCTION

Cerebral palsy (CP) is a condition of impaired movement control and function due to permanent damage to brain cells during a child's growth and development (Van Naarden Braun, 2016). In Indonesia, the prevalence of CP sufferers is 1-5 per 1000 live births (Mayang, 2018). One of the problems that occurs in children with CP is difficulty in moving and changing places due to stiffness in the hands, feet, and body (Alaa AL-Nemr, 2022). As a result, the potential for respiratory disorders in children with CP is quite large (Vitrikas K, 2020). Respiratory function will work optimally when the child's body moves well (Malik, 2021). In children with CP, this does not happen, because of limited movement, children with CP tend to have shortness of breath, are susceptible to respiratory tract infections, have a lot of phlegm in the respiratory tract and ultimately disrupt the body's homeostatic balance (Hong, 2017). Therefore, a breathing exercise program is needed for children with CP (Hong, 2017).

One of the roles of physiotherapy in children with CP is to provide breathing exercises to improve breathing ability. The current breathing exercise therapy model is a conventional/manual model, namely by asking CP patients to blow tissues, balloons, and candles, which is impractical because it requires tools and

FISIO MU: Physiotherapy Evidences

ISSN 2722 – 9610
E –ISSN 2722 - 9629

materials. Children with CP are asked to blow these objects so that their breathing is constant or stable and the duration is long. The exercise is impractical, not well documented in terms of dosage and ability and children get bored easily. To overcome this problem, a breathing exercise application was created in the form of an android. We named this application SETITI (sebul tiup-tiup). The advantage of breathing exercises with an Android application is that it is practical and the results of the exercise are recorded digitally. In addition, CP children become more motivated in doing the exercises because the model is contemporary. In addition, parents can do the exercises anywhere and anytime without preparing complicated tools and materials.

This application can be downloaded through the Play Store. The SETITI application contains two training options, namely breathing endurance training and breathing strength training. How to use the application is that the child blows the microphone of the device or the headset of the device which will later display the results of strength and breathing endurance indicators on the screen. In the application, there is a choice of image displays, namely cars, flags, balloons, and dolls, so that it is interesting for CP children.

The results of the trial on 2 CP patients at the YPCP clinic in Surabaya, this application can be used without error and can respond to the child's breath. Children are greatly helped with breathing exercises. In terms of function, this application runs well when used on the 2 children. However, until now the level of accessibility of the application and also the quality of the application in general is not known so this study needs to be conducted. Accessibility is assessed by the ease of downloading, and quality is assessed by the appearance of images, application sound, and application performance when used.

METHODS

This study is a qualitative descriptive study on 20 parents with cerebral palsy children at YPCP Surabaya in September 2024. The sampling technique was purposive sampling with inclusion criteria, namely parents who use Android-type gadgets, and their CP children have cognition that can be ordered to blow. From 20 parents, the number of samples obtained was 17.

Parents were asked to download the application, and then try the application on their CP children. After that, parents were asked to fill out a questionnaire about application access and application quality. Application access is in the form of ease of downloading the application. The quality of the application is assessed from the appearance of the application, sound and images, ease and smoothness of use the display of the child's blowing numbers whether they are clear or not, and the child's motivation to do the exercises. The research data will be displayed in graphs and tables in the form of percentages that can be easily interpreted. At the end of the questionnaire, parents were asked to provide suggestions and experiences after using the application. This study has received an ethical feasibility letter from RS Haji Surabaya 445/161/KOM.Etik/2024.

FISIO MU: Physiotherapy Evidences

ISSN 2722 – 9610
E –ISSN 2722 - 9629

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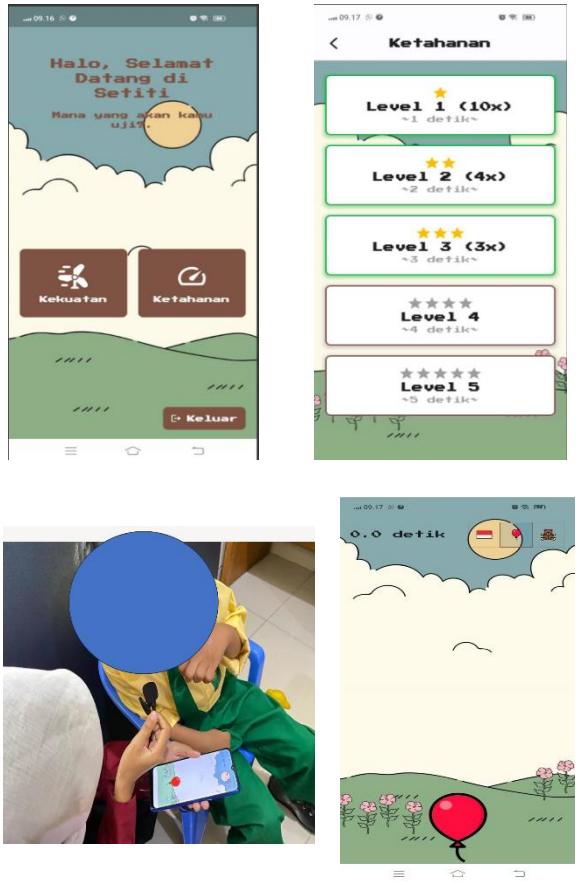

Figure 1. Application view and usage

RESULTS

The study was conducted at YPCP Surabaya with a population of 20 parents with Cerebral Palsy children, of which 17 parents were included in the research criteria. The educational background of the parents was 15 high school graduates and 2 bachelor's degrees. The average age of the parents in this study was 31.7 years.

In terms of accessibility, the ease of downloading this application is quite good, because 16 parents answered very easy (94%) and 1 parent answered easy (6%).

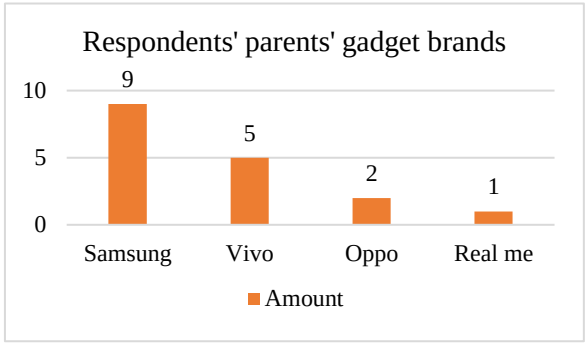

Figure 2. Ease of downloading applications

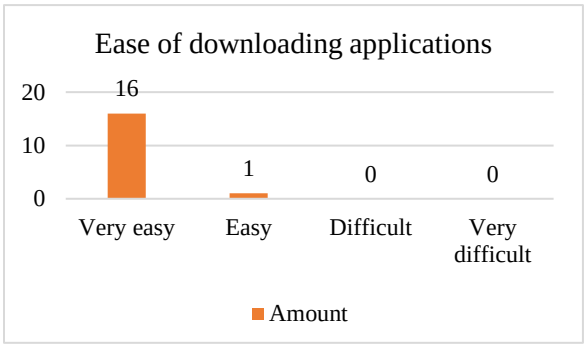

Figure 3. Data on respondents' Android device brands

In terms of image quality, this application is very good because 10 parents said it was very good (59%) and 7 parents said it was good (41%).

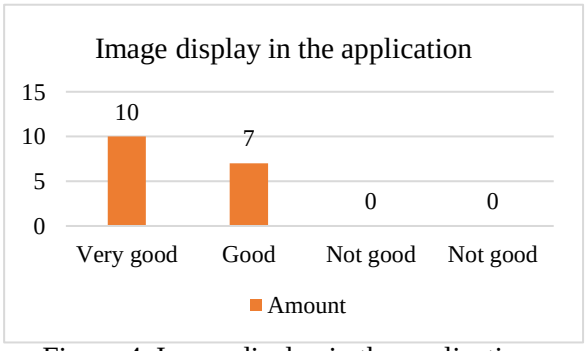

Figure 4. Image display in the application

In terms of sound quality, this application has very clear sound because 12 parents stated

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ISSN 2722 – 9610
E –ISSN 2722 - 9629

that it was very clear (70%) and 5 parents stated that it was good (30%).

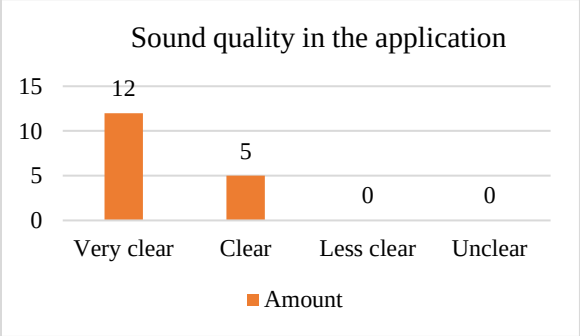

Figure 5. Sound display in the application

In terms of ease of use of the application, this application is very easy to use because 17 parents stated that it was very easy (100%).

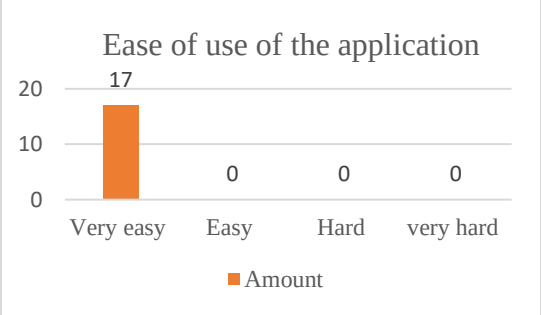

Figure 6. Ease of use of the application

17 parents with CP children tried to download and do breathing exercise therapy using the SETITI (Sebul tumpeng-up) application. This application can be downloaded on gadgets with an Android concept. From the results of this study, almost all gadget brands can now download and use the application without error. The most popular gadget brand is Samsung, which is commonly used by the public and respondents. From this data, it can be concluded that this application can most likely be accessed by all Android phones.

DISCUSSION

In terms of downloading, parents stated that the application is easy to download. This is the initial key that the application can be used by the wider community who have Android devices. This is our main goal, that the creation of this application can be used widely. Indeed, at this time it can only be used on Android devices, it cannot be used on devices with IOS operations. But we are trying to do it, even though the process is not easy.

In terms of quality, according to respondents, this application has a pretty good color display, and the sound of songs and clapping hands are audible. In addition, the motivation of CP children increases when using this application to train their breathing. Color and sound are the main attractions when using the application because this is what makes users feel at home interacting with the application for a long duration.

Some input from parents, the application needs to be improved by adding display options on the screen, such as children's favorite cartoon characters so that children become more motivated in doing breathing exercises using this application.

CONCLUSION

The SETITI breathing exercise application with Android gadget media can be easily accessed by almost all brands of Android gadgets (Samsung, Vivo, Oppo, Realme) and can be used well has good picture and sound quality, and motivates CP children to train their breathing.

ACKNOWLEDGEMENT

Thank you to YPCP Surabaya for providing time and opportunity so that this research can be carried out well and smoothly.

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ISSN 2722 – 9610
E –ISSN 2722 - 9629