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PEDIATRIC AUGMENTED REALITY (P-AR) IMPLEMENTATION IN PANDALUNGAN SOCIETY: FOR PREVENTION OF UPPER AIRWAYS INFECTION IN CHILDREN

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ABSTRACT

ARI is an upper and lower respiratory tract infection, often affecting children. The incidence of ARI, which is often repeated in children, makes parents experience difficulties in ARI children, so this becomes a stressor for parents. Therefore the importance of knowledge about ARI cares for parents and children own. Health information can be conveyed through engaging media. One media that can be used in conveying childcare health information is PAR. The purpose of the study was to see the effect of PAR intervention in reducing parental stress to prevent ARI in children. This research method is to use a pre-experimental design with the sampling method being consecutive. The number of respondents is 107 mothers with inclusion criteria who have children with ARI. The data collection tool is the DASS questionnaire which has 42 questions. The study result used univariate and bivariate analysis using the Wilcoxon test. The results of the univariate test of respondents' characteristics were that 81% of mothers were still married, 54% graduated from elementary school, 21% did not go to school, 58% were homemakers and workers, and three to fifteen days the child had ARI. and the results of the bivariate test had a p value of 0.0001 ($p < 0.05$). PAR can increase mothers' knowledge by providing ARI health information on child care. With previous knowledge, there is a decrease in stress levels that the mother has experienced.

Keywords:
Augmented reality, Pediatric, Respiratory tract infection

BACKGROUND

Acute respiratory infections (ARI) are still a major health problem in Indonesia and even in the world. It causes of mortality and morbidity of many people in developing countries. ARI is a problem with cases of sufferers who are still quite high and experience death for sufferers, especially infants and toddlers. ARI is one of the causes of death in children under the age of five and is positioned as a major killer in the world. Acute respiratory infection (ARI) is an infection that attacks the respiratory tract such as the nose, throat, and lungs that lasts for approximately 14 days (Niki, 2019). Acute respiratory infections are included in a heterogeneous and complex group of diseases caused by many kinds of pathogens which anatomically can cause and attack from the pharynx to the alveoli (Turabian & Turabian, 2020).

The prevalence of acute respiratory infections (ARI) is very high than the burden of low- and middle-

income countries, WHO data states that the annual number of deaths from ARI in children under five years old excluding deaths from measles, pertussis and neonatal deaths is 2.1 million and 20% of all deaths in childhood. Every year around 10.8 million children die due to ARI, of which 70% are in Africa and Southeast Asia. The results of Riskesdas 2018 argued that in Indonesia the prevalence of ARI in children under five by province is 7.8% and in the province of East Java itself is the second with the highest prevalence of ARI sufferers in toddlers, which is 12.9% after Bengkulu province, in Jember district the number of patients with pneumonia in toddlers amounted to 5,227 people in 2018 (Dinas Kesehatan Jember, 2019). The cause of the occurrence of ARI in children is the environment where they live, but there are other factors, namely viruses and bacteria, the age of the child, gender, nutritional status, immunization (Zahra & Assetya, 2017). The condition of the living environment that affects the occurrence of ARI is air pollution and ventilation (Syahidi, Gayatri, & Bantas, 2016). This is not a direct cause, but if it is not treated it will potentially become a problem that can aggravate the condition of children with ARI.

The high prevalence of ARI which is increasing and has become an emerging and reemerging disease significantly causes the state and government as well as the community to immediately overcome deal with this incident. Prevention and treatment are carried out by the government but have not been able to optimally solve the problem of ARI, especially in children. Currently, the prevention that can be done is the application of a clean and healthy lifestyle, the establishment of government programs at the health office such as education and health education regarding ARI in children, as well as mini-monthly workshops in collaboration with the local village. Prevention and control of ARI diseases continue to be carried out but have not been able to optimally solve this problem so that a preventive measure is needed in the form of health education that is more specific and easily implied to the public, namely educational media based on Augmented Reality (AR), according to research from Haryani et al. 2017 shows that Augmented reality (AR) is an application that can combine the virtual world with the real world with two-dimensional and three-dimensional forms that can be projected into a real environment in one scope of time at the same time (Haryani & Triyono, 2017).

AR has the potential to provide contextual education in media and can help explore interconnections in information in cyberspace, people, especially children and parents can use AR to build new understandings based on their interactions with virtual objects (Zhu et al., 2014). Therefore, to increase understanding and promotive and preventive actions to the public on education about ARI disease, the authors try to provide services that are more optimal, effective, and easily implied in the era of the industrial revolution 4.0, namely technology in the form of media for ARI disease education in children based on Augmented Reality is integrated with picture cards.

METHOD

The research method used in this research is pre-experimental design. The type of research design that is expected to prove the effect of P-AR on ARI with the design of educational media that has been prepared in 2020. Evaluation of the program to see the effect of the implementation carried out from the results of filling out the stress of parents about ARI as an effort to prevent ARI in children. The DASS 42 questionnaire consists of 42 questions with three types of emotional states such as depression, anxiety and stress in individuals. Respondents will answer each question in the range 0-3 with a validity and reliability test result of 0.880 (Noviani, 2018).

The sampling technique in this study was consecutive sampling which was taken when posyandu activities were running, with the number of respondents being 107 mothers who had children with ARI. Before giving treatment in the form of Augmented Reality intervention, the mother gets an assessment of stress variables. Furthermore, the respondent received the intervention once. The last measurement was carried out as an evaluation after being given treatment using the same questionnaires. The study was conducted in the Pandalungan area in the Jember area, as a sample in the work area of the Sumbersari Public Health Center. Data analysis was carried out after the sample was fulfilled, using univariate and bivariate. The univariate analysis test displays the characteristics of the respondents, while the Wilcoxon Signed Rank Test analysis test can see the value of the difference before and after the intervention is carried out so that it can determine the effect of the AR intervention.

RESULT

The total participants in this study were 107 participants, with an age range of 21 - 40 years. Participants were divided into several data categories such as marital status, education, mother's occupation, duration of illness, number of children, child's age,

Table 1. Participant Categories

Variable	f (%)	Median	Min-Max
Age		33 (years)	21-40 (year)
Marital status:			
Married	81 (75.7)		
Divorce (death)	11 (10.3)		
Divorce (life)	15(14.0)		
Education:			
No school	21 (19.6)		
Elementary school	54 (50.5)		
junior high school	0 (0)		
senior High School	32 (29.9)		
Mother's Job:			
Full time mother	49 (45.8)		
Laborer	58 (54.2)		
How long has the child been sick with ARI?		6 days	3-15 (day)
Number of children		1	1-4
Child Age		3 (years)	1-7 (years)
Gender:			
Woman	53 (49.5)		
Man	54 (50.5)		

Table 2. Wilcoxon Signed Ranks Test

Variable	n	Mean±SD	Median (Min-Max)	p-value	Z
Stress					
Before	107	19.2523±5.35660	21(10-26)	0.0001	-9.037
After	107	9.6449±6.07850	12(0-17)		

child's gender. complete data regarding the criteria for participants in this study are contained in table 1.

Based on table 2, In addition, there was a decrease in maternal stress levels as much as stress (SD± 19.25 - 9.644) and improvement in maternal resilience after the application of PAR with (SD± 5.35 - 8.38). Thus it was concluded "there is a significant difference in stress, and resilience between before and after intervention with a significance value of 0.001 ($p < 0.05$).

DISCUSSION

This study found that respondents had a variety of prominent characteristics, namely the mother's education, most of which were in elementary schools, and some did not graduate. At the same time, children who experienced ARI were three to six days. Children often experience acute respiratory infection under five years of age increased frequency of childhood disease causes many things for the family. They become uncertain about management ARI children feel safer returning to the general practitioner. Moreover, with the mother's educational background, the mother will be withdrawn, incurring additional costs, which can improve the social and economic community (Alexandrino et al., 2017).

Based on the results of sufficient research, before the intervention was carried out, mothers were stressed with the condition of their children who had ARI. Mothers who care for children with ARI can cause excessive stress, but the ability to manage it is essential to note. Stress can be seen as a non-specific reaction in humans responding to stimuli or pressure (stimulus stressors) (Donsu, 2017). Stress will be felt in real when self-balance begins to be disturbed. Mothers will be stressed when they perceive that the pressures that arise in their lives or themselves are considered to exceed the limits of their ability to overcome these pressures. Based on the results of research (Pedro et al., 2017), it is shown that mothers who have children with respiratory infections to receive health care in hospitals can make mothers experience depression and anxiety. In addition, children also feel anxious about the presence of disease. One technique for coping management is

behavior modification by turning bad habits into problem-solving habits (Andromeda, 2018). Knowledge is one of the factors that can influence the mother's behavior. So we need information that can help in problem solving.

In accordance with research conducted by (Tait et al, 2020) found that health education using Augmented Reality is effective in adding information and knowledge between parents and children about health, it is hoped that the use of Augmented Reality technology can increase the strength of the relationship between parents and children. AR can be used to improve emotional health in children. AR technology has a positive effect as an improvement in domains such as social interaction, communication, and attention skills (Berenguer, et al., 2020).

Augmented Reality (AR) is a technology that combines virtual objects with images in the real world, including video, sound, text, and photos in 3D. Users seem to be able to interact directly with virtual objects placed in natural scenes to create interaction between humans and computers (Cai, Wang, & Chiang, 2014). Augmented Reality (AR) can be used as a promotive and preventive effort to educate children about ARI disease. According to existing research, AR has a level of effectiveness in the educational process for children. AR is included in multimedia technology which has the advantage of being able to describe a situation or an object visually. It not only can be seen from one point of view but can be seen from all directions so users can interact with real-world environments generated by smartphones. The added value of Augmented Reality technology makes it easier to receive information and makes the information more interesting, especially for children. So far, the provision of education is only in the form of pictures, videos, or dolls which are usually applied so that it can reduce enthusiasm in children (Lantin et al., 2020).

From the results of this study, it can be seen that maternal stress decrease after the intervention by providing education through PAR. The stress becomes lighter because they have received the information they need about ARI treatment. Several studies have found that providing parents with appropriate health information before their child becomes sick is an essential part of preventive measures taken because of the high incidence of ARI in children, especially for children who are placed in child care centers. However, some researchers show that parents find some preventive measures challenging to apply to their children, especially regarding social distancing behavior (Teasdale, 2014). Parents need the information to help them understand and manage their child's illness, including signs serious illness, how to care for children with ARI and how to prevent or reduce recurrence (Ingram et al., 2013). Parents often feel unsure about identifying and interpreting the signs and symptoms of ARI, causing them to seek often seek health professionals, which can increase costs (Alexandrino, 2017).

Mothers with sufficient knowledge about caring for children with ARI have adaptive coping mechanisms to adapt better, deal with problems, control themselves, and have the proper estimate to deal with an incident (Rustandi et al., 2018). Having the proper knowledge in dealing with the problems at hand, mothers have the stress level experienced is also lower (Hafizah, 2013). Mothers who can manage stress can provide good parenting when caring for children who are sick with ARI.

Augmented Reality has the potential to have many benefits in several areas of nursing. In the field of education, nursing students can use AR technology to improve their academic performance, especially in fields other than health AR technology has been widely used to assist the learning process. While in pediatric nursing, AR technology benefits nurses in providing health education to children and their families. Clients will find it easier to understand what are nurse is saying.

CONCLUSION

PAR is able to increase mother's knowledge about ARI disease in children, so that from increasing mother's knowledge and can reduce stress levels related to ignorance about ARI disease in children. PAR also has a positive impact on increasing maternal resilience. PAR is present as an effort to provide education about ARI in children so this application is highly recommended for use in the community. For further research, it is expected to use augmented reality (AR) technology-based methods for discussing other health problems.

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