

The Aquatic Game Model for Children of Asthma Patients in 6-12 Years

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Abstract: This study aims to produce an aquatic game model which is suitable for children aged 6-12 years with asthma. This research model was research and development. The instruments in data collection used were interview guides, questionnaires, and children's health questionnaires. The data were analyzed descriptively and quantitatively on the model rating scale, sign test (t test) on effectiveness and descriptive qualitative tests on the input of model assessment and interview results. The result gained from this study was an aquatic game model for children with asthma aged 6-12 years, consisting of nine aquatic game models, namely (1) walking, running, jumping, and jumping water, (2) magic circles, (3) waves wavy, (4) water bubbles, (5) drowning, (6) pushing the ball, (7) pulling thrust friends, (8) you hide I find, (9) throwing balls. The model developed was effective for children with asthma aged 6-12 years.

1 INTRODUCTION

Health always overcomes illness and illness that causes disease does not choose who is attacked. Children, adolescents, adults, and even very old people can suffer an illness that we may not realize. When people are sick, they will definitely divert all activities, especially children who are still in the growth period.

School-age children will have difficulties in the future if they have many health problems. Children's health at this time will greatly determine the quality of children in the future. If the health problems are not taken into account, they can develop into more serious illness. Health problems in school-age children often occur in developing countries including Indonesia. School-age children need to get regular treatment or medical checkup at school or at home.

Some health problems that often occur in school-age children are: diarrhea, tuberculosis, Dengue Hemorrhagic Fever (DHF), whooping cough, diphtheria, fever, tetanus, hepatitis, measles, worms, chickenpox, meningitis, mumps, middle ear infection and dengue asthma. Asthma is a disease that is often experienced by school-age children. The General Director of Disease Control and

Environmental Health (P2PL), MARS, DTM & HDTCE explained that asthma from childhood can continue in adulthood. Asthma from children or adults who have been infected is likely to be cured (Pos Kota, Tuesday, December 20, 2011). Asthma is still the top ten diseases that cause illness and death in Indonesia. Asthma is also a major cause of disability, deteriorating quality of health throughout the world. Asthma treatment has been quite effective, but asthma morbidity and mortality rates remain high (Stanojevic, et.al., 2012).

Based on Pos Kota news, more than 6% of children in Indonesia were diagnosed with asthma. In 2009 in America, 8.2% was diagnosed with asthma and it affected 24.6 million people (17.5 million adults and 7.1 million children with the age range 0-17 years (Centers for Disease Control and Prevention, 2009). In Indonesia, asthma also increases by 75% today, even the sufferers are 40% more than urban areas. From the data of World Health Organization (WHO), the number of people with asthma in the world is estimated to reach 300 million people. This figure is feared to continue to increase in 2025 to 400 million people (Global Initiative for Asthma, 2012).

In Indonesia, the prevalence of asthma is uncertain, but the results of research on children

aged 13-14 years using the ISAAC questionnaire (International Study of Asthma and Allergies in Children) in 1995 the prevalence of asthma was still 2.1%, while in 2003 it increased to 5.2%. The survey results of asthma in school children in several cities in Indonesia (Medan, Palembang, Jakarta, Bandung, Semarang, Yogyakarta, Malang, and Denpasar) showed that the prevalence of asthma in elementary school children (6 to 12 years) ranged from 3.7% -6, 4%, while for junior high school children in Central Jakarta 5.8% in 1995 and 2001 and 8.6% in East Jakarta. Based on the description above, it is a public health problem that needs serious attention.

Some sports recommended by the experts in reducing or minimizing asthma in school-age children are running and swimming. As stated by Sumosardjuno (2012), activities such as running and swimming improve fitness and reduce asthma symptoms. Swimming has advantages. Physiologically, this exercise trains the strength of the respiratory muscles, and the water/ the environment in a swimming pool helps keeping the respiratory tract from interference with dust or dirt carried by the air which will stimulate recurrence of asthma.

Physical activities such as swimming for asthma sufferers suggested by experts should be done at moderate intensity. Swimming with moderate intensity helps breathing exercises in asthmatics and prevents recurrence during exercise. Asthma attacks can occur in patients with physical conditions triggered by being too tired or exhausted, so swimming should be designed to make sufferers feel happy and it aims to practice breathing.

A study conducted by The UK National Asthma Management Study together with the Tayside Asthma Management Initiative involving 12.203 respondents showed that the most common asthma attacks occurred in children aged less than five years (37%). Asthma in children is a problem for the child itself and the family, because asthma in children influences various specific aspects related to quality of life, including the process of growth and development, both in infancy, infancy, and adolescence (Sidhartani, 2007). If an acute asthma attack occurs, the child will experience shortness of breath, experience disruption of daily activities, including frequent absence from school, reduced physical fitness, and recurring anxiety and can reduce quality of life (Anurogo, 2009).

The results of the study of Robert, et.al., (2010) state that the factors that can affect the quality of life of children with asthma are lung function, characteristics of asthma symptoms, and

psychosocial functions. Children with asthma are mostly aware of their limitations in activities such as running, playing, and learning, sometimes feeling angry and frustrated in children due to their limitations. The effects of asthma in children such as disruption of daily activities, such as playing, running, and children seem to avoid the usual activities. Another impact seen in asthmatic a child is rest and sleep disorders. Children are seen as having difficulty sleeping and there are disturbances in sleep patterns.

Preliminary observations related to swimming exercise carried out by asthmatics, especially elementary school age children were done in swimming clubs or in private swimming lessons. The researchers' initial observations were carried out at one of the swimming clubs in Yogyakarta and the elementary schools in Yogyakarta which held learning and extra swimming. According to the children' parents, the children who took part in swimming exercises at the club felt less confident and less able to take part in training even though they were still the basis of swimming. Children felt less confident because they considered themselves as the one being unable to carry out heavy activities. The basic abilities possessed by asthmatic children were also categorized as less than other friends who do not suffer from asthma at the same age. Thus, it made the children lazy to do the exercises. The children in elementary schools having asthma tended to be less active and were interested in sports and aquatic learning. The sports carried out at the club were to achieve achievements, so the exercise used was carried out in accordance with the achievement training program, while swimming with private lessons made children bored because the training given tends to be monotonous.

The researchers interviewed some parents of the elementary school children who took their children to take extra swimming activities. The parents said that they did that because their children suffered from asthma and their mobility was sometimes not optimal because the children were not confident and were afraid if their asthma recurs. The parents felt that the health of asthma children was important because the children's parents who took part in swimming suffered from asthma. Therefore, the parents expected that their children's extra swimming would make the children more confident in doing movement activities. However, sometimes when the learning was too heavy, the children relapsed when he was home.

Preliminary observations with the swimming instructors or swimming trainers about aquatic

activities for children with asthma showed that the system of swimming exercise was usually to get achievements. The children who participated in swimming clubs would usually tend to be more silent and they were not able to cope with the training activities provided by the coach. Asthma children who do the exercise would usually feel burning sensation in their chest and find it difficult to breathe when the exercise given was rather excessive, so it took a long rest period. Sports instructors or teachers who accompanied extracurricular activities rarely used game approaches in implementation and often did not assess the learning process of children, especially children with asthma who tended to have limited mobility and lack of confidence. Asthma children who were not so confident made the quality of motion not optimal and it could interfere the development and development of elementary school age children.

Based on the above problems, it was necessary to make a game model adapted to asthmatics, especially children aged 6-12 years. Game model was an effort to provide variations in the game that could attract the interest of children to play games, as a form of giving physical activity as a whole. Giving overall physical activity could be done through various sports activities done in leisure time, or by habituation in daily life. This is in accordance with that expressed by Branca & Valuena (2001) that "A good level of physical activity should be promoted in children of all ages through organized sport, leisure, and everyday habits.

The children with asthma do not have to swim in doing activities in water, especially for beginners. One of the water activities that can be done by children with asthma is by playing in water. The most important water game for people with asthma is to try to keep the child moving in the water and to practice breathing management when getting into and leaving the water. A fun game will make the child become unconscious when the exercise maximizes basic motion quality and improves fitness in order to minimize the occurrence of asthma attacks and to increase endurance.

Aquatic games focussed on improving the motion quality of elementary school-aged asthma children and increasing their fitness and endurance. Until now, there had not been developed a game package in water (aquatic) specifically for asthmatics of elementary school age children that could minimize the asthma attacks. The purpose of this study was to develop an aquatic game model designed to reduce or minimize asthma in children

aged 6-12 years (elementary school) which was expected to be one of the solutions that could be done and useful, especially to answer the problem of asthma.

2 RESEARCH METHODS

2.1 Types of Research

This type of research was research and development. It is the type of research used to produce certain products and test the effectiveness of those products (Sugiyono, 2014).

2.2 Development Procedure

This procedure of research utilized the steps of Borg & Gall (2007). The design of the development of the Borg and Gall development model was later modified more simply involving seven main steps: (1) preliminary study, (2) design of the initial draft, (3) validation of the initial and revised drafts, (4) small-scale trials and revisions, (5) large-scale trials and revisions, (6) final products, and (7) effectiveness tests.

2.3 Target/ Research Subject

The targets/ subjects of this study were taken in a small-scale trial at Muhammadiyah Elementary School in Karangkajen Yogyakarta aged 6-12 years suffering from asthma, as many as 4 children. Large-scale trials were conducted in the same place as the number of students of 8 children. The effectiveness test was carried out on 10 children aged 6-12 years with asthma at Muhammadiyah Elementary School Karangkajen.

2.4 Instruments and Data Collection Techniques

The instruments of data collection used by researchers were: (1) interviews, (2) questionnaires. The interview instrument was carried out when the researcher collected initial information. Questionnaire was used to state the feasibility of the draft game.

2.5 Data Analysis Technique

The data used in this study were qualitative and quantitative data. The effectiveness test was done by

quasi-experimental method, by comparing the results of the pretest with the results of the posttest. Data analysis was conducted by using nonparametric statistical tests, the sign test. According to Hasan (2008), it is called a sign test because the data analyzed is expressed in the form of signs that are positive signs and negative signs, positive and negative signs will be known based on differences in scores during pre-test and post-test. This sign test can be used to find out the effects of a particular action, the effects of those actions are expressed in positive and negative signs.

3 RESEARCH RESULT

This study aims to develop an aquatic play model for children suffering from asthma aged 6-12 years. This was done as an effort to help swimming practitioners and parents having asthma children in introducing water. The researchers expected that the products produced in the development of this game model could be a safe alternative when parents wanted to introduce water for their children with asthma aged 6-12 years.

Validation was carried out by experts/ the experts associated with this research. They were the experts in the fields of aquatic, health, and sports teachers. The results of expert evaluations of the draft model are presented in Table 1 as follows.

Table 1: Data on the results of expert validation on the model draft.

No	Expert	%	Category
1	Expert 1	82.5	Very good
2	Expert 2	90	Very good
3	Teacher	87.5	Very good

Table 1 above shows that the expert 1 classified the model in very good category, having 82.5% percentage. The expert 2 categorized the model in very good category, acquiring the percentage of 90%. Besides, the teacher categorized the model in very good category, reaching the percentage of 87.5%. From the experts' judgement, the assessment obtained was in the very good category, the suggestions and inputs from the initial draft were revised in accordance with the results of validation. This shows the expert's assessment of the model made was worth testing.

From the implementation of small-scale trials, the researcher obtained the data from two experts and one teacher. These data are presented in Table 2 as follows.

Table 2: Data on assessment results for models in small-scale trials.

No	Expert	%	Category
1	Expert 1	82,5	Very good
2	Expert 2	87,5	Very good
3	Teacher	87,5	Very good

Table 2 above shows the assessment result from the experts and the teacher, the expert 1 having a percentage of 82.5% in the very good category, expert 2 having a percentage of 87.5% in the very good category, and the teacher a percentage of 87.5% in the very good category. From the evaluation on the small-scale trial, it was found that the assessment was in the very good category, this shows that the evaluation of the model was feasible to be tested on a large scale.

Large-scale trials involved the children from SD Muhammadiyah Karangajen. The children with asthma were made as subjects, as many as 8 children.

Table 3: Data on assessment results for models in small-scale trials.

No	Expert	%	Category
1	Expert 1	87,5	Very good
2	Expert 2	90	Very good
3	Teacher	92,5	Very good

Table 3 above shows the assessment result from the experts and the teacher, the expert 1 having a percentage of 87.5% in the very good category, expert 2 having a percentage of 90% in the very good category, and the teacher having a percentage of 92.5% in the very good category. From the evaluation of large-scale trials, it was found that the evaluation in the very good category showed that the evaluation of the model was feasible. In general, the material experts and the sports teacher rated it with good category, by adding the instructions for carrying out asthma medication in children engaged in activities.

4 DISCUSSION

The ultimate goal of this development research is to produce a product in the form of an aquatic game guidebook for children with asthma aged 6-12 years. The purpose of the guidebook is to explain more specifically about the model, so that the teachers and the students as practitioners in the field as well as the readers will understand the purpose of the model

developed, the tools needed, the preparation of tools, and how to implement them.

The development of an aquatic game model for children with asthma aged 6-12 years started from stage (1) preliminary study, (2) design of the initial draft, (3) validation of the initial and revised drafts, (4) small scale trials and revisions, (5) large-scale trials and revisions, (6) final products, and (7) effectiveness tests. The final product of this development research was in an aquatic game guide book for children with asthma aged 6-12 years. The final product of the aquatic game model for children with asthma aged 6-12 years consisted of nine aquatic game models, namely (1) road, run, jump, and jump water, (2) magic circle, (3) choppy waves, (4) water bubbles, (5) drowning, (6) thrusting balls, (7) pulling thrust friends, (8) you hide I find, (9) throwing balls. The model was compiled using simple, inexpensive, and safe facilities and infrastructure so that it is easily available and not harmful to children. Aquatic games for asthmatics can be chosen which one to use and, in each exercise, can be carried out 2-3 games with the time of play accompanied by a maximum rest of 1 hour.

Health assessment carried out in this study uses indicators to determine the usefulness of the game for the health of asthma children. The Effectiveness Test indicators consist of (1) Frequency of Asthma Attacks, (2) Asthma intensity on a scale of 1-10, 1 mild to 10 weight, (3) Asthma Attack Duration in minutes, (4) Frequency of Other Diseases related to power body resistance, and (5) Heart Rate When Recovery related to fitness is calculated using the Recovery Heart Rate "RHR". The results of the effectiveness test using the sign test are presented in the table as follows.

Table 4: Sign test results.

No	Indicator	Signifikansi
1	Recovery Heart Rate "RHR"	0,004
2	Frequency of Asthma Attacks	0,031
3	Asthma intensity	0,002
4	Asthma Attack Duration	0,016
5	Frequency of Other Diseases	0,016

Based on the results of the analysis in Table 4 above, it shows that the significance value is <0.05 , so there are significant differences.

Based on the results of the effectiveness test above, it shows that the developed model is effective for children with asthma aged 6-12. Effectiveness is shown by increasing Recovery Heart Rate (RHR), and decreasing the frequency of asthma attacks, asthma intensity, duration of asthma attacks in the

form of duration of asthma attacks in hours, frequency of other diseases associated with endurance. This is reinforced by the results of Handayani (2012) who stated that swimming exercises and asthma exercises regularly can increase the value of FEV1 in asthmatics; swimming exercises and asthma exercises regularly can increase cortisol hormone levels in asthmatics; Increased FEV1 values and higher levels of cortisol hormone in the pool exercise group compared to the asthma exercise group. Added McArdle, Katch, & Katch (1994) that swimming exercise requires more energy compared to other exercises (running or walking) because swimming exercises emphasize the movement of the legs and arms and there is a force that blocks the subject, namely water so that pulmonary function in the muscles -The respiratory muscles are also better.

The role of physical exercise in the pathophysiology of asthma and disease control has been the focus of attention for consideration. Better ventilation capacity and relief of symptoms associated with asthma are the benefits of physical exercise for asthmatic patients. Physical exercise causes improvements in physical fitness, reduces shortness of breath, reduces consumption of inhaled steroids in asthma patients, reducing physical exercise can cause bronchospasm.

Some of the benefits of water therapy include: to prevent flu / fever, improve fertility, cure fatigue, improve immune function, increase body energy, and help smooth blood circulation (Chaiton, 2002). Hydro therapy or water therapy is a method of treatment and healing by using water to get the effects of therapists (Chaiton, 2002). In particular, water has the quality to achieve a bodily response that can heal the symptoms and improve the body's mechanism in the face of external threats. Benefits of aquatic activity / swimming exercises include reducing blood pressure, diabetes mellitus, heart disease, arthritis, hypercholesterolemia, and obesity.

According to Albert M. Hutapea (in Tamyiz, 2008), in his book "Towards a Healthy Lifestyle" revealed, a 16-year study of 17,000 alumni of Harvard University showed that those who were not actively exercising (who burned no more than 500 calories per week in activities exercise) is more likely to have heart disease. The following is explained some of the benefits of swimming exercise as a therapy for internal medicine which affects many people who are lazy to exercise (Tamyiz, 2008). Tamyiz (2008) added that the benefits of aquatic activity / swimming exercise are to reduce children who suffer from asthma.

Educational efforts provided by educators should be carried out in pleasant situations by using strategies, methods, materials and media that are interesting and easy for children to follow. Through play children are invited to explore, discover and utilize objects that are close to the child, so that learning becomes meaningful. Games for children are a creative process for exploring, can learn new skills and can use symbols to describe their world. When playing they build understanding related to their experience.

The nature of the game is physical activity carried out seriously, voluntarily and pleasantly. Aquatic learning also involves physical activity carried out seriously to achieve the learning objectives. Through the playing approach the learning objectives will be easily achieved because students will carry out physical activities voluntarily, happily, and in a pleasant atmosphere. Water games are the introduction of students to water without realizing it. In playing students will walk, run, jump both forward and backward and sometimes fall into the water. This game will be carried out by students happily without realizing students have known the nature of water, including: cold, water objects, providing obstacles upward or forward that are quite large. With this game the feeling of fear of water will disappear and trust in oneself will arise, so that it will be easy to accept the forms of the next lesson.

The nature of the game is physical activity carried out seriously, voluntarily, and fun. As stated by Sukintaka (1998, p.24) play is a physical activity that is carried out voluntarily and is serious about getting pleasure from these activities. Aquatic learning also involves physical activities that are carried out seriously to achieve the learning objectives. Through the play approach the learning objectives will be easily achieved because students will carry out physical activities voluntarily, happily, and in a pleasant atmosphere. The water game is the student's unconscious recognition of water. In playing students will walk, run, jump both back and forth and sometimes fall into the water. This game will be carried out by students happily without realizing it students already know the nature of water, including: cold, water objects, providing obstacles up or forward which is quite large. With this game the feeling of fear of water will disappear and self-confidence arises, so that it will be easy to accept the following forms of learning.

5 CONCLUSION

From the results of data analysis, conclusions can be drawn: (1) Aquatic game models have been developed for children with asthma aged 6-12 years consisting of nine aquatic game models, namely (1) walking, running, jumping, and jumping water, (2) magic circle, (3) choppy waves, (4) water bubbles, (5) drowning, (6) thrusting balls, (7) pulling thrust friends, (8) you hide I find, (9) throwing balls. The model is compiled using simple, inexpensive, and safe facilities and infrastructure so that it is easily available and not harmful to children. Aquatic games for asthmatics can be chosen which one to use and in each exercise can be carried out 2-3 games with the time of play accompanied by a maximum rest of 1 hour. (2) The model developed is effective for children with asthma aged 6-12 years. Effectiveness was shown by increasing Recovery Heart Rate (RHR), and decreasing the frequency of asthma attacks, the intensity of asthma attacks, the duration of asthma attacks, and the frequency of other diseases that were significant ($p < 0.05$).

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