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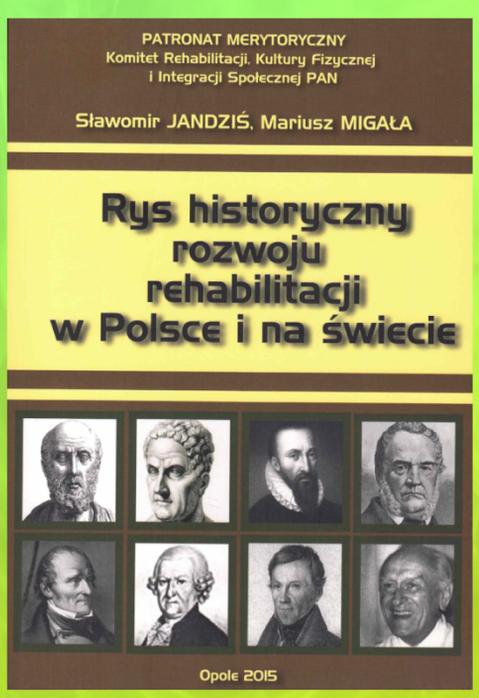

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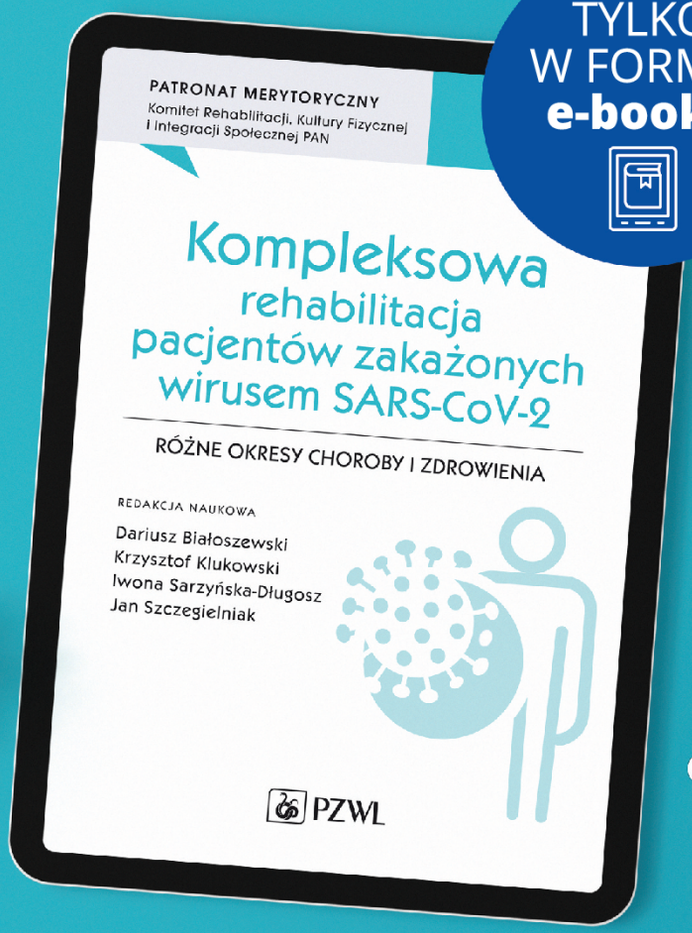

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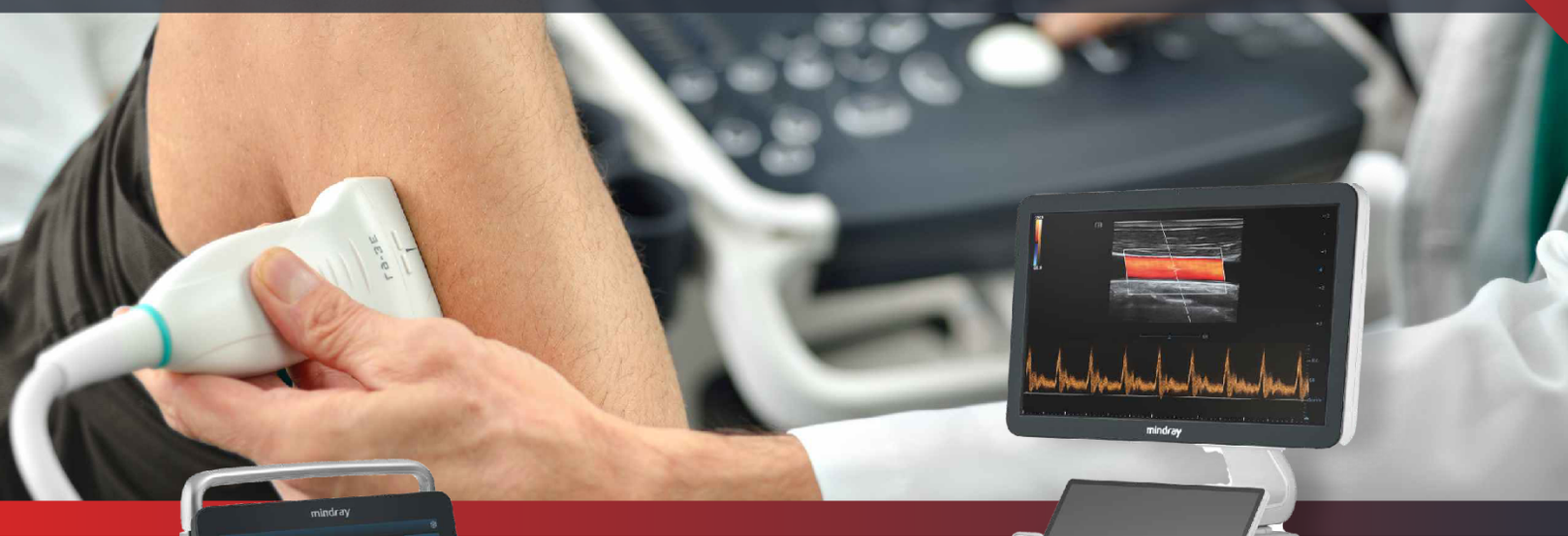

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Rehabilitacja kardiologiczna i fizjologia wysiłku – zapraszamy do rejestracji na wyjątkową konferencję w Wiśle

W dniach 11–13 maja w Hotelu Stok Wiśle odbędzie się wyjątkowe i interdyscyplinarne spotkanie specjalistów z całej Polski – 26. Sympozjum Sekcji Rehabilitacji Kardiologicznej i Fizjologii Wysiłku Polskiego Towarzystwa Kardiologicznego. Serdecznie zapraszamy do rejestracji.

26. Sympozjum Sekcji Rehabilitacji Kardiologicznej i Fizjologii Wysiłku Polskiego Towarzystwa Kardiologicznego to coroczne spotkanie specjalistów, zajmujących się rehabilitacją kardiologiczną, prewencją chorób układu krążenia i innymi formami aktywności fizycznej, która ma prowadzić do poprawy stanu naszego zdrowia.

Ta trzydniowa konferencja przeznaczona jest dla lekarzy kardiologów, specjalistów rehabilitacji medycznej oraz innych specjalności, którzy w swojej codziennej praktyce zajmują się rehabilitacją i fizjologią wysiłku, ale także dla fizjoterapeutów, pielęgniarek, techników i przedstawicieli innych zawodów medycznych, zainteresowanych tematyką spotkania, oraz studentów.

Jakie tematy zostaną poruszone podczas konferencji?

26. Sympozjum Sekcji Rehabilitacji Kardiologicznej i Fizjologii Wysiłku to konferencja, na którą zaproszeni zostali wybitni specjaliści z dziedziny kardiologii i nie tylko. Podczas wydarzenia wygłoszonych zostanie prawie 100 wykładów merytorycznych w ciągu aż 20 sesji. Uczestnicy będą mieli również szansę na udział w sesjach przypadków klinicznych, intensywnych warsztatach, a także panelach dyskusyjnych. To wydarzenie cechujące się dużą interdyscyplinarnością, dlatego z pewnością każdy znajdzie coś dla siebie.

Podczas wydarzenia kompleksowo pochylimy się nad dziedziną rehabilitacji kardiologicznej i fizjologii wysiłku. Wśród tematów wiodących znajdują się:

- rehabilitacja w dobie pandemii i po pandemii COVID-19;
- telerehebilitacja i rehabilitacja hybrydowa;
- rehabilitacja kardiologiczna w specyficznych grupach pacjentów;
- programy KOS-zawał i KONS;
- nowe standardy ESC, PTK i SRKiFW;
- Testy wysiłkowe i testy spiroergometryczne
- monitorowanie wysiłku fizycznego;
- prewencja pierwotna i wtórna chorób sercowo-naczyniowych;
- farmakoterapia pacjentów rehabilitowanych kardiologicznie i nie tylko;
- sport i aktywność sportowa w kardiologii;
- czynniki ryzyka chorób układu krążenia.

Program merytoryczny wydarzenia jest niezwykle bogaty i angażujący. Warto podkreślić także, iż na konferencji pojawią się specjalne sesje wykładów prowadzone przez zaproszone sekcje i asocjacje Polskiego Towarzystwa Kardiologicznego, m.in. Sekcję Kardiologii Sportowej, Asocjację Niewydolności Serca, Asocjację Elektrokardiologii Nieinwazyjnej i Telemedycyny, Sekcję Pielęgniarstwa Kardiologicznego i Pokrewnych Zawodów Medycznych, „Klub 30”, Sekcję Farmakoterapii Sercowo-Naczyniowej, Sekcję Prewencji i Epidemiologii, a także Polskie Towarzystwo Medycyny Sportowej.

„Pandemia wymusiła na nas zmianę paradygmatu rehabilitacji kardiologicznej”

Organizatorami wydarzenia są wydawnictwo naukowe Evereth Publishing oraz Sekcja Rehabilitacji Kardiologicznej i Fizjologii Wysiłku Polskiego Towarzystwa Kardiologicznego (SRKiFW). Przewodniczącą Komitetu Naukowego jest prof. dr hab. n. med. Małgorzata Kurpesa, Wiceprzewodniczącymi – prof. dr hab. n. med. Anna Jagier, dr hab. n. med. Dominika Szalewska, a Komitetu Organizacyjnego – dr n. med. Bartosz Szafran.

Dr n. med. Agnieszka Mawlichanów, Przewodnicząca SRKiFW, podkreśla, iż ostatnie Sympozjum miało miejsce w 2019 r. w Wiśle. W tym czasie udało się zorganizować wydarzenie w formule online, jednak zdaniem Przewodniczącej obecnie „wszyscy spragnieni jesteśmy spotkania osobistego, wymiany doświadczeń i bezpośrednich rozmów, nie tylko na sali wykładowej, ale i w kuluarach”.

– Cztery lata w sporcie to pełna olimpiada, a w naszej dziedzinie kardiologii można powiedzieć – cała wieczność. Pandemia wymusiła na nas zmianę paradygmatu rehabilitacji kardiologicznej, między innymi stworzyła pole dla rozwoju modelu hybrydowego i monitorowanego telemedycznie. W tym czasie ukazało się wiele ważnych dokumentów, stworzonych przez polskie i europejskie towarzystwa kardiologiczne, dotyczące rehabilitacji, prewencji i aktywności fizycznej. Dynamicznie w naszym kraju rozwija się też program KOS-zawał, przynoszący liczne korzyści, ale też budzący kontrowersje. O tym wszystkim i jeszcze wielu innych sprawach pragniemy podyskutować w czasie naszego majowego spotkania – zapowiedziała dr Mawlichanów.

Rejestracja na 26. Sympozjum Sekcji Rehabilitacji Kardiologicznej i Fizjologii Wysiłku możliwa jest na stronie internetowej konferencji rehabilitacja-2023ptk.pl/rejestracja/. Informacje na temat opłaty zjazdowej i wydarzeń towarzyszących znajdują się tutaj: rehabilitacja2023ptk.pl/oplata-konferencyjna/.

Informujemy jednocześnie, iż liczba miejsc na konferencji jest ograniczona, dlatego warto zarejestrować się już dzisiaj.

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Development of physical fitness tests for early childhood 4–6 years

Opracowanie testów sprawności fizycznej dla dzieci w wieku 4-6 lat

Mikkey Anggara Suganda[1,2(A,B,C,D,E,F,G)], Soegiyanto[3(A,B,C,E)], Henny Setyawati[3(A,B,D)], Setya Rahayu[3(A,D,E)], Tri Rustiadi[3(A,E,F)]

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Abstract

Study Purpose. The importance of physical fitness for every early childhood has because it has benefits and influences on full development. However, existing physical fitness instruments such as the Indonesian physical fitness test (TKJI) only focus on ages 6–19 years. This study aims to develop a test instrument and physical fitness norms for early childhood 4-6 years that are valid and reliable.

Material and Methods. The research used was Research and Development (R&D) with the Borg & Gall Development Model. This research was conducted in several steps, namely: (1) needs analysis (2) product planning, (3) developing the initial product, (4) expert validation, (5) product revision, (6) small group trials, (7) product revisions, (8) large group trials, (9) final product revisions and continued with product effectiveness testing with experiments, (10) final product results. Respondents for the small-scale product trial were 40 students from 4 kindergartens and for the large-scale trial 137 students from 12 kindergartens in the city of Cirebon.

Result. The results of this study show the development of a physical fitness instrument model for early childhood 4-6 years, with a physical fitness test battery that has been validated by experts, including; 1) Speed Test (time), 2) Agility Test (time), 3) Explosive Power Test (cm), 4) Muscle Strength Test (time), 5) Cardiovascular Test (time). The results of this study also prove the development of test instruments and norms of physical fitness for early childhood 4–6 years. It can be seen that the overall value of r count for each test item is greater than r table 0.159, so each test item is declared valid and the reliability value is 0.942, so it is declared reliable.

Conclusion. Based on the results of research and development of physical fitness test instruments for early childhood 4–6 years, it is stated that they are valid and effective and can be used for physical fitness tests for early childhood 4–6 years.

Keywords

development, physical fitness, early childhood

Streszczenie

Cel pracy: Zbadanie znaczenia sprawności fizycznej dla każdego dziecka, pod względem korzyści i wpływu na pełny rozwój. Istniejące instrumenty do badania sprawności fizycznej, takie jak indonezyjski test sprawności fizycznej (TKJI), koncentrują się tylko na grupach wiekowych 6–19 lat. Niniejsze badanie ma na celu opracowanie instrumentu testowego i norm sprawności fizycznej dla dzieci w wieku 4-6 lat, które są ważne i wiarygodne.

Materiał i metody. Zastosowano badania i rozwój (R&D) z modelem rozwoju Borg & Gall. Badanie składało się z kilku etapów, a mianowicie: (1) analiza potrzeb, (2) planowanie produktu, (3) opracowanie początkowej wersji produktu, (4) walidacja ekspercka, (5) korekta produktu, (6) badania w małych grupach, (7) korekta produktu, (8) badania w dużych grupach, (9) końcowa korekta produktu oraz dalsze testowanie skuteczności produktu przez eksperymenty, (10) końcowe wyniki. Uczestnikami badania na małą skalę było 40 uczniów z 4 przedszkoli, a w badaniach na dużą skalę 137 uczniów z 12 przedszkoli w mieście Cirebon.

Wynik. Wyniki niniejszego badania pokazują opracowanie modelu przyrządu do badania sprawności fizycznej u dzieci w wieku 4-6 lat, obejmującego testy sprawności fizycznej zatwierdzone przez ekspertów, w tym; 1) Test szybkości (czas), 2) Test zwinności (czas), 3) Test siły eksplozywnej (cm), 4) Test siły mięśni (czas), 5) Test układu sercowo-naczyniowego (czas). Wyniki niniejszej pracy świadczą również o rozwoju aparatury badawczej i norm sprawności fizycznej dla dzieci w wieku 4–6 lat. Można zauważyć, że ogólna wartość R dla każdej pozycji testowej jest większa R 0,159, więc każda pozycja testowa jest uznana za ważną, a wartość wiarygodności wynosi 0,942, a więc zadeklarowana jest jako wiarygodna.

Wniosek. Na podstawie wyników prac badawczo-rozwojowych w zakresie przyrządów do badań sprawności fizycznej u dzieci w wieku 4–6 lat stwierdza się, że są one aktualne i skuteczne oraz mogą być stosowane do badań sprawności fizycznej w okresie wczesnodziecięcym 4–6 lat.

Słowa kluczowe

rozwój, sprawność fizyczna, wczesne dzieciństwo

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Introduction

A review of articles proves that the performance of the metabolic and neuromuscular systems increases by doing movement activities [1], and as a determinant of fitness in adolescence, where movement activity is a sport that can be done by both the elderly and early childhood [2], and make the body healthy and fit [3]. Early age is a crucial time to provide a variety of movement experiences because the growth and development of children rapidly occurs at this time. At this time is the golden age, where children will imitate what they see so this should be an opportunity for parents to teach children to maintain physical fitness, so at this time early childhood education is very important [4]. The development of myelin around neurons (myelination), which is mostly complete at the end of early childhood, makes the passage of nerve impulses faster so that children can respond to stimuli more quickly. The child's movement patterns also continue to increase complexly following the process of myelination in the cerebellum. In addition, during the golden age of this child, surprising developments will occur, namely in physical and psychological development [5], Therefore, early childhood represents an ideal period for children to develop and refine various motor tasks, from fundamental movements in early childhood to sports skills in mid-childhood [6].

Childhood is a period when children are very active in carrying out activities, one of which is sports activity, components that support physical activity so that children can run well, namely gross motor skills [7], that way it will provide health benefits in childhood and adolescence [8]. Motor development is a progressive change in movement behavior throughout the life cycle [9], where the process of a child learns to skillfully move the limbs [10]. Intensive experience and practice in various motor skills will result in ease of skill acquisition. When children do movement activities, children can explore their environment so that they can stimulate cognitive development [11]. Next [9] explains that children's knowledge has reached 75% by weight of adult knowledge at the age of three years and nearly 90%, at the age of six children aged 6 to 7 years are at a mature stage in fundamental movements which are characterized as being able to carry out efficient, coordinated and controlled movements in the phase this [6]. At this time the growth of brain cells and organs is very well developed so that gross motor skills such as walking, running, jumping, climbing and so on [5].

Physical education in early childhood can provide more opportunities for students to develop their physical abilities and motor development with various physical exercises [12]. Therefore, early childhood education aims to achieve the motor, cognitive, emotional, and social development of preschoolers by providing them with various learning opportunities. [13], however, at least the teacher's understanding in providing learning [14]. The importance of experiencing movement skills from an early age for a child who will become an athlete later, and what needs to be understood here is that not only children who become athletes need various kinds of experience and movement skills at an early age so that children have good hard skills [15]. This movement is obtained by children from various types of activities and activities carried out. In line with the statement made by [16] aspects of children's gross motor development should be the concern of parents by providing motivation to stimulate social, adaptive-fine motor and language development so that children's development can reach optimal. Low motor skills have a relationship with the ability to speak in children [17]. Based on this review, it illustrates that the scope of sports and health physical education in children is closely related to efforts to increase movement abilities so that children have a good level of maturity and physical fitness.

Physical fitness is the main capital that must be owned by a person, both adults and children, especially an athlete who is synonymous with activities that come into contact with the physical [18]. Several factors affect physical fitness related to health, namely body weight and socioeconomic status [19]. Therefore it is important to know physical fitness so that these results can be an illustration for coaches and sports teachers to arrange activities for children to do [20, 21], and unknowingly the learning activities carried out by early childhood education teachers at school such as singing and others that are oriented towards the concept of play include carrying out physical activities [22]. The problem in this study is that in motor learning for early childhood there is no test reference, so fitness cannot be known. Existing physical fitness tests such as the Indonesian physical fitness test (TKJI) only focus on ages 6–19 years. Previous studies conducted [23] said that tests had never been carried out on kindergarten children, here the teachers only used the existing AP-PAUD instruments by assessing their motor skills only.

Another problem is the physical fitness test that was previously carried out by [22] produce a physical fitness test for an early age by (1) 6 meter panda walk, (2) swinging on horizontal stairs, (3) running back and forth 5 × 10 meters, (4) pushing animal images. Looking at the results of the research that has been done, the researcher re-analyzes it by seeing whether the four test items have fulfilled all the elements of physical fitness. Further preliminary studies with Focus Group Discussion (FGD) on Kindergarten Teachers in several kindergarten schools in Cirebon City. Physical fitness tests for early childhood aged 4-6 years can be used but do not meet the elements of physical fitness, therefore it is necessary to do research and development again and it is better to fulfill the elements of physical fitness with games and in accordance with the characteristics of early childhood 4–6 year. Based on these problems, this is one of the gaps that can be developed as well as the reason why this study is important. This research is a research to develop an effective and efficient test instrument and physical fitness for early childhood aged 4–6 years by fulfilling the elements of physical fitness.

Research methods

Participants

The research subjects for the development of early childhood physical fitness tests were kindergarten students 4–6 years old in Cirebon City with a sample size of 40 students from 4 kindergartens on a small scale and 137 students from 12 kindergartens on a large scale.

Procedure

This research uses an R&D (Research And Development) research approach, according to [24] states that the basis of research and development consists of two main objectives, namely developing products and testing the effectiveness of products to achieve goals.

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The first objective is referred to as the validation function while the second objective is referred to as the effectiveness test.
This research was conducted by dividing the development steps into 10 main steps, namely: 1) research and data collection, 2) planning, 3) development, 4) initial field trials, 5) revision of trial results, 6) field trials second, 7) field test product improvement, 8) field test implementation, 9) final product improvement, 10) dissemination and implementation. The research and development procedure has complete stages, but in this study it simplifies the research and development steps as described (Sukmadinata, 2012) which simplifies the development steps into three stages: 1) preliminary study, 2) model development, 3) model testing. The development of the physical fitness test in this study is a test in the form of physical (physical) activity in the field (field test), which refers to existing tests, the research and development procedure has a complete stage, as follows:

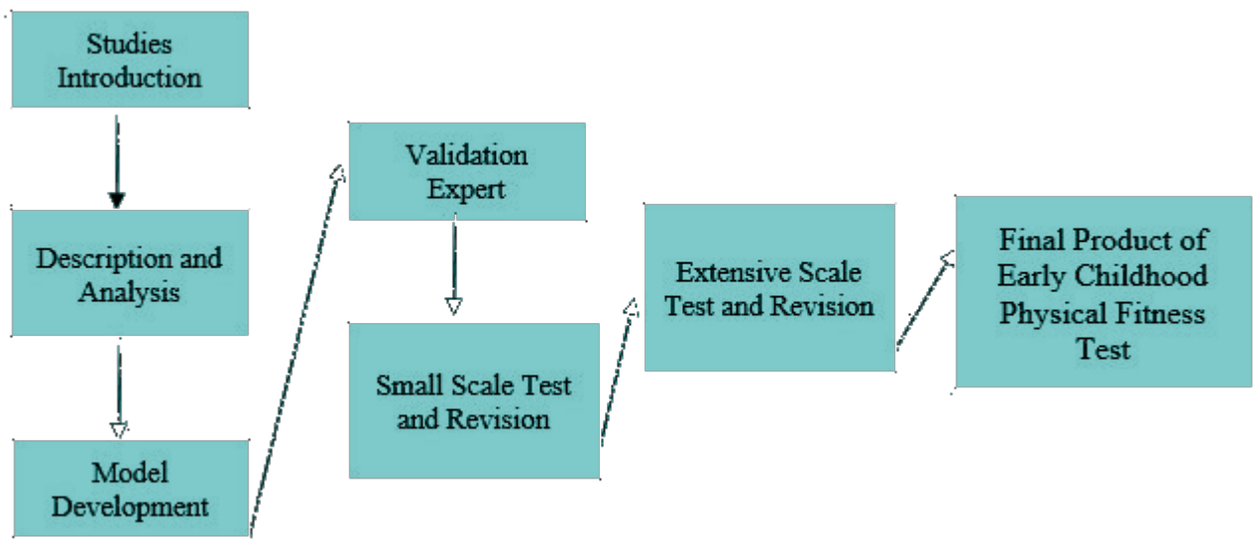

Figure 1. Steps for research and development of physical fitness tests for early childhood

Data Analysis
Data reliability test was carried out using test-retest analysis techniques, split-half tests, one-way analysis of variance (intraclass correlation). To test statistical products in the development of tests with validity tests, test reliability tests and normality tests. Test the validity of the test in this study was carried out to look for predictive validity and construct validity. Predictive validity is a degree that describes or shows the value of a series of tests that can predict fitness tests. Construct validity is validity that takes issue with how far the test items are able to measure what they really want to measure in accordance with the established concept. The validity of this test is expert judgment, then analysis of the data needs for experts using percentage descriptive analysis techniques.
As opinion [25] to determine individual skill level by: 1) individual matches (tournaments), so that the winner will be seen; 2) to determine physical quality in team sports with a 1–5 rating scale rating carried out by a reliable coach; 3) comparing several performance levels of high skills and low skills. For data from the observations of material experts on this model. If it is desired to classify subjects into 5 categories of physical fitness, we divide the standard deviation units into 5 sections which will be presented in Table 1.

Table. 1 Unit standard deviation [26]

$(M + 1.5\ SD) < X$	Very well
$(M + 0.5\ SD) \leq X < (M + 1.5\ SD)$	Well
$(M - 0.5\ SD) \leq X < (M + 0.5\ SD)$	Currently
$(M - 1.5\ SD) \leq X < (M - 0.5\ SD)$	Not enough
$X \leq (M - 1.5\ SD)$	Less once

The effectiveness test is the final test before the physical fitness test product for early childhood 4-6 years is doubled. The analysis technique used to determine the effectiveness of early childhood physical fitness tests uses the SPSS 20 program.

Results

Content validation test was carried out by 3 (three) experts and 2 panelists by answering a questionnaire of 10 questions. In testing the content validity of the initial draft of the physical fitness test model for early childhood 4-6 years. The initial test of the draft of the physical fitness test model produced eight (8), namely; 1) Speed Test (time), 2) Agility Test (time), 3) Explosive Power Test (cm), 4) Muscle Strength Test (time), 5) Peut Muscle Strength Test (time), 6) Accuracy test (cm), 7) Balance Test (time), 8) Car-

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diovascular Test (time). There were three (3) tests that were annulled by the expert due to the fatigue condition of the research subjects taking the fitness test into account. Therefore the 5 tests that are maintained are considered to represent physical fitness tests for early childhood 4-6 years, namely: 1) Speed Test (time), 2) Agility Test (time), 3) Explosiveness Test (cm), 4) Muscle Strength Test (time), 5) Cardiovascular Test (time).

The results of the assessment of experts and panelists for each classification item were categorized into 4 (four) categories, namely Very Eligible, Eligible, Inadequate, and Inadequate. The following are eligibility categories based on expert and panelist assessment norms regarding the content validation test of the initial draft of the physical fitness test model:

Table 2. Level of achievement [27]

No	Score	Category	Information
1	81% ≤ X < 100%	Very Worthy	No Revision Needed
2	62% ≤ X < 81%	Worthy	Revision
3	43% ≤ X < 62%	Less worthy	Revision
4	25% ≤ X < 43%	Not feasible	Revision

After analyzing each item and then categorizing it based on the norms of table 2 above, the results of the content validation analysis are based on the value scale for material experts/panelists on the physical fitness test model can be seen in table 3.

Speed Test (time)

The results of the speed test content validation analysis by 3 experts and 2 panelists, namely in the form of a percentage of eligibility. The results of the assessment of all experts and panelists obtained an assessment score above 81%, this means that the aspects/contents of the physical fitness test on the speed test are very feasible and do not need revision.2.

Table 3. Speed Test validity analysis results

Evaluator	Expert 1	Expert 2	Expert 3	Panelist 1	Panelist 2
Item 1	4	4	4	4	4
Item 2	4	3	3	4	3
Item 3	3	3	3	3	3
Item 4	3	4	3	4	4
Item 5	3	4	4	4	4
Item 6	3	4	4	4	4
Item 7	3	4	4	4	4
Item 8	3	3	4	4	4
Item 9	4	3	4	4	4
Item 10	3	3	3	3	3
Total Score	33	35	36	38	37
Rating Score (%)	82.5	87.5	90	95	92.5
Category	Very Worthy	Very Worthy	Very Worthy	Very Worthy	Very Worthy
Information	No Revision Needed	No Revision Needed	No Revision Needed	No Revision Needed	No Revision Needed

Agility Test (time)

The results of the content validation analysis of the agility test by 3 experts and 2 panelists were in the form of a feasibility percentage. The results of the assessment of all experts and panelists obtained an assessment score above 81%, this means that the aspects/contents of the physical fitness test in the agility test are very feasible to use and do not need revision.

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Table 4. Agility Test validation analysis results

Evaluator	Expert 1	Expert 2	Expert 3	Panelist 1	Panelist 2
Item 1	4	4	4	4	4
Item 2	3	4	3	4	4
Item 3	4	4	3	4	4
Item 4	3	3	3	4	4
Item 5	3	3	3	4	4
Item 6	3	3	4	4	4
Item 7	3	3	4	4	4
Item 8	3	3	4	4	4
Item 9	4	4	3	4	4
Item 10	3	3	3	3	3
Total Score	33	34	34	39	39
Rating Score (%)	82.5	85	85	97.5	97.5
Category	Very Worthy	Very Worthy	Very Worthy	Very Worthy	Very Worthy
Information	No Revision Needed	No Revision Needed	No Revision Needed	No Revision Needed	No Revision Needed

Explosive Power Test (cm)

The results of the content validation analysis of the explosive power test by 3 experts and 2 panelists were in the form of a feasibility percentage. The results of the assessment of all experts and panelists obtained an assessment score above 81%, this means that the aspects/contents of the physical fitness test in the strength test are very feasible and do not need revision.

Table 5. Explosive Power Test validation analysis results

Evaluator	Expert 1	Expert 2	Expert 3	Panelist 1	Panelist 2
Item 1	4	4	4	4	4
Item 2	3	3	3	4	4
Item 3	3	3	3	4	4
Item 4	3	3	3	4	4
Item 5	3	3	3	4	4
Item 6	4	3	3	4	4
Item 7	4	3	3	4	4
Item 8	4	3	4	4	4
Item 9	4	4	4	4	4
Item 10	3	4	4	3	3
Total Score	35	33	34	39	39
Rating Score (%)	87.5	82.5	85	97.5	97.5
Category	Very Worthy	Very Worthy	Very Worthy	Very Worthy	Very Worthy
Information	No Revision Needed	No Revision Needed	No Revision Needed	No Revision Needed	No Revision Needed

Muscle Strength Test (time)

The results of the strength test content validation analysis by 3 experts and 2 panelists were in the form of a feasibility percentage. The results of the assessment of all experts and panelists obtained an assessment score above 81%, this means that the aspects/contents of the physical fitness test on the explosive power test are very feasible to use and no revision is needed.

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Table 6. Strength Test validation analysis results

Evaluator	Expert 1	Expert 2	Expert 3	Panelist 1	Panelist 2
Item 1	4	4	4	4	4
Item 2	3	3	3	4	4
Item 3	3	3	3	4	4
Item 4	3	3	3	4	4
Item 5	4	3	3	4	4
Item 6	3	4	3	4	4
Item 7	3	4	3	4	4
Item 8	4	4	4	4	4
Item 9	4	4	4	4	4
Item 10	3	3	3	3	3
Total Score	33	33	33	33	33
Rating Score (%)	82.5	87.5	90	95	92.5
Category	Very Worthy	Very Worthy	Very Worthy	Very Worthy	Very Worthy
Information	No Revision Needed	No Revision Needed	No Revision Needed	No Revision Needed	No Revision Needed

Cardiovascular Test (time)

The results of the content validation analysis of the cardiovascular test by 3 experts and 2 panelists were in the form of a percentage of eligibility. The results of the assessment of all experts and panelists obtained an assessment score above 81%, this means that the aspects/contents of the physical fitness test on the endurance test are very feasible to use and no revision is needed.

Table 7. Endurance Test validation analysis results

Evaluator	Expert 1	Expert 2	Expert 3	Panelist 1	Panelist 2
Item 1	4	4	4	4	4
Item 2	4	3	3	4	4
Item 3	3	3	3	4	4
Item 4	3	3	3	4	4
Item 5	3	3	3	4	4
Item 6	3	4	3	4	4
Item 7	3	4	4	4	4
Item 8	3	4	4	4	4
Item 9	3	4	4	4	4
Item 10	4	3	3	3	3
Total Score	33	35	34	39	39
Rating Score (%)	82.5	87.5	85	97.5	97.5
Category	Very Worthy	Very Worthy	Very Worthy	Very Worthy	Very Worthy
Information	No Revision Needed	No Revision Needed	No Revision Needed	No Revision Needed	No Revision Needed

The results of the content validation analysis based on filling out the feasibility of the draft test model and physical fitness measurement by experts and panelists, it can be concluded that the physical fitness measurement test model for early childhood in the 4–6 year age group which is being developed is stated to be very feasible to use.

Small Scale tTest

A series of early childhood physical fitness test items that have been prepared and made based on recommendations and revisions from experts need to be tested first, of course the aim is that this measuring instrument can later be declared worthy as a measuring tool for measuring children's physical fitness early age.

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This trial was carried out in stages according to the development research design. The first stage was a small-scale trial conducted on 40 children from 4 schools. The results of the early childhood physical fitness test trials can be seen in table 8.

Table 8. Table of Small-Scale trial results of early childhood physical fitness tests

	Speed Test (time)	Agility Test (time)	Explosive Power Test (cm)	Strength Test (time)	Endurance Test (time)	Total Score
Amount	246.82	751.34	5,872	273	12,825	19,968.16
Average	6.17	19.27	146.80	6.83	320.63	499.7
Max Value	5.22	17.65	155	9	280	466.87
Min Value	7.12	21.21	135	5	412	580.33

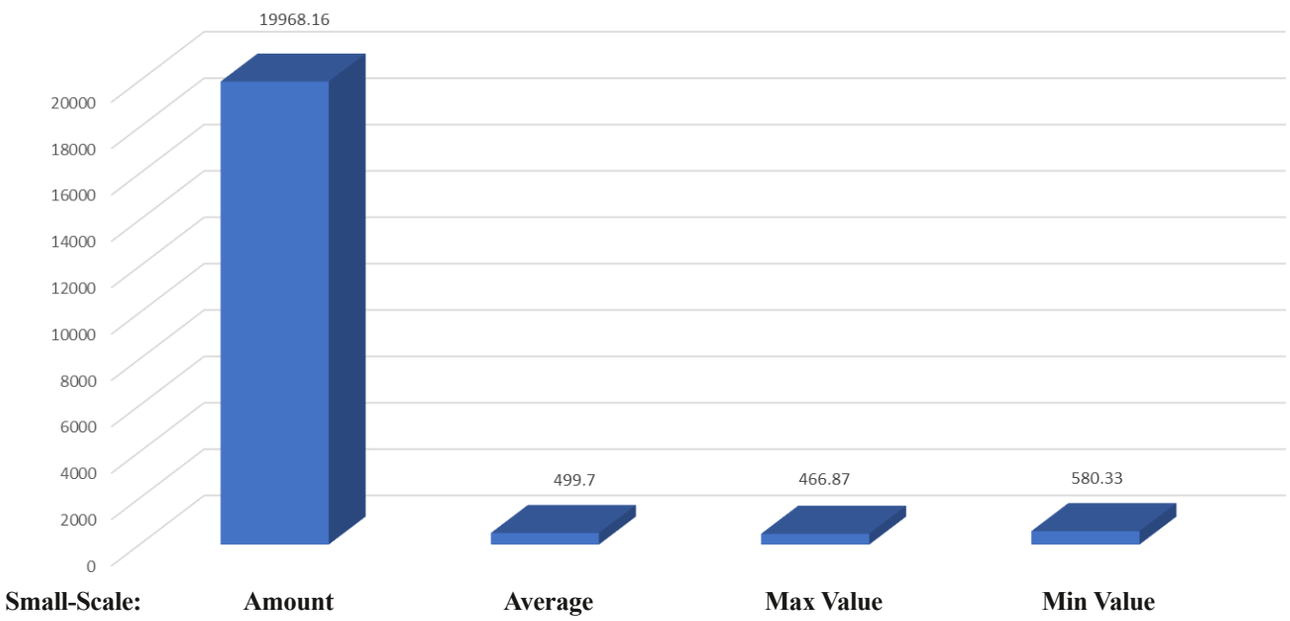

Figure 2. Small-Scale trial of early childhood physical fitness test

Based on these data, the total value obtained is 19968.16 with an average small-scale physical fitness test for early childhood 499.7. The max value is 466.87 and the min value is 580.33. These results can be seen in figure 2.

Large/Wide Scale Test

After small-scale trials have been carried out, the next step is to carry out large-scale trials, namely trials carried out on all research samples. The research sample that the researchers used in the study were 137 students consisting of 12 kindergarten schools. The description of the data from the large-scale trial results can be seen in table 9.

Table 9. Table of Large-Scale Test results for early childhood physical fitness test

	Speed Test (time)	Agility Test (time)	Explosive Power Test (cm)	Strength Test (time)	Endurance Test (time)	Total Score
Amount	819.42	2648.71	19987	861	44756	69072.13
Average	6.12	19.33	146.4	6.28	326.69	504.82
Max Value	5.07	18.09	155.00	8.00	278.00	464.16
Min Value	7.77	20.41	133.00	5.00	446.00	612.18

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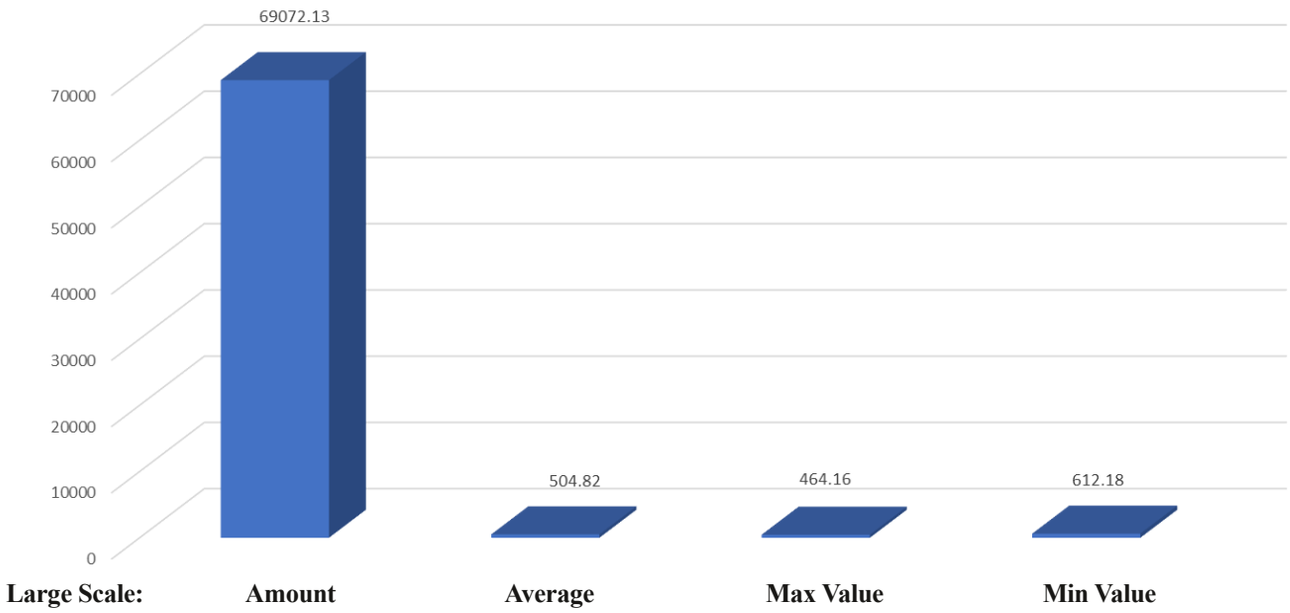

Figure 3. Large-Scale trial of early childhood physical fitness test

Based on these data it shows that the total value obtained is 69072.13 with an average large-scale physical fitness test for early childhood 504.82. The max value is 464.16 and the min value is 612.18. These results can be seen in figure 3.
Based on the results of the large-scale validity test, the criteria used for decision making are if the value of r count is greater than r table, it is said to be valid, and if r count is less than r table, it is said to be invalid. Large-scale validity test in table 10, the value of r table for a sample of 137 with a significance level of 0.05 is 0.159. In the table above it can be seen that the overall value of r count for each test item is greater than r table 0.159, so each test item is declared valid.

Table 10. Large-Scale validity test results

Test items	r table	r count	Information
Speed test	0.159	0.733	Valid
Agility test		0.821	Valid
Strength test		0.843	Valid
Explosive power test		0.766	Valid
Endurance test		0.995	Valid

Based on the opinion [28] explains that if the r count value is > 0.20, the item is said to be reliable. In the table above it is known that the r table value is > 0.60, so the test items used in the early childhood physical fitness test are declared reliable. In the table above it is known that the r table value is > 0.60, so the test items used in the early childhood physical fitness test are declared reliable. Overall the battery reliability value for this early childhood physical fitness test is 0.942, which can be seen in table 12.

Table 11. Large-Scale validity test results

Test items	r count	Information
Speed test	0.946	Reliable
Agility test	0.934	Reliable
Strength test	0.931	Reliable
Explosive power test	0.944	Reliable
Endurance test	0.918	Reliable

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Table 12. Reliability Test results for early childhood physical fitness

Cronbach's Alpha	Cronbach's Alpha based on standardized items	N of items
0.942	0.942	6

Next, the results of the values and norms for the overall fitness test are based on table 13.

Score

The following is a value calculation table, after the five items of the physical fitness test are carried out in a battery test or may not be intermittent, each item will be calculated in a category of value by adding up the total of the five test results T1 + T2 + T3 + T4 + T5 = Result.

Table 13. Physical fitness test scores for early childhood 4–6 years

Score	Speed Test (time)	Agility Test (time)	Endurance Test (time)	Score	Strength Test (time)	Explosive Power Test (cm)
5	X < 5.2	X < 18.4	X < 265	1	X < 4.7	X < 137
4	5.2 < X ≤ 5.8	18.4 < X ≤ 19	265 < X ≤ 306	2	4.7 < X ≤ 5.6	137 < X ≤ 143
3	5.8 < X ≤ 6.5	19 < X ≤ 19.7	306 < X ≤ 347	3	5.6 < X ≤ 6.8	143 < X ≤ 149
2	6.5 < X ≤ 7.1	19.7 < X ≤ 20.3	347 < X ≤ 388	4	6.8 < X ≤ 7.9	149 < X ≤ 155
1	7.1 < X	20.3 < X	388 < X	5	7.9 < X	X < 155

Norm

The following is the calculation of the norm after the results of calculating the total value obtained by the participants and classifying the fitness level of early childhood 4–6 years.

Table 14. Norms of physical fitness tests for early childhood 4–6 years

Number	Physical fitness	Classification
1	X < 12.6	Less Once (KS)
2	12.6 < X ≤ 14	Less (K)
3	14 < X ≤ 15.4	Medium (S)
4	15.4 < X ≤ 16.8	Good (B)
5	16.8 < X	Very Good (BS)

Based on the norms of the physical fitness test for early childhood 4-6 years that have been developed, if the child does the fitness test and gets a total score of less than equal to 12.6, it is stated that he has Less Physical Fitness (KS), the child gets a total score of more than 12.6 to 14, it is stated that they have less physical fitness (K), the child gets a total score of more than 14 to 15.4 is declared to have moderate physical fitness (S), the child gets a total score of more than 15.4 to 16.8 is declared to have good fitness (B), and a child who gets a total score of more than 16.8 is declared to have very good fitness (BS).

Discussion

The research aims to develop an effective and efficient test instrument and physical fitness norm for early childhood aged 4-6 years by fulfilling the elements of physical fitness. Based on expert and panelist assessments related to the validation test of the physical fitness test instrument for early childhood aged 4-6 years, it was stated that it was very suitable to be used as a tool to measure physical fitness for early childhood. The results of small-scale research and development using a sample of 40 with a significance level of 0.05, the validity of the value of r count for each test item is greater than r table 0.312, so each test item is declared valid and the test reliability is 0.829. Furthermore, a large-scale test with 137 samples with a significance level of 0.05 equal to 0.159. The results of this study prove that the development of test instruments and physical fitness for early childhood 4-6 years can be seen that the overall value of r count for each test item is greater than r table 0.159, so each of these test items is declared valid and the reliability value is 0.942, it is declared reliable.

Measurement of physical fitness is an important factor from various perspectives, it is also a determinant of healthy child development [29]. Early childhood is an important age for brain and cognitive development [30]. Therefore, Physical education must be of high quality to encourage and support all students to develop into lifelong participants in ways that maintain their own health, fitness and well-being. [31]. Research findings conducted by [32] Early life frequency in socioeconomic status has an important role in childhood and physical fitness during adolescence. Based on this statement, the measurement of physical fitness in early childhood is more advisable so that it can provide an overview of the learning process and provide sports activities for children.

The review illustrates the importance of physical activity, but requires specific doses of appropriate physical activity at an early

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age [30]. A multi-faceted intervention can improve body composition and physical fitness of preschoolers [33]. The mHealth program is also recommended to reduce obesity in children aged 4 years [34]. Low cardiorespiratory fitness is a risk factor for childhood obesity [35].

Conclusion

The results of the above research have a strong foundation regarding the development of effective and efficient test instruments and physical fitness norms for early childhood 4–6 years, on the basis of references from previous studies that have been conducted which are listed in the discussion of results and discussion. Based on these results, the physical fitness test for early childhood 4-6 years is effective for use because it has gone through expert research and validation, so this test is declared valid and can be used. The results of this study provide a new reference for measuring physical fitness in early childhood 4-6 years where these results are very much needed, especially in Early Childhood Education. The researcher suggests for users, both trainers, teachers and students, that the Early Childhood Physical Fitness Test can be used in the practical learning process in schools so that it can optimize the motor learning process.

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