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RESEARCH ON THE PHYSICAL FITNESS EVALUATION INDICATOR OF CHINESE FEMALE DRAGON BOAT ATHLETES BY DELPHI METHOD

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Abstract

The objective of this research was to physical fitness evaluation indicator of Chinese female dragon boat athletes. This paper probes into the factors influencing the physical fitness evaluation indicator of Chinese female dragon boat athletes and analyzes the relationship between the factors influencing the physical fitness evaluation indicator of Chinese female dragon boat athletes. The mixed research methodology was used by conducting quantitative and qualitative research. Using the interviews as a research tool, The validity test was evaluated using the project- objective agreement index (IOC), with a final IOC mean of 0.929.Through the method of literature and interview, the evaluation indexes of body shape, body function and sports quality were initially established. By using Delphi method, 13 experts screened the initial indicator for three rounds, and finally determined the physical fitness evaluation indicator of Chinese female dragon boat athletes. Data from this study were analyzed and collected using SPSS21.0 and Excel Table. The results are as follows: According to the interview method, previous research and theoretical combing, The factors that affect the physical fitness level of Chinese female dragon boat athletes; According to the theory of sports training and the constituent elements of physical characteristics, this paper investigates from three dimensions: body shape, physical function and sports quality. According to the Delphi method, 13 experts were invited to conduct three rounds of screening of first, second and third indicator using five-point Likert scale. The results showed that 3 first-level indicators (body shape, physical function, sports quality);11 second-level indicators (length, width, girth, body principal component, cardiopulmonary function, energy supply system, strength, endurance, speed, flexibility, sensitivity) and 36 third level indicator. The average of 36 third level indicator is above 4, between 4.23 and 4.92; The coefficients of variation are all below

0.25 and range from 0.06 to 0.17.From the numerical point of view, experts on the third round of third Level indicator are very recognized, to determine the final indicator.

Key words: Female dragon boat, Physical fitness, Evaluating indicator

Introduction

Dragon boat movement has a long history and culture in China, and is a traditional sports project deeply loved by the people and has profound ethnic characteristics (Yu Zhengzhi, Liu Shuai & Tan Jiangjiang.2019).Dragon boat sport is driven by the paddling of the paddler, through the concerted efforts of the drummer, the paddler and the helmsman, in the shortest possible time, to complete the prescribed race distance, and the first to reach the end is the winner. The standard dragon boat has 22 people, 1 helmsman, 1 drummer, and 20 paddlers. 200m and 500m are the most used events in international dragon boat races (Song qiang,2012). The size of the standard dragon boat is as follows: The total length of the hull including the dragon head and tail is 18400±30mm (Shen Lin & Chen Chun mei.2022). In 2010 Guangzhou Asian Games, in 6 straight track races for 200m, 500m and 1000m, in women's event, the Chinese women's team won three gold MEDALS (Tian M J. (2023).In the 13th World Dragon Boat Championship, Team Canada showed strong physical strength and endurance advantage and became the biggest winner; the 16th World Dragon Boat Championship, Team Canada continued to win the 200 m straight and 500 m straight silver.

According to previous research findings, there is no research on the physical fitness evaluation index of Chinese female dragon boat athletes. 200m and 500m are the most used events in international dragon boat races (Song qiang,2012). Chinese female dragon boat team has always been at an advantage in 200m. The research on the 200m straight race of female dragon-boat athletes is blank, which has become a big lack of scientific research of dragon-boat project. Therefore, the purpose of this study is to fill the gap in the physical evaluation index of Chinese female dragon boat athletes, and to reveal the key elements of physical training with the goal of 200m straight race, so as to provide a reference for the physical training effect of female dragon boat athletes.

Research Problem

The female dragon boat athletes of physical training efficiency is low,It is mainly of female dragon boat athletes of the physical fitness characteristics the lack of accurate understanding, the lack of athletes physical characteristics evaluating for standard, Lead to the inability to implement targeted training, Affect the effect of physical training.

Research Objectives

To explore and analyze the relationship between the influencing factors of physical fitness evaluation Indicator of female dragon boat athletes in China. development the of physical fitness evaluation Indicator of female dragon boat athletes in China.

Methods

In this study, The development a physical fitness evaluation indicator for Chinese female dragon boat athletes. The main research goal is to explore the development of the physical fitness evaluation indicators of Chinese female dragon boat athletes, understand the relationship between the influencing factors of the physical fitness evaluation indicators of Chinese female dragon boat athletes, and promote the development of the selection field of Chinese female dragon boat athletes.

Prior to the official data collection, permission was obtained from the Ethics Committee of Mahasarakham University on 31 October 2023.

Population

The study included coaches and leaders of dragon boat teams, Management personnel of the China Dragon Boat Association, University scholars in related fields.

Subject

In the first stage, conduct a semi-structured interview with the team coaches, team leaders and managers of China Dragon Boat Association. In the second stage, according to the Delphi method, 13 experts were invited to conduct three rounds of screening of first, second and third indicator using five-point Likert scale, finally determine the physical evaluation indicator of Chinese female dragon boat athletes.

Instrument

The research tools used were interview Outlines and Delphi method. The initial interview outline comes from literature review and theoretical research, Semi-structured interviews are mainly for the dragon boat team coach, team leader and the China Dragon Boat Association management staff. The effectiveness of the interview syllabus was assessed by a panel of five experts using the project-Objective Consistency Index (IOC). After two rounds of evaluation, the IOC value of each project is greater than or equal to 0.8(≥0.8), indicating that the project content validity is reasonable. Formulated about《Primary indicators of physical fitness evaluation of Chinese female dragon boat athletes》 questionnaire, The 5-point Likert scale was used, and gives 5,4,3,2 and 1 points according to "very important", "important", "relatively important", "generally important", and "not important".

Sampling

The first stage, through the purpose sampling method, to the three dragon-boat team coaches, two dragon boat leaders and five managers of China Dragon Boat Association conducted semi-structured interviews. The snowball technique is then used during the interview to identify other potential participants. (Bao H. (2016). The second stage, Delphi method, as an expert consultation method, has a high level of selection of experts, and have certain representativeness and authority in related fields (Cui, Xiaochun.(2022).

Data Collection Procedure

There are two kinds of interviews, one is face-to-face interview. One is to use telephone, wechat video online interview. The interviews will be 60 to 90 minutes long. The Delphi method was used to send and retrieve the expert questionnaire of Physical Evaluation Indicators of Chinese female Dragon boat Athletes to 13 experts through WeChat and email.

Data Analysis

The interviews were mainly conducted by the text analysis method (M & H Ray .2012). SPSS21.0 was used to analyze the mean value, standard deviation and coefficient of variation of the expert rating table. According to the feedback of 13 experts, three rounds of indicators were screened. According to the average rating of experts ≥4, the greater the average rating of experts, the higher the emphasis of experts on evaluation indicators ; Coefficient of variation < 0.25 indicates that the degree of agreement between experts is higher.

Results

Interview Results

The sample of this phase is 10 respondents, according to the interview results of the interviewees, we can conclude: Physical characteristics include three dimensions: body shape, physical function and sports quality. It mainly include length, width,Girth,endurance,Strength, speed, flexibility, Energy supply system, Cardio- pulmonary function, body principal component, Sensitive and so on. According to the three dimensions of physical characteristics, the indicator is divided to improve the physical level of female dragon boat athletes and provide a scientific basis for the selection and training of future female dragon boat athletes.

Delphi Results

Table 1 Physical fitness indicators expert survey results (First round)

Number	Indicators	Mean	Criterion deviation	Variable coefficient	Result
A1	Body Shape	4.62	0.51	0.11	pass
A2	Physical Function	4.62	0.51	0.11	pass

A3	Sport Quality	4.62	0.65	0.14	pass
B1	Length	4.31	0.86	0.2	Pass
B2	Width	4.62	0.51	0.11	Pass
B3	Girth	4.62	0.51	0.11	Pass
B4	Body principal component	4.62	0.65	0.14	Pass
B5	Cardio-pulmonary function	4.46	0.66	0.15	Pass
B6	Energy supply system	4.23	0.93	0.22	Pass
B7	Strength	4.46	0.66	0.15	Pass
B8	Endurance	4.69	0.63	0.13	Pass
B9	Speed	4.39	0.87	0.2	Pass
B10	Flexibility	4.62	0.51	0.11	Pass
B11	Sensitive	4.31	0.86	0.2	Pass
C1	Upper extremity length	4.62	0.65	0.14	pass
C2	Calf length (cm)	4.46	0.78	0.17	pass
C3	Arm span(cm)	4.46	0.66	0.15	pass
C4	Lower limb length (cm)	4.15	0.56	0.13	pass
C5	Arm long	4	0.71	0.18	pass
C6	Shoulder width(cm)	4.39	0.65	0.15	pass
C7	Hip wide	4.08	0.86	0.21	pass
C8	Pelvic width	4.15	0.8	0.19	pass
C9	Calf circumference(cm)	4.08	0.86	0.21	pass
C10	Waist circumference(cm)	4.15	0.8	0.19	pass
C11	Thigh circumference(cm)	4.31	0.75	0.17	pass
C12	Chest circumference(cm)	4	1.08	0.27	pass
C13	Upper arm tension (cm)	4.46	0.78	0.17	pass
C14	Relax your upper arm	4.15	0.8	0.19	pass
C15	Height (cm)	4.46	0.66	0.15	pass
C16	Body fat percentage	4.39	0.77	0.18	pass
C17	The Ketole indicators	4.31	0.75	0.17	pass
C18	Weight	4	0.71	0.18	pass
C19	Quiet heart rate(Time)	4.31	0.86	0.2	pass
C20	Heart Function indicators (Time)	4.23	0.93	0.22	pass
C21	Vital capacity	4.54	0.66	0.15	pass
C22	Maximal oxygen uptake (VVO2ma)	4.08	0.76	0.19	pass
C23	Oxygen-free valve	4.31	0.75	0.17	pass

C24	Maximum anaerobic power(W)	4.39	0.87	0.2	pass
C25	20s full pull slurry distance	4	1	0.25	pass
C26	Vertical jump touch height	4.23	0.83	0.2	pass
C27	Core ventral bridge level 8	4.23	0.83	0.2	pass
C28	1RM pull-out(kg)	4.46	0.78	0.17	pass
C29	Back muscle endurance	4.39	0.87	0.2	pass
C30	Free pole sleeper push	4.54	0.66	0.15	pass
C31	Standing long jump	4.77	0.6	0.13	pass
C32	1RM bench press	4.46	0.66	0.15	pass
C33	1min pull-ups	4.39	0.77	0.18	pass
C34	1RM Squat (kg)	4	0.82	0.2	pass
C35	800 m	4.62	0.65	0.14	pass
C36	3000m	4.62	0.65	0.14	pass
C37	Dynamometer 1000 m	4	0.82	0.2	pass
C38	Dynamometer 2000 m	4	0.82	0.2	pass
C39	Seated forward bend (cm)	4.31	0.95	0.22	pass
C40	Cross fork(cm)	4.62	0.65	0.14	pass
C41	Shoulder rotation	4.46	0.66	0.15	pass
C42	Dynamometer 500 m	4.77	0.6	0.13	pass
C43	30 m Sprint (s)	4	0.71	0.18	pass
C44	400m run(s)	4.54	0.66	0.15	pass
C45	1min jump rope	4.08	0.95	0.23	pass
C46	Cross-shaped change direction run	4.39	0.77	0.18	pass
C47	30s burpees	4.54	0.66	0.15	pass
C48	The hexagon test	4.85	0.38	0.08	pass

According to the results of the first round of primary indicators scored by experts, Will average score> 4,The indicators with a coefficient of variation <0.25 were screened out,A1-A3 and B1-B11 are more ideal, Explain the expert to the indicators more recognition, Therefore, all the A1-A3 first-level indicators are retained, The second and third level indicators have been partially modified in combination with expert opinions, Delete 1 second level indicators,42 third-level indicators,3 first-level indicators were finally determined, Second level indicators of 11 items,48 third-level indicators, Entering the second round of screening, no new indicators were added.

Second round

Table 2 Second level indicators expert survey results (Second round)

Number	Second-level indicators	Mean	Criterion deviation	Variable coefficient	Result
				coefficient	

1	B1 Length	4.46	0.66	0.15	pass
2	B2 Width	4.69	0.48	0.10	pass
3	B3 Girth	4.69	0.48	0.10	pass
4	B4 Body principal component	4.77	0.44	0.09	pass
5	B5Cardio-pulmonary function	4.54	0.52	0.11	pass
6	B6 Energy supply system	4.39	0.77	0.18	pass
7	B7 Strength	4.54	0.52	0.11	pass
8	B8 Endurance	4.69	0.63	0.13	pass
9	B9 Speed	4.46	0.78	0.17	pass
10	B10Flexibility	4.69	0.48	0.10	pass
11	B11 Sensitive	4.46	0.78	0.17	pass

Table 3 Third level indicators expert survey results (Second round)

First Level indicators	Second indicators	Third Level indicators	Mean	deviation	coefficient	Result
A1 Body	B1 Length	C1Upper extremity	4.85	0.38	0.08	Pass
		C2 Calf length (cm)	4.69	0.48	0.10	Pass
		C3 Arm span(cm)	4.62	0.51	0.11	Pass
		C4 Lower limb length	4.54	0.52	0.11	Pass
	B2 width	C5 Shoulder width	4.69	0.48	0.10	Pass
		C6 Hip width (cm)	4.54	0.66	0.15	Pass
	B3 Girth	C7 Upper arm tension	4.54	0.52	0.11	Pass
		C8 Calf circumference	4.62	0.51	0.11	Pass
		C9 Waist circumference	4.62	0.51	0.11	Pass
		C10 Thigh circumference	4.62	0.51	0.11	Pass
		C11 Chest circumference	4.54	0.52	0.11	Pass
	B4 Body principal component	C12Height (cm)	4.54	0.52	0.11	Pass
		C13 Body fat percentage	4.62	0.51	0.11	Pass

		C14 The Ketole indicators	4.54	0.52	0.11	Pass
A2 Physical Function	B5 Cardio-pulmonary function	C15 Quiet heart rate(Time)	4.62	0.51	0.11	Pass
		C16 Heart Function indicators (Time)	4.62	0.51	0.11	Pass
	B6 Energy supply system	C17 Maximal oxygen uptake (VVO2ma)	4.62	0.51	0.11	Pass
		C18 Maximum anaerobic power(W)	4.62	0.51	0.11	Pass
A3 Sport Quality	B7 Strength	C19 Vertical jump touch height	4.54	0.52	0.11	Pass
		C20 Core ventral bridge level 8	4.69	0.48	0.10	Pass
		C21 1RM pull-out	4.77	0.44	0.09	Pass
		C22 Back muscle endurance	4.85	0.38	0.08	Pass
		C23 1RM bench press	4.77	0.44	0.09	Pass
		C24 Standing long jump	4.92	0.28	0.06	Pass
		C25 1RM Squat (kg)	4.69	0.48	0.10	Pass
		C26 1min pull-ups	4.62	0.51	0.11	Pass
	B8 Endurance	C27 3000m run(s)	4.77	0.44	0.09	Pass
		C28 800m run(s)	4.69	0.48	0.10	Pass
	B9 Flexibility	C29 Seated forward bend	4.69	0.48	0.10	Pass
		C30 Cross fork(cm)	4.77	0.44	0.09	Pass
		C31Shoulder rotation	4.54	0.52	0.11	Pass
	B10 Speed	C32 400m run(s)	4.92	0.28	0.06	Pass
		C33 30 m Sprint (s)	4.77	0.44	0.09	Pass
	B11 Sensitive	C34 1min jump rope	4.54	0.52	0.11	Pass
		C35 cross-shaped change direction run	4.77	0.44	0.09	Pass
		C36 30s burpees	4.92	0.28	0.06	Pass

According to the second round of experts on the second and three level of the assignment and suggestions, Will average score> 4,The indicators with a coefficient of variation <0.25 were screened out, into the third round; Otherindicators that do not meet the requirements are deleted, 36 tertiary indicators were finally determined, due to the consensus of the experts on the secondary indicators, in the third round of questionnaire, there was no survey of the secondary indicators.

Table 4 Third level indicators expert survey results (Three round)

First level indicator	Second level indicators	Third Level indicators	Mean	Criterion deviation	Variable coefficient
A1 Body Shape	B1 Length	C1Upper extremity length	4.31	0.75	0.17
		C2 Calf length (cm)	4.39	0.77	0.18
		C3 Arm span(cm)	4.23	0.83	0.20
		C4 Lower limb length	4.15	0.56	0.13
	B2 width	C5 Shoulder width	4.39	0.65	0.15
		C6 Hip width (cm)	4.15	0.80	0.19
	B3 Girth	C7 Upper arm tension	4.15	0.80	0.19
		C8 Calf circumference	4.08	0.86	0.21
		C9 Waist circumference	4.15	0.80	0.19
		C10 Thigh circumference	4.46	0.66	0.15
		C11 Chest circumference(cm)	4.31	0.75	0.17
	B4 Body principal component	C12Height (cm)	4.46	0.66	0.15
		C13 Body fat percentage	4.39	0.77	0.18
		C14 The Ketole indicators	4.31	0.75	0.17
A2 Physical Function	B5 Cardio-pulmonary function	C15 Quiet heart rate(Time)	4.31	0.86	0.20
		C16 Heart Function indicators (Time)	4.23	0.93	0.22
	B6 Energy supply system	C17 Maximal oxygen uptake (VVO2ma)	4.31	0.75	0.17
		C18 Maximum anaerobic power(W)	4.39	0.87	0.20
A3 Sport Quality	B7 Strength	C19 Vertical jump touch height	4.23	0.83	0.20

	level 8			
	C21 1RM pull-out	4.46	0.78	0.17
	C22 Back muscle endurance	4.39	0.87	0.20
	C23 1RM bench press	4.54	0.66	0.15
	C24 Standing long jump	4.77	0.60	0.13
	C25 1RM Squat (kg)	4.46	0.66	0.15
	C26 1min pull-ups	4.39	0.77	0.18
B8 Endurance	C27 3000m run	4.62	0.65	0.14
	C28 800m run	4.62	0.65	0.14
B9 Flexibility	C29 Seated forward bend	4.31	0.95	0.22
	C30 Cross fork(cm)	4.62	0.65	0.14
	C31Shoulder rotation	4.46	0.66	0.15
B10 Speed	C32 400m run(s)	4.77	0.60	0.13
	C33 30 m Sprint (s)	4.54	0.66	0.15
B11 Sensitive	C34 1min jump rope	4.39	0.77	0.18
	C35 cross-shaped change direction run	4.54	0.66	0.15
	C36 30s burpees	4.46	0.66	0.15

According to the grading situation and suggestions of the third round of experts on the three-level indicators, the average value of 36 third-level indicators was more than 4 points, and the coefficient of variation was less than 0.25, indicating that experts had a high recognition of the third-level indicators and there were a small difference. Finally, 36 third-level indicators were determined. After the previous two rounds of screening, the coefficient of variation of the third round of indicators was <0.25, indicating that the expert evaluation of the indicators was more consistent. After three rounds of expert questionnaire survey, a set of physical fitness evaluation indicators of Chinese female dragon boat athletes was formulated, which included 3 first-level indicators,11 second-level indicators and 36 third-level indicators (Table 4).

Conclusions

This study was conducted on three female dragon boat team coaches, two dragon boat leaders and 5 managers of the China dragon boat association Semi-structured interviews were conducted. Through interviews with 10 respondents. Concluded that: Influencing factors of physical evaluation indicators of Chinese female dragon boat athletes, It mainly involves 3 dimensions, 12 factors and 95 sub-factors.

This study illustrates the whole process of development the physical fitness evaluation indicators for Chinese female dragon boat athletes, Using the Delphi method, inviting 13 experts, Conducted three rounds of screening of the first level, second level and third level indicators using the Likert five-point scale, From the initial 3 first- level indicators, 12 second-level indicators, 95 third-level indicators, The final screening was 3 first-level indicators and 11 second-level indicators and 36 third-level indicators.

Discussions

This study is divided into two phases, with a total of three research objectives

Part 1: Through interviews, physical fitness factors affecting includes three elements: body shape, physical function and sports quality, and sports quality is the most important element. According to morphological analysis, the body shape reflects the external morphological characteristics such as height, circumference, length and width of each link of human growth and development, as well as the internal morphological characteristics such as the vertical and horizontal diameter of the heart and the cross section of the muscle. (He Fei & Wang Xiaogang.2017).

Part 2: The purpose of this study is to elaborate the whole process of development physical evaluation indicators for Chinese female dragon boat athletes. Using the Delphi method, 13 experts were invited for three rounds of screening for the first, second and third-level indicators (Jian Bo & Qi Y. 2006), The results show that 3 first-level indicators, 11 second-level indicators and 36 third-level indicators were finally selected. At present, according to previous studies, many physical components are applied to various sports projects (Li Z W. 2001).

Conflicts of interest

No potential conflict of interest was reported by the authors.

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