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Availability of measurement instruments in sport science department among Ethiopian universities

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Abstract

The title availability of measurement instruments in sport science department among Ethiopian universities has been taken up to study the different instruments available with sport science departments. The data was collected from 12 universities out of 25 total universities which had sport science department among academic faculties. A total number of 65 sport science teachers has been evaluated out of total 157 teachers with observation and questionnaire. During this data collection 17 basic measurement instruments selected and their availability in the sport science department had been checked. The standard descriptive statistics was applied to analyse and to present the data. The result of the present study has shown that 71% of measurement tools (12 out of 17) were not available in the sport science department. Only 5 instruments (29%) were available. It depicted that there was a huge shortage of availability of instruments which actually must be provided to the department as their availability will definitely affect the enhancement of sport professional performance.

Keywords: Measurement instrument, basic instrument

1. Introduction

The first "Health and physical education department" established in Kottebe College in 1960. Now it is called Kottebe Metropolitan University that found in Addis Ababa, Ethiopia. In its premature time the college have been contributed in producing PE teachers in diploma level for many years. In comparing the earlier single college, the development of sport Science department was increased in 25(78%) among the total 32 Government Universities, at the time of this survey conducted in 2016/17. Presently, Bahardar and Mekele Universities have been providing training in PhD level. However, the existing common challenge in sport science department was scarcity of Sport material, equipment and including scientific measurement instruments. Consequently, Ethiopian PhD scholars of sport science in India have been facing by lack of measuring instrument to conduct research work when they back at home. Although this problem was well recognized by the subject instructors, less attention was given across all sample universities. As a result, the researcher determined to conduct this survey study by raising simple research question "what measurement instruments are available in the department of sport science at university level in Ethiopia?". To response to the question 65 sport science instructors of 12 sample universities have been participated. The finding shows that measuring instrument deficiency rise up 71% in sample sport science department. Consequently, teaching-learning, Training and research work were deprived from the application of scientific practice in sport science department. For the context of this material the phrase "Measurement instrument" denotes to "Standardize measuring instruments" particularly applied for human body, human physiology, sport performance and psychological condition of Athletes. In this digital era, sport science has been reached to profoundly measure the physiology of human body parts and performance through advanced technology and computerized machine. The advancement of digital Science apprehended to track and record athletes' physical performance through GPS, Biomechanical motion analysis and simulation technology. However, Ethiopian sport science scholars has been challenging even by lack of portable basic measuring instruments to conduct research. This incident specifically linked to Ethiopian Ph.D. Sport Science students at Punjabi university of the 2014/15 and the subsequent batches. The scholars often purchased basic and portable measuring instruments

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from India by their own to conduct the Ph.D. research work. Therefore, this study intended to indicate how the sport science department in Ethiopian university was very far from even the basic, easily portable and cheap instruments. This condition implies that the curriculum, the student learning, training and research works in sport were in deficiency of measuring instrument. As the effect of this the quality of sport science department program extremely affected.

1.1 Basic Measuring instruments

One of an essential basic instrument in sport science was Body weight measurement. It was predominantly used to measure human body weight in kilogram or pound both in sport and medicine setting. Body weight when combined with height it contributes in creating standardize BMI categories. ^[1] indicates that weight measurement serve in combat sport such as (boxing, wrestling, judo, jujitsu, karate, taekwondo etc.) through rapid weight loss(RWL) to compete in Olympic. Measuring tape was another commonly used in sport related Girth measurement (person's body width, thickness or circumference) in Anthropometrics. ^[2] state that Circumference measurement (CM) was a method intended to measure specific anatomical sites with a tape meter. Stadio meter was also an alternative basic instrument considerably contribute to a variety of sports related to height measurement and BMI. Another simplest and basic scientific instrument for evaluating fat in the body was Skin fold calliper. The instrument measures the thickness of skin to estimate the amount of fat in the body. Study show that there was an association between reduced in flexibility and higher skinfold measurement ^[3]. A Ruler, a simple and important instrument uses in a reach and sit test for evaluation of flexibility as a part of physical fitness component ^[4]. described that Reach and sit test used for the flexibility of lower back and hamstring muscle.

1.2 Instrument measurement for body motion

Time plays momentous role in scientific measurement in sport and medicine. It usually measured by easy and portable stopwatch to advanced computerize system. It measures speed that cover distance, reaction time, hang time pulse rate, breathing and fitness level in exercise heart rate etc. Cycle ergometer is a basic instrument that practiced in sport research, in health and fitness and medicine. The instrument was a fixed cycling machine linked for the measurement of heart rate, Time, speed, Distance, calories and revolutions per minute (RPM) recovery. Tread mill was a measuring instrument in laboratory set for a variety of athletes and non-athletes individuals. The machine uses for cardiac tests, peak oxygen consumption and for the incremental treadmill test that allows the athlete to achieve higher Vo₂ peak, ^[5] Hand grip strength was considered as an indicator of a total body strength that was measured by Dynamometer. ^[6] explain that an isokinetic dynamometer was a tool applicable within sports and exercise science along with clinical testing that support to assess joint torque. According to ^[7] definition: "The pedometer was a device about the size of a small cell phone that typically attached to the belt or waist band and was designed to count walking or running steps". ^[8] indicate that Steps were a fundamental unit of human movement which was a preferred metric measurement for quantifying of physical activity. Another very significant instrument for the measure of joint Range of motion was named Goniometry ^[9]. describe that Goniometry, due to low cost, portability and reliability, was used for measurement of joints range of

motions (ROM) and considered as a standard method for ROM determination. This instrument uses in athletic training, physical therapy and occupational therapy.

1.3 Instruments measuring internal body signal

Regarding Sphygmomanometer ^[10] state that athletes who have showed higher blood pressure reaction linked with superior physical performance ^[11]. pointed that participating in regular activity and training were direct related with the reduced of blood pressure. The study added that in physical evaluation of athlete by measuring their bp it can be identified elevated bp (common abnormality) before participation of any physical activity. Another widely used instrument in a diversity of sport activity and training was Heart rate monitor ^[12] underline that Heart rate was a convenient indicator of physiological adaptation and intensity of effort ^[13]. explain that heart rate monitors (HRMs) have become broadly used training aid for a diversity of sports Over the last 20 years. HRMs were mainly applicable to determine the exercise intensity of a training and in the prevention and detection of overtraining. Another important instrument was concern about Oximeter / Oximetry. According to ^[14] It was defined as a device that can detect a pulsatile signal in the finger or toe and can calculate the amount of oxygenated haemoglobin and the pulse rate. The study state that a healthy individual with normal lungs, breathing air at sea level, will have an arterial oxygen saturation of 95%– 100%. It was caution that extremes altitude will affect these numbers ^[15]. asserted that one of the innovative HR testing was the use of a Smartphone applications particularly design for this purpose. Thermometer measurement was one of the needed instrument in sport science department for measurement of the temperature of body and environment. Thermoregulation was an important consideration not only for athletic performance but also for the safety of the athlete ^[16]. describe that altitude training was practiced by endurance athletes at preferably over 2,400 metres above sea level to increase the mass of red blood cells and haemoglobin and altering muscle metabolism. High temperature can cause various heat illnesses such as heat cramps and heat stroke, while very low temperatures may lead to hypothermia as a result physiological body change often observed with temperature change.

2. Material and Methods

The present study has been taken up to see the availability of measuring instruments among the university level department of sport science and physical education in Ethiopia. For this purpose, 12 universities out of 25 of total universities which have been running the sport science department were taken for evaluation in the year 2016/17. The total strength of academic staff among the 12 universities was found to be 157 and with the help of purposive technique 65(41%) sport science teacher was further selected as a sample subject. As if this was a homogeneous sample with the similar type of educational qualification and sport background the small sample was suppose of to be the representative of whole sport science community ^[17] As questionnaire was used to check out the availability of 17 basic instruments as observed from the literature and in different sport science department in Punjabi university, Patiala India. These basic instruments further divide in to three categories. First, basic measuring equipment for different body segment i.e. Anthropometric. Second, instrument measuring body motion and the third category was to monitor internal body signal.

3. Result

The data collected the present study had been tabulated categorically and had been given some statistical treatment to brought up some mean value result as well as percentages of these the availabilities and use of measuring instruments. The interpretation of this result as follow:

3.1 Basic Instruments

As shown on table 1 the availability of measuring instruments to a ruler with response "Yes" was 62% and "No" was in

38%, to Tape meter "Yes" was in 65% and "No" was in 35%, to the body weight balance "Yes" was 43% and "No" was 57%, to fat calliper "Yes" was 25% and "No" was in 75%, to Studio meter "Yes" was in 17% and "No" was in 83%. From these result in conclusion both a ruler and Tape meter availability was in 64% on average and SD.48. Fat calliper, body weight balance and Stadio meter were not available in 72% on average and SD. 42 in sport science department of 12 universities in Ethiopia.

Table 1: Measuring Instruments with Body Contact.

s. no	Basic Instruments	N	Available		Mean	Std. D.	Result		
			Yes (%)	NO (%)			Respond	%	Av.
1	Bodyweight balance	65	28(43.1)	37(56.9)	1.56	.49	Not available	57	72%
2	Stadiometer	65	11(16.5)	54(83.1)	1.83	.37	Not available	83	
3	Fat calliper	65	16(24.6)	49(75.4)	1.75	.43	Not available	75	
4	Tape meter	65	42(64.6)	23(35.4)	1.63	.48	Available	65	64%
5	Ruler	65	40(61.5)	25(37.5)	1.38	.49	Available	62	

As shown on table 2 the availability of Stopwatch response for "yes" was 66% and "No" in 34%, treadmill was "yes" in 65% and "No" in 35%, cycle ergometer was "yes" in 54% and "No" in 46%, Dynamometer was "yes" in 2% and "No" in 98%, Pedometer was "yes" in 3% and "No" in 97%, Inclinator was "No" in 100%, Goniometer was "No" in 100%. From this figure stopwatch, treadmill and cycle ergometer were available in 62% on average and SD of. 48. The other four (Dynamometer, pedometer, Inclinator and

Goniometer) all on average 99% not available with SD.19 in sport science department among 12 universities in Ethiopia.

As shown on table 3 sphygmomanometer not available in 84%, Stethoscope not available in 97%, Heart rate monitor not available in 97%, Ox-meter not available in 99%, Thermometer not available in 97% from this data all the above 5 instruments were not available on total average in 95% and SD.22 in sport science department among 12 universities in Ethiopia.

Table 2: Body Motion Instruments Measurement

S. no	Basic Instruments	N	Available		Mean	Std. D	Result		
			Yes (%)	NO (%)			Respond	%	Av.
1	Stop watch	65	43(66.2)	22(33.8)	1.33	.47	available	66	62%
2	Tread mill	65	42(64.6)	23(35.4)	1.35	.48	available	65	
3	Cycle ergometer	65	35(53.8)	30(46.2)	1.46	.50	available	54	
4	Dynamometer	65	1(1.5)	64(98.5)	1.96	.12	not available	99	99%
5	Pedometer	65	2(3.1)	63(96.9)	1.96	.17	not available	97	
6	Inclinometer	65	0(0)	65(100)	1.96	.24	not available	100	
7	Goniometer	65	0(0)	65(100)	1.96	.24	not available	100	

Table 3: Internal Body Signal Instruments Measurement

s. no	Basic Instruments	N	Available		Mean	Std. D	Result		
			Yes (%)	NO (%)			Respond	%	average
1	Sphygmomanometer	65	10(15.4)	55(84.6)	1.84	.36	Not available	84	95%
2	Stethoscope	65	2(3.1)	63(96.9)	1.96	.17	Not available	97	
3	Heart rate monitor	65	2(3.1)	63(96.9)	1.96	.17	Not available	97	
4	Ox-meter	65	1(1.5)	64(98.5)	1.96	.24	Not available	99	
5	Thermometer	65	2(3.1)	63(96.9)	1.96	.17	Not available	97	
	Valid N (list wise)	65							

Discussion

The availability of scientific measuring instruments in sport science department is very demanding at university level in Ethiopia. The core motivation of the study come up with lack of minimum basic portable measuring instruments by Ethiopian Ph.D. sport science scholars during the research. The contribution of the finding was grounded on 65 (5phD,59Masters and 1Bachelor) sport science instructors from 12 sample universities. The finding has shown that from the total selected 17 sample basic instruments of accessibility, 5instruments are available in (29%) and 12 measuring instruments were not available in (71%). Besides, this big deficiency, the researcher further discovers on the availability of observed facilitates in the sample places in the area of

fitness center 8(66%), gymnasium 3(25%), computer lab 2 (16%) and sport laboratory 1(8%). In this connection ^[18] state that unavailability of learning material strongly contravenes the involvement of student in practice that effect to the decline of application of skills development ^[19]. assert that minimum standards of facilities and equipment including measuring instruments required for effective training in sport college. In this regard financial support was one of key consideration to resolve facilities and equipment challenge. ^[20] recognize that resources like financial considerations have had many impacts on physical education not only Europe, but across the world. The allocation of funds for sport science seems to be deficient in most countries. Another significant consideration was as ^[19] emphasise that on the importance of

redesigning the curriculum in view of the inclusion of essential facilities and instruments (measuring instruments) to appreciate the expected quality of sport science and physical education trainee. At the end, school leader's decision was very essential to realize the solution in school [21] explain that the modern educational concept firmly state that the school leader has very clear and incredible influence on the level of collaboration and an important role player in supporting their school to be more functional and effective. Currently, In Ethiopia the Sport science department increasing the program in master and PhD level has been very promising. It is believed that the advancement of the program should include material, equipment and measuring instrument accessibility to keep the standard quality of learning at the university level. In such emphasis the progress will aspire in creating a better sport science department environment that enhance learning, teaching, research and training for the quality of sport science department and physical education program at university level.

5. Conclusion

The study finding on the availability of standard measuring instrument in sport science department at university level in Ethiopia has produced the following end result based on 17 basic measuring instruments evaluation. First concerning the 5 Measuring Instruments with Body Contact (Body weight balance, Fat Calliper and stadiometer) not available in 74% and (measuring tape meter and Ruler) available in 64%. Second among 7 Body Motion Instruments Measurement (stopwatch, treadmill and cycle ergometer) were available 62% on average and The other four (Dynamometer, pedometer, Inclinator and Goniometer) all on average not available in 99%. Third regarding Internal Body Signal Instruments Measurement (Sphygmomanometer, Stethoscope, Heart rate monitor, Ox-meter and Thermometer) on average not available in 95%. This statistical finding has revealed that from the total selected 17 sample basic instruments of accessibility, 5 instruments are available in (29%) and 12 measuring instruments were not available in (71%). Due to this huge deficiency learning, teaching, research, training and coaching affected the quality of sport science training program at university level. According to related study Curriculum improvement and financial consideration should be a core emphasis for improving availabilities of measuring instrument. The problem can effectively be resolved by the collaborative contribution of teachers with the decision makers in the school. This definitely enhances for the advancement of sport science department quality training at university level in Ethiopia. This work is a small glance and the area need attention to be perceived from different prospective by the searchers for the development of sport science department at university level.

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