

Epidemiological Surveillance Screening of Functional Movement in Children and Adolescents Physical Activity

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Abstract

Keywords: Physical Activity, Surveillance, Epidemiology, Functional Movement, Health

Background: Functional Movement Screening (FMS) is an essential surveillance element during physical activity routine especially amongst children and adolescents. In Sierra Leone, this movement gradually depreciates in late adolescents finishing high school education and preparing for university education, hence causing muscle inflexibility leading to arthritis. Arthritis is an epidemic disease, therefore the need for epidemiological surveillance screening of functional movement in children and adolescents physical activity. This study aimed at scoring, measuring and evaluating epidemiological surveillance screening of functional movement in children and adolescents physical activity in Sierra Leone.

Methods: Behavioural Regulations for Physical Activity and Functional Movement Screening Questionnaire (BRPA-FMSQ) was the adopted research instrument. The variables were analyzed using IBM-SPSS v.23 Statistics, with a mean and standard deviation age of 14.0 ± 4.0 , response rate of 96% and with sampled participants of $N=60$, ranged from 10-18 years, using simple random sampling (SRS) method of selection.

Results: The researchers scaled the results at $P < 0.05$, with highest scores recorded as: Boys (32.76) scored highest for Physical Activity Intensity (PAI); Boys (32.45) scored highest for Physical Activity Level (PAL); Boys (35.15) scored highest for Deep Squat Screening (DSS) and Boys (32.59) scored highest for Physical Activity Intrinsic Motivation (PAIM).

Conclusion and Recommendation: In conclusion, boys displayed greater proportion of intensive physical activity (IPA), physical activity sufficiency (PAS), week-round physical activity (WPA) and high functional movement of deep squat (FMDS) due to intrinsic motivation of physical activity routinely in terms of rating compared to girls. The researchers recommended that, attention now more than ever should focus on practicing behavioural change communication (BCC) in learning institutions, in the work place and at home regularly.

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I. Introduction

Children, adolescents and youths do not respond to daily physical activity routine as largely compared to adults in Sierra Leone. The monitoring, measurement, evaluation and surveillance of functional movement is possible through physical activity routine. The surveillance of screening for human functional movement is key. It is possible through the medium of prescribed physical activity performance under the guidance and supervision of an exercise physiologist and a health and nutrition educator. The lack of physical activity (physical inactivity or sedentary behaviour) amongst young people especially children, adolescents and youths serves as a catalyst for lack of ease due to non-communicable diseases (NCDs) like obesity, insomnia, undue fatigue and arthritis. Arthritis for example is an epidemic disease largely due to lack of physical activity (physical inactivity or sedentary behaviour) that can be reduced or modified through the following related physical activity information mentioned in the proceeding paragraphs.

Health literacy for children, adolescents and youths with premedical condition(s) like asthma^[1], muscle atrophy^[2], stress^[3] related condition, muscle weakness^[4] in the form of arthritis and maximum volume of oxygen^[5] is very much essential for exercise prescription during physical activity performance. Also, physical activity performed routinely for the purpose of public health education^{[6][22][25]}, health extension^[7] services and physical activity epidemiology^{[8][29][30]}, helps create the enabling awareness and adherence for the younger generation especially children, adolescents and youths to maintain and maximize the functional movement for healthiness of life. However, knowledge and awareness associated with the good tidings of physical activity through physical education programme^[9], public health and physical education^[26] programmes, health and physical

education^[27] learning activities and physical education literacy^[10] programme play a significant role in physical and mental wellness and wellbeing of an individual gearing towards soundness of the mind and body.

Physical activity performed routinely by observing exercise prescription rules and regulations, under the guidance, counselling and supervision of exercise physiologist and health and nutrition educator will support individual physical and mental health^[11], by slowing ageing process^[18] and also reducing early and unsuccessful ageing^[12] of the younger generation, especially children, adolescents and youths. Therefore, educating (i.e. formally, informally or by apprenticeship) of individuals especially children, adolescents and youths about their regular physical activity routine is an essential element in health education strategy^[13], that can contribute effectively and efficiently to balanced decision^[14] making and self-efficacy^{[15][23]} response in carrying out the day-to-day activities without undue fatigue.

Observing leisure time^[16] by engaging in some form of prescribed physical activity (mild exercise, moderate exercise or vigorous exercise) based on premedical conditions routinely is a behavioural regulation^[19] that will help in preventing sports injuries^[17] and other related injuries, thereby minimizing the process of ageing^[20], and increasing healthy lifestyle and span. Physical literacy^[24] is very much key in sustaining physical activity routinely amongst children, adolescents and youths. Because through physical literacy, the younger generation can learn about the advantages and disadvantages of doing physical activity routinely. This will bring about physical activity motivation^[28], which will bring about physical activity motives^[21] of intrinsic motivation and extrinsic motivation. This study aimed at scoring measured and evaluated epidemiological surveillance screening of functional movements in children and adolescents physical activity in Sierra Leone, hoping to enhance behavioural change communication gearing towards improving functional movements for healthy lifestyle and span.

II. Materials And Methods

Respondents

The research sampled participants of **N=60**, with a mean and standard deviation age of **14.0±4.0** with a **96%** response rate and with **10-18** years age range, selected using a process of simple random sampling (SRS) method, mainly amongst junior secondary school pupils from two secondary schools.

Instrumentation

Behavioural Regulations for Physical Activity and Functional Movement Screening Questionnaire (**BRPA-FMSQ**) was the adopted research instrument used in the research, with evidence of validity and reliability supported by test retest reliability of Cronbach's Alpha Reliability of (**0.654**), which was previously used by Bebeley et al.^{[16][28]}

Procedure

The testing and scoring of research participants were done individually on school grounds following procedural instructions provided for by the research instrument, through census survey entry (**CSEntry**) and census survey processing (**CSPro**) systems software application installed on tablets, smart phones and computers accordingly.

Analysis

An inferential Statistics of Non-Parametric Tests using the example of Mann Whitney U Statistical Test of Mean Rank from **IBM-SPSSv.23** Statistics were used to compute, analyze data and compare the research findings at significant value of **P<0.05**.

III. Results

The Mann Whitney U Test statistics of **Physical Activity Intensity (PAI)** by sex, religion and school: Boys (32.76), Christianity (31.91) and St. Andrews (31.00) scored highest for **Physical Activity Vigorous (PAV)**. In addition, **Physical Activity Level (PAL)** by sex, religion and school: Boys (32.45) and Christianity (31.05) scored highest for **Physical Activity Enough (PAE)** as in tables 1 & 2.

Table 1: Mann-Whitney U Test – Physical Activity Intensity (N=60)

Physical Activity Intensity		Mean Rank of Mann-Whitney U Statistics Test		
		Physical Activity Mild	Physical Activity Moderate	Physical Activity Vigorous
Sex	Boys (n=37)	30.50	28.24	32.76
	Girls (n=23)	30.50	34.13	26.87
	P(2-tailed)	1.000	0.058	0.058
Religion	Christianity (n=22)	30.50	29.09	31.91
	Islam (n=38)	30.50	31.32	29.68
	P(2-tailed)	1.000	0.478	0.478
School	Centenary (n=30)	30.50	31.00	30.00
	St. Andrews (n=30)	30.50	30.00	31.00

Table 2: Mann-Whitney U Test – Physical Activity Level (N=60)

Physical Activity Level		Mean Rank of Mann-Whitney U Statistics Test	
		Physical Activity Enough	Physical Activity Insufficient
Sex	Boys (n=37)	32.45	28.55
	Girls (n=23)	27.37	33.63
	P(2-tailed)	0.114	0.114
Religion	Christianity (n=22)	31.05	29.95
	Islam (n=38)	30.18	30.82
	P(2-tailed)	0.791	0.791
School	Centenary (n=30)	30.50	30.50
	Saint Andrews (n=30)	30.50	30.50
	P(2-tailed)	1.000	1.000
	P(2-tailed)	1.000	0.741
		0.741	0.741

The Mann Whitney U Test statistics of **Physical Activity Insufficient (PAI)** by sex, religion and school:Girls (32.72) and Christianity (31.23) scored highest for **Due Study Pressure and Illness**. In addition, **Physical Activity Weekly (PAW)** by sex, religion and school:Boys (32.20) and Christianity (31.32) scored highest for **Physical Activity Week Round (PAWR)** as in tables 3&4.

Table 3: Mann-Whitney U Test – Physical Activity Insufficient (N=60)

Physical Activity Insufficient		Mean Rank of Mann-Whitney U Statistics Test		
		Due Study Pressure	Due Domestic Work	Due Illness
Sex	Boys (n=37)	29.12	29.50	30.93
	Girls (n=23)	32.72	32.11	29.80
	P(2-tailed)	0.136	0.070	0.573
Religion	Christianity (n=22)	30.23	29.50	31.23
	Islam (n=38)	30.66	31.08	30.08
	P(2-tailed)	0.859	0.278	0.570
School	Centenary (n=30)	30.50	30.50	30.50
	St. Andrews (n=30)	30.50	30.50	30.50
	P(2-tailed)	1.000	1.000	1.000

Table 4: Mann-Whitney U Test – Physical Activity Weekly (N=60)

Physical Activity Weekly		Mean Rank of Mann-Whitney U Statistics Test		
		PA Week Day	PA Week End	PA Week Round
Sex	Boys (n=37)	30.12	29.18	32.20
	Girls (n=23)	31.11	32.63	27.76
	P(2-tailed)	0.622	0.309	0.228
Religion	Christianity (n=22)	29.86	30.32	31.32
	Islam (n=38)	30.87	30.61	30.03
	P(2-tailed)	0.619	0.933	0.728
School	Centenary (n=30)	31.50	29.50	30.50
	St. Andrews (n=30)	29.50	31.50	30.50
	P(2-tailed)	0.305	0.545	1.000

The Mann Whitney U Test statistics of **Functional Movement Screening (FMS)** by sex, religion and school:Boys (35.15), Christianity (32.59) and St. Andrews (38.43) scored highest for **Deep Squat, Hurdle Stepan and Shoulder Mobility** respectively. In addition, **Physical Activity Motivation (PAM)** by sex, religion and school:Boys (32.59), Christianity (31.82) and Centenary (30.88) scored highest for **Intrinsic Motivation (IM)** as in tables 5&6.

Table 5: Mann-Whitney U Test – Functional Movement Screening (N=60)

Functional Movement Screening (FMS)		Mean Rank of Mann-Whitney U Statistics Test						
		Deep Squat	Hurdle Step	Inline Lunge	Shoulder Mobility	Straight Leg Raise	Trunk Pushup	Rotary Stability
Sex	Boys(n=37)	35.15	31.53	31.05	31.65	34.62	31.92	30.46
	Girls(n=23)	23.02	28.85	29.61	28.65	23.87	28.22	30.57
	P(2-tailed)	0.004	0.500	0.715	0.459	0.009	0.369	0.979
Religion	C ₁ (n=22)	31.73	31.95	28.52	32.59	31.91	32.41	30.36
	I(n=38)	29.79	29.66	31.64	29.29	29.68	29.39	30.58
	P(2-tailed)	0.644	0.567	0.434	0.419	0.593	0.468	0.958

School	C ₂ (n=30)	33.88	34.37	34.02	32.23	25.15	25.37	22.57
	St.(n=30)	27.12	26.63	26.98	28.77	35.85	35.63	38.43
	P(2-tailed)	0.094	0.045	0.068	0.379	0.008	0.010	<0.001

Note! C₁ = Christianity; I = Islam; C₂ = Centenary; St. = Saint Andrews

Table 6: Mann-Whitney U Test – Physical Activity Motivation (N=60)

Physical Activity Motivation		Mean Rank of Mann-Whitney U Statistics Test	
		Intrinsic Motivation	Extrinsic Motivation
Sex	Boys (n=37)	32.59	37.88
	Girls (n=23)	27.13	18.63
	P(2-tailed)	0.160	<0.001
Religion	Christianity (n=22)	31.82	35.45
	Islam (n=38)	29.74	27.63
	P(2-tailed)	0.596	0.093
School	Centenary (n=30)	30.88	31.17
	Saint Andrews (n=30)	30.12	29.83
	P(2-tailed)	0.839	0.767

IV. Discussion

The surveillance of functional movement imbalance (FMI) as an epidemic is largely due to physical inactivity or sedentary behaviour amongst the younger generation especially children, adolescents and youths. This is causing to some extent an epidemic disease such as arthritis. Therefore, a call for concern especially for Physical Activity Epidemiologists (PAE) and Physical Activity and Public Health Educators (PAPHE) in the world and Sierra Leone in particular. The discussion of this nature will focus comparatively between boys and girls based on the population sample under research.

The surveillance showed that boys compared to girls were more into intense physical activity when monitored. In addition, boys displayed enough evidence to show for physical activity sufficiency compared to their female (girls) counterpart when evaluated. Hence, a wake up call for epidemiological surveillance of physical activity motivation research, which is synonymous to a research conducted by Bebeley, et al. on Epidemiological Surveillance of College Students Physical Activity Motivation^{[29][30]}.

The result also showed that girls compared to boys were less engaged in physical activity leading to physical activity insufficiency amongst the younger generation especially children, adolescents and youths, when evaluated. However, boys were more into week-round physical activity (WPA) compared to their female (girls) counterpart when surveillanced. Therefore, a clear signal for epidemiological surveillance of physical activity motivation research, which has an insight into a research conducted by Bebeley, et al. on Epidemiological Surveillance of College Students Physical Activity Motivation^{[29][30]}.

The results again showed that boys compared to girls manifested more of functional movement under physical activity of deep squat when screened. In addition, that boys compared to their female (girls) counterpart were more intrinsically motivated to engage in physical activity regularly. Again, another intrigue for epidemiological surveillance of physical activity motivation research, which has connection to a research conducted by Bebeley, et al. on Epidemiological Surveillance of College Students Physical Activity Motivation^{[29][30]}.

V. Conclusion And Recommendation

In conclusion, boys displayed greater proportion of intensive physical activity (IPA), physical activity sufficiency (PAS), week-round physical activity (WPA) and high functional movement of deep squat (FMDS) due to intrinsic motivation of physical activity routinely in terms of rating compared to girls. On the other hand, girls compared to boys displayed evidence of higher proportion of physical activity insufficiency. This is an intrigue for more epidemiological surveillance of physical activity motivation research especially amongst girls.

The researchers recommended that, attention now more than ever should focus on practicing behavioural change communication (BCC) in learning institutions, in the work place and at home regularly. In addition, that the behavioural change communication (BCC) should be carried out by health extension officers (HEOs), public health education promoters (PHEPs), nutrition education promoters (NEPs) and health economists (HEs) charged with the responsibility of educating and monitoring people about personal hygiene, community hygiene, industrial hygiene, social and physical distancing in the era of epidemic and pandemic outbreaks of diseases. In addition, to educate people about the economic implications of such especially in the preventive health care chain (PHCC).

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