

Knowledge of Health Benefits of Engaging in Physical Activity among Adolescents in Secondary Schools in Nsukka Education Zone, Enugu State

*¹Perpetua Chinyere Ofili, ²Linus O. Ugwuezuonu and ²Jude C. Nwakamma

¹Department of Human Kinetics and Health Education, University of Nigeria, Nsukka

²Department of Human Kinetics and Sports Studies, Alvan Ikoku Federal College of Education, Owerri, Imo State

*Correspondence: chinyere.ofili@unn.edu.ng; 07033751545

Abstract

This study aimed to determine knowledge of the health benefits of engaging in physical activities possessed by in-school adolescents in secondary schools in Nsukka Education Zones. The study utilized a survey research design. Population for the study consisted of 30,735 in-school adolescents in Nsukka Education Zone. The sample for the study was 412 in-school adolescents, selected through random sampling without replacement technique. The instrument for data collection was structured by the researcher based on the literature on Physical health benefits, psychological benefits and social benefits. The instrument consisted of four sections (A, B, C &D). Section 'A' contained items that elicited information on personal data of the respondents. Section 'B' contains items on knowledge of physical benefits. Section 'C' contained items on psychological benefits while section 'D' contained items on social benefits. The validity of the instrument was determined by the consensus of five experts drawn from the Department of Human Kinetics and Health Education University of Nigeria, Nsukka. Cronbach Alpha statistic were used to determine the reliability coefficient of the instruments which gave 0.70, 0.71 and 0.69 respectively. Data were collected from the sampled in-school adolescents in Nsukka Education Zone by personal visit to their respective sampled schools. Data collected were analyzed using the Statistical Package for Social Sciences-IBM-SPSS version 21. Mean and the standard deviation was used to answer all the research questions. T-test statistic was used to test the null hypothesis at the 0.05 level of significance. Level of knowledge of physical and psychological health benefits was interpreted as low with scores (0-4), moderate (5-8), high (9-12). For social health benefits scores of (0-3) was low, (4-6) was moderate and (7-8) high. The result indicated that adolescents possess high knowledge of health benefits of PA but low knowledge of the recommended PA.

Keywords: Physical activity, Health Benefits, Adolescents, Physical Inactivity, Non- communicable Diseases

Introduction

Physical inactivity is a modifiable risk factor of non-communicable diseases ravaging the entire human race in recent time. It is the fourth major cause of death worldwide (Mikaelsson, Rutherg, Lindqvist, & Michaelson, 2019). Globally over 80% of in-school adolescents between 11-17 years do not attain the recommended health-enhancing physical activity of at least one hour of moderate to vigorous daily physical activity (World Health Organisation, 2019; Orreskovic, Perrin, Robinson Locascio, Blossom, Chen, Winickoff, Field, Green, & Goodman, 2015). This is attributed to a lifestyle driven by advancement in technological ingenuity where the invention of automobiles, washing and mowing machines, blenders, pounders and other fabricated machines and domestic gargets reduce human labour and encourage sedentary and physically inactive lifestyle. Physical inactivity refers to a lifestyle of not attaining the recommended physical activity level specified by (WHO, 2010). Several empirical studies reported physical inactivity as the leading risk factor of many non-communicable diseases such as cancer, diabetes, hypertension, coronary and cerebrovascular diseases, overweight and obesity, osteoporosis, lipid disorder, depression, anxiety and reduced life expectancy, dementia/Alzheimer's disease, atherosclerosis, sarcopenia, metabolic syndrome, reduced immune system (McKinney et al., 2016; Night, 2012; LIvewell, 2020), chronic respiratory diseases such as obstructive pulmonary disease and asthma (Physio-Pedia, ND).

Non-communicable diseases are poor health conditions that are not contagious or cannot be transferred from one person to another. They may occur as a result of a physically inactive lifestyle, physiological impairment, environmental and genetic factors (Heathline, 2019). World estimation of about 3.2 million deaths is attributed to insufficient physical activity (WHO, ND). In Nigeria, physical inactivity is the leading cause of death of about 24% of all death (Oyeyemi et al., 2018). Oyeyemi et al. (2016) reported that majority of in-school adolescents do not meet the international PA recommendation. Adolescents seem to be at risk of non-communicable diseases if

they advance to adulthood without a habit of regular engagement in physical activity. However, attaining the recommended physical activity (PA) level has been reported by WHO, (2017) to prevent, reduce or ameliorate rate of non-communicable diseases.

Physical activity refers to any bodily movement produced by skeletal muscles that require energy expenditure (WHO, 2017). Physical activity includes activities such as time spent in active play, recreation and sports, active domestic chores, walking and cycling or other types of active transportation, and planned exercise (WHO, 2019). In the context of this study, Physical activity refers to the physical exertion of the body in domestic, walking to school, engaging in sports or exercise, and recreation that uses energy. Literature evidence indicates that physical activity offer varied physical, psychological, mental and social health benefits. It provides therapeutic and secondary prevention over non-communicable diseases (Goud et al., 2014).

Regular engagement in physical activity controls and maintains overweight and obesity which are risk factors of many non-communicable diseases such as diabetes, cancer, cardiovascular diseases (Kokkinos, 2012). It reduces osteoporosis and depression (Warburton, Nicol & Bredin, 2006). It also strengthens bones and muscles and helps with arthritis (United States Centers for Disease Control, 2020). The decline in PA during adolescent stage may result in accumulation of excess body fat leading to overweight and obesity which may lead to an untimely death in adulthood (Anteneh, Gedefaw, Tekletsadek, Tsegaye& Alumu, 2015). Overweight refers to body mass index (BMI) above 24.9 to 29.9 while a BMI of 30 and above refers to obesity. About 31% of premature deaths are associated with body mass index of more than 25 and physical activity below 192 minutes weekly (Night, 2012). Physical activity reduces accumulated body fat which results from physical inactive lifestyle through increased calories use (Bowen et al., 2015; Medicinenet, 2018).

Inactivity makes the body muscle to atrophy. When muscles are not used, the fibres are slowly replaced with fat thereby encourage muscle wasting (Livewell, 2020). Research evidence indicates that sufficient physical activity help to develop strong and resilient muscles which can support and protect bones from injury thereby improves stability, balance, and flexibility/coordination of the body. It also improves blood supply to the muscles thus improves oxygen use by the body (Bogdanis, 2012). Physical activity also boosts psychological health.

Physical activity improves psychological and mental health by facilitating secretion of chemicals called endorphins and serotonin which improves mood. These chemicals can reduce stress and symptoms of mental health such as depression, anxiety and facilitate recovery from mental health problems (Healthdirect, 2020). Regular engagement in physical activity also prevents and helps in the maintenance of neurodegenerative diseases such as Alzheimer's and Parkinson's diseases which present as cognitive and motor disorders (Paillard, Rolland& Barreto, 2015). It also improves academic work (Kunesh, 2020)

Physical activities also, improve social health. It boosts self-image, increase self-esteem and confidence, improve relational skills (make friends), encourage teamwork and cooperation, places negative behaviour on the check (Kunash, 2020). Mikaelsson et al. (2019) in their study observed that individuals who engage regularly in physical activity experience a greater sense of belonging than individuals who do not engage in physical activity.

Because of the numerous benefits of engaging in physical activities, adolescents in secondary schools are expected to possess adequate knowledge of these health benefits, to enable them to realize the need to regularly engage in physical activities to attain the recommended health-enhancing level of PA. Knowledge of benefits of PA may motivate the adolescents to regularly participate in PA (Xu et al., 2017). However, the decision to take action depends on one's level of knowledge of the benefits and consequences of not engaging insufficient PA. Knowledge is the acquisition of facts and information and knowing how or possessing the ability to do something (Vainoih, 2002). In this study knowledge is being abreast with the concept of physical activity, knowing the benefits accruing from it and the consequences of not engaging regularly in PA. Knowledge is assumed to be a prerequisite to any action or practice. Fredrikson, Alley, Rebar, Hayman, and Vandeanotte (2018) in their study observed that participants who possess high knowledge of the health benefits of PA were more physically active, whereas those who were inactive had low knowledge of disease conditions associated with inactivity and low knowledge of PA guideline. Also in a study by Corder, Van Sluijs and Gooder (2011), the majority of the adolescents failed to attain the recommended PA level and also lacked knowledge of the health benefits of PA. Abula, Gropel and Beckmann (2018) reported only 4.4 % of participants who had correct knowledge of physical activity recommendation and they were also more physically active than those who possess low knowledge of benefits of physical activity. These adolescents probably would engage regularly in PA if they possess adequate knowledge of the health benefits, associated health problems of physical inactivity and recommended guidelines for health-enhancing physical activity. This, however, is in line with temporary self-regulation theory propounded by Cameron and Webb (2013) as an individual's ability to exercise control over thought, feelings and actions. In line with this, adolescents will be physically active if they perceive susceptibility to diseases. Following from

above adolescents in secondary schools are likely to engage in PA if they possess sufficient knowledge of the benefits and health implication of not engaging in it.

Adolescents are individuals in the developmental stage between childhood and adulthood. Lucile (2013) described adolescence as the person in teenage years between 12-19 years considered the transition period to adulthood. In-school adolescents in this paper refer to adolescents who enrolled in secondary education. Adolescence is a critical period when life opportunities are explored and lifetime attitude and habits formed. Adolescence stage, therefore, is the appropriate time for intervention if there are habits of not engaging in regular PA. On the other hand, adolescents who cultivate habits of regular PA will likely be physically active in adulthood.

Demographic variable such as gender seems to exert influence on one's engagement in PA and acquisition of knowledge of the various dimensions of the health benefits associated with PA. Gender is a vital variable in knowledge acquisition especially on the potential health benefits of engaging in physical activity. Several studies reported gender differences in knowledge of physical activity recommendation and accruing health benefits. Vilhjalmsson and Kristjansdottir (2003) in their study observed that 40% of males and 60% of females do not know WHO recommendation of 60minutes of daily physical activity for adolescents. Umeifekwem (2011) in a study observed that males have more knowledge of the health benefits of physical activity. Also, Ansari, Khalil, Crone and Stock (2014) in their study reported that male adolescents possess a higher knowledge of health benefits of engaging in physical activity and also attained the recommended physical activity guideline more than their female counterparts. The results of the above studies, therefore, necessitated the need to carry out the present study among adolescents in secondary schools in Nsukka Educational Zone to ascertain their level knowledge of health benefits of physical activity and to determine which gender possess more knowledge of health benefits of physical education.

Research Questions

1. What is the level of knowledge of the health benefits of engaging in physical activity possessed by in-school adolescents?
2. What is the level of knowledge of the health benefits of engaging in physical activity possessed by in-school adolescents based on gender?

Hypothesis

One null hypothesis was postulated for the study.

1. There is no significant difference in the level of knowledge of the health benefits of physical activity based on gender.

Materials and Methods

The study utilized a survey research design. Population for the study consisted of 30,735 in-school adolescents in Nsukka Education Zone. The sample for the study was 412 in-school adolescents, determined with Cohen, Manion and Morrison (2007) which indicates that when the population ranges in 30,000 at 95 per cent confidence level and interval, a sample of 379 should be used. To guide against poor return rate and incomplete information a sample of 412 respondents were used. The sample was stratified by gender and selected through random sampling without replacement technique. The instrument for data collection was researcher's structured instrument based on physical health benefits highlighted by U.S. CDC (2020), psychological benefits listed by Poirel (2017) and Schober (2018) and social benefits as highlighted by Eugene (2017) and BetterHealth (2012). The validity of the instrument was determined by the consensus of five experts drawn from the Department of Human Kinetics and Health Education University of Nigeria, Nsukka. The instrument consisted of four sections (A, B, C & D). Section 'A' contained items that elicited information on personal data of the respondents. Section 'B' contains items on knowledge of physical benefits. Section 'C' contained items on psychological benefits while section 'D' contained items on social benefits. Cronbach Alpha statistic was used to determine the reliability coefficient of the instruments which gave 0.70, 0.71 and 0.69 respectively. Data were collected from the sampled in-school adolescents in Nsukka Education Zone by personal visit to their respective sampled schools. Data collected were analyzed using the Statistical Package for Social Sciences-IBM-SPSS version 21 statistics. Mean and the standard deviation was used to answer all the research questions. T-test statistic was used to test the null hypothesis at the 0.05 level of significance. Level of knowledge of physical and psychological health benefits was interpreted as low with scores (0-4), moderate (5-8), high (9-12). For social health benefits scores of (0-3) was low, (4-6) was moderate and (7-8) was high, For overall knowledge 0-9, 11-19 is moderate while 20 and above is high, a modified version of the level of knowledge rating by Okafor (1997).



Results

Table 1: Scores on levels of knowledge of the health benefits of participating in physical activity by in-school adolescents (n=412)

N/S	Item Statements	Yes F(%)	\bar{X}	SD	Dec
Physical benefits					
1	Recommended physical activity guideline	139(33.7)	.34	.48	L
2	Control weight	373(90.5)	.91	.29	H
3	Reduce the risk of CVD	330(80.1)	.81	.40	H
4	Reduce the risk of cancer	294(79.9)	.71	.45	M
5	Reduce the risk of type-2 diabetes	329(79.9)	.80	.40	H
6	Strengthen bones and muscles	366(88.8)	.89	.37	H
7	Improve energy for daily activity	370(89.8)	.90	.32	H
8	Increase chances of living longer	326(79.1)	.80	.41	H
9	Improve quality life for chronic diseases	313(76.0)	.76	.43	M
10	Reduce risk for chronic diseases	311(75.5)	.76	.43	M
11	Reduce pain	346(84.0)	.85	.37	H
12	Help with relaxation and sleep	335(81.3)	.81	.39	H
	Cluster Mean	77.5	9.34	2.18	H
Psychological benefits					
13	Improve self-confidence/self-esteem	347(84.)	.85	.37	H
14	Improve body image	326(79.1)	.79	.40	M
15	Reduce anxiety and depression	306(74.3)	.74	.44	M
16	Reduce stress	315(76)	.76	.43	M
17	Help control addiction	318(77.2)	.77	.42	M
18	Boost happy chemicals	296(71.8)	.71	.45	M
19	Boost brainpower	296(71.8)	.79	.41	M
20	Sharpen memory	324(78.6)	.78	.41	M
21	Prevent cognitive decline	335(81.3)	.81	.39	H
22	Boost creativity	330(80.1)	.80	.39	H
23	Improve concentration	347(84.2)	.84	.37	H
24	Improve happiness	360(87.7)	.87	.33	H
	Cluster Mean	78.9	9.54	2.41	H
Social benefits					
25	Learn how to work as a team	354(85.9)	.86	.35	H
26	Learn how to respect each other	292(85.9)	.71	.42	M
27	Better ones communication skill	318(77.2)	.77	.42	M
28	Improve patience	276(67.0)	.67	.47	M
29	Helps one deal with frustration	256(256)	.62	.49	M
30	Learn how to control ones emotions	300(72.8)	.73	.46	M
31	Offer opportunity make new friends	327(79.4)	.80	.41	H
32	Boost self esteem	321(77.9)	.78	.42	M
	Cluster Mean	74.2	6.81	1.93	M
	Grand Mean	76.87	25.69	6.52	M

Key: Low = .00-.49; Moderate = .5-.89; High = 9-1.2 : Overall Key: Low =09; Moderate =10-19; High = 20-32

Table 1 shows that majority 75.5% ($\bar{X} = 9.34$), 78.9% ($\bar{X} = 9.54$) and 74.1% ($\bar{X} = 6.81$) respectively of in-school adolescents' possessed high knowledge of physical, psychological and social health benefits of engaging in physical activities. However, majority 66.3% ($\bar{X} = .34$) of the respondents lacked knowledge of the WHO recommended physical activity guideline for health enhancement and well being.

Table 2: Scores on knowledge of the health benefits of participating in physical activity by in-school adolescents based on gender

S/N	Items Statement	Male (n=225)				Female (n=187)			
		Yes (%)	\bar{X}	SD	Dec	Yes (%)	\bar{X}	SD	Dec
Physical benefits									
1	Recommended physical activity guideline	79(35.2)	.39	.50	L	60(31.4)	.28	.45	L
2	Control weight	208(94.1)	.92	.27	H	175(91.6)	.88	.32	H
3	Reduce the risk of CVD	189(85.9)	.83	.38	H	156(81.7)	.78	.42	M
4	Reduce the risk of cancer	167(75.6)	.75	.44	M	127(66.5)	.67	.47	M
5	Reduce the risk of type-2 diabetes	185(83.7)	.81	.39	H	144(75.4)	.79	.42	M
6	Strengthen bones and muscles	204(92.3)	.92	.27	H	169(88.5)	.86	.37	H
7	Improve energy for daily activity	197(89.1)	.92	.29	H	173(90.6)	.88	.32	H
8	Increase chances of living longer	180(81.4)	.84	.37	H	146(76.4)	.44	.40	L
9	Improve quality life for with chronic diseases	166(75.1)	.78	.42	M	147(77.0)	.74	.44	M
10	Reduce the risk for chronic diseases	170(76.9)	.77	.42	M	141(73.8)	.73	.44	M
11	Reduce pain	197(89.1)	.85	.37	H	149(78.0)	.84	.37	H
12	Help with relaxation and sleep	187(84.6)	.82	.39	H	148(77.5)	.80	.40	H
	Cluster Total	59.34	.52	.28		53.98	.53	.30	
Psychological benefits									
13	Improve self confidence/self esteem	194(87.8)	.88	.34	H	153(80.10)	.82	.40	H
14	Improve body image	173(78.3)	.80	.40	H	153(80.1)	.78	.42	M
15	Reduce anxiety and depression	165(74.7)	.77	.42	M	141(73.8)	.71	.45	M
16	Reduce stress	177(80.1)	.77	.42	M	141(73.8)	.76	.43	M
17	Help control addiction	174(78.7)	.76	.43	M	144(75.4)	.78	.42	M
18	Boost happy chemicals	163(73.8)	.75	.44	M	135(70.7)	.67	.47	M
19	Boost brain power	185(83.7)	.80	.40	H	142(74.3)	.77	.41	M
20	Sharpen memory	176(79.6)	.82	.39	H	179(81.0)	.74	.44	M
21	Prevent cognitive decline	179(81.0)	.80	.40	H	159(83.2)	.83	.37	H
22	Boost creativity	179(81.0)	.81	.40	H	151(79.1)	.79	.40	M
23	Improve concentration	188(85.1)	.84	.36	H	159(83.2)	.84	.37	M
24	Improve happiness	198(89.6)	.90	.30	H	168(88.0)	.85	.37	M
	Cluster Total	81.10	.81	.39		78.56	.78	.41	
Social benefits									
25	Learn how to work as team	192(86.9)	.87	.34	H	29(13.1)	.85	.36	H
26	Learn how to respect each other	153(69.2)	.70	.46	M	142(74.3)	.72	.45	M
27	Better ones communication skill	173(78.3)	.81	.39	H	145(75.9)	.73	.45	M
28	Improve patience	142(64.3)	.70	.46	M	134(70.2)	.64	.48	M
29	Helps one deal with frustration	148(67.)	.63	.48	M	108(75.9)	.61	.49	M
30	Learn how to control ones emotions	160(72.4)	.73	.45	M	140(73.3)	.73	.45	M
31	Offer opportunity make new friends	189(85.5)	.83	.39	H	140(73.8)	.77	.43	M

32	Boost self-esteem	183(82.8)	.81	.39	H	141(73.8)	.74	.44	M
	Cluster Total	76.30	.51	.28		72.50	.48	.29	
	Grand Total	72.25	.61	.32		68.35	.60	.33	

Key: Low = .00-.49; Moderate = .5-.89; High = 9-1.2 : Overall Key: Low =09; Moderate =10-19; High = 20-32

Table 2 indicates that all the genders possessed high knowledge of the physical, psychological and social benefits of engaging in physical activities, though male adolescents possessed more knowledge of the recommended physical activity guidelines than females with 35.2% ($\bar{X} = .28$) and 31.4% ($\bar{X} = .39$) respectively.

Table 3: Result of t-test verifying mean difference in knowledge of the health benefits of participating in physical activity by in-school adolescents based on gender

Dimensions of Health Benefits	Male (n=225)		Female (n=187)		t-cal	df	P-value	d	Mean d/f	95% CI	
	\bar{X}	SD	\bar{X}	SD						Lower	Upper
Physical	9.61	2.00	9.01	2.34	2.82	410	.01	.22	.60	.18	1.02
Psychological	9.69	2.28	9.35	2.55	1.46	410	.46		.35	-.12	.8
Social	6.97	1.93	6.6	1.91	1.83	410	.07		.35	-.03	.72

Table 3 above reports an independent t-test conducted to compare the knowledge of health benefits of physical activity possessed by male and female adolescents. There was significant difference in scores for males in knowledge of the physical benefits of physical activity ($\bar{X} = 9.61$, $SD = 2.00$) and females ($\bar{X} = 9.01$, $SD = 2.34$; $t(410) = 2.82$, $P = .01$, two-tailed). The magnitude of difference in the means (mean difference -.60, 95 CI .18 to 1.02) was small (Cohen's $d = .22$). There was no significant difference in scores of males for knowledge of psychological health benefits of physical activity ($\bar{X} = 9.69$, $SD = 2.28$) and females ($\bar{X} = 9.35$, $SD = 2.55$; $t(410) = 1.46$, $P = .46$, two-tailed). There was also no significant difference in scores of males for knowledge of social health benefits of physical activity ($\bar{X} = 6.97$, $SD = 1.93$) and females ($\bar{X} = 6.6$, $SD = 1.91$); $t(410) = 1.83$, $P = .07$, two-tailed. Since the P-value for physical benefits was less than .05 level of significance, the null hypothesis was rejected whereas in the psychological and social benefits the P-value were greater than .05 level of significance, thus the hypothesis of no significant difference was not rejected. This implies that adolescents knowledge differs significantly in physical benefits based on gender but did not differ in psychological and social benefits.

Discussion

Table 1 showed that in-school adolescents possess high knowledge of the physical, psychological and social health benefits of engaging in physical activities. However, less than half of the respondents possess knowledge of the recommended guideline for health-enhancing physical activities. This result is in agreement with the report of Fredrikson et al (2018) that respondents had high knowledge of the health benefits of PA and low knowledge of the recommended PA guidelines. However, the result contrasted with the finding of Corder et al (2011) that the adolescents in their study area lacked knowledge of the health benefits of PA. Gropel and Beckmann (2018) reported only 4.4 % of participants who had correct knowledge of physical activity recommendation and they were also more physically active than those who possess low knowledge of benefits of physical activity

Table 2 shows that male adolescents possess more knowledge of the health benefits of engaging in physical activity and knowledge of PA recommendation more than females. This finding agrees with the report of a study conducted by Corder et al. (2011), Nielsen, Pfister and Andersen (2011), Umeifekwem (2011) that males possess more knowledge of health benefits of engaging in physical activity than females. The result is also in perfect agreement with the findings of Vanegas et al. (2017) that male adolescents have more knowledge of health benefits of engaging in physical activity and the recommended weekly level of physical activity more than female counterparts. One major implication of lack of knowledge by a majority of the in-school female adolescents may be on reduced physical activity which may lead to an increased risk of non-communicable diseases for them. On the interim, they may not have signs of such life-threatening health problems thus, tend to see no reason to be active at this stage of life. In line with temporal self-regulation theory, Fredriksson et al. (2018) stressed that people engage in health preventive activity when they anticipate negative health consequences. Suffice to say that

individuals who envisage disease as a result of inactivity lifestyle will adopt a more active lifestyle. The independent t-test conducted indicated a significant difference in knowledge of physical benefits only. This implies that adolescents knowledge differs in physical benefits based on gender but did not differ in psychological and social benefits. This result, however, portends the need to plan more educative programme for female adolescents on the physical health benefits of engaging in physical activity.

Conclusion

Adolescents possess high knowledge of the health benefits of engaging in physical activities and low knowledge of the recommended physical activity by WHO. In terms of gender, males' possess more knowledge than the females. However, adolescents seem to be the target population for the promotion of PA which can only be achieved when they have adequate knowledge on the health benefits. Adolescents are more likely to engage in physical activities if they possess sufficient knowledge of the health implications of not meeting the health-enhancing PA recommendations.

Recommendations

1. Secondary Education Management Board in collaboration with Health and Physical Education expert need to adopt policies, programmes and strategies to promote an increased knowledge of health benefits of engaging in physical activity with special attention on female students.
2. World Health Organisation physical activity level recommendations should be incorporated in school curriculum to facilitate students knowledge acquisition in that direction

References

- Ansari, W.E., Khalil, K., Crone, D., & Stock, C. (2014). Physical activity and gender differences: Correlates of compliance with recommended levels of five physical activity among students of nine universities in Libya. *Cent European Journal of Public Health*, 22 (2): 98-105
- Anteneh, Z. A., Gedefa, M., Tekletsadek, K. N., Tsegaye & Dagmawi (2015). Risk factors of overweight and obesity among high school students in Bahir Dar City North West Ethiopia: School-based cross-sectional study. *Hindawi Journal*. Retrieved on 15/8/019 from <https://www.hindawi.com/journals/apm/2015/29490/>
- BetterHealth (2012). Physical activity – it's important. Retrieved on 5/8/2019 from <https://www.betterhealth.vic.gov.au/health/healthyliving/physical-activity-its-imortant>
- Bogdanis, G. (2012). Effects of physical activity on muscle fatigue. Retrieved on 9/9/2019 from <https://www.frontiers.org/articles/10.3389/fphys.2012.00142/full>
- Bowen, L., Taylor, A. E.; Sullivan, R.; Ebrahim, S.; Kinra, S.; Krishna, K.V. R; Kulkarni, B.; Ben, S. Y.; Ekelund, U.; Well, J. C. K. & Kuper, H. (2015). Association between diet, physical activity and body fat distribution; A cross-sectional study in an Indian population. Retrieved on 15/8/2019 from <https://bmcpublichealth.biomedicalcentral.com/article/10.1186/s12889-115-1550-7>Self regulatory capacity.
- Cameron, D. & Webb, T. (2013). *Encyclopedia of behavioural medicine*. Retrieved on 5/6/2019 from 15/8/019 from <https://link.springer.com/referenceworentry/10.1007%2F978-1-4419-10051177>
- Center for Disease Control and Prevention (2020). Physical activity and health. Retrieved on 3/9/2019 from <https://www.cdc.govv/physicalactivity/basis/pa-health/index.htm>
- Cohen, L., Manion, L. & Morrison, K. (2007). *Research method in Education*. London and New York Routledge
- Corder, K., Van Suijs, E. M. F. & Gooder, I. (2011). Physical activity awareness of British adolescents. Retrieved on 9/9/2019 from <https://jamanetwork.com/journals/jamapediatrics/fullarticle/1107552>
- Eugene Civic Alliance (2017). Physical activity benefits: social health. Retrieved f0n 5/9/2019 from <https://eugenevialliance.org/physical-actiity-benefits-social-health/>
- Fredrikson, V., Alley, S. J., Rebar, A. L., Hayman, M., Vandeanotte, C. & Schoeppe, S. (2018). How are different levels of Knowledge about physical activity associated with physical activity behaviour in Australia adults? *PLOS ONE*. Retrieved On 6/9/2019 from <https://journal.plosone/article?id=10.1371/journal.pone.0207003>
- Goud, M., Pamidi, N., Devi, O. S., Nayal, B., Ullas, K. & Ragbuveer (2014). A questionnaire survey of awareness of physical activity among faculties of medical college. *Journal of Education Health promotion*, 3(47).



- Healthdirect (2020). Exercise and mental health. Retrieved on 15/8/2019 from <https://www.healthdirect.gov.au/exercise-and-mental-health>
- Healthline (2019). Most non-communicable diseases. Retrieved from <https://www.healthline.com/health/noncommunicable-disease-list>
- Joens-Matre, R. R., Welk, G. J., Calabro, M. H. & Russell, D. W. (2008). Rural-urban differences in physical activity, physical fitness, and overweight prevalence of children. *The Journal of Rural Health*, 24(1): 49-54. doi:10.1111/j.1748-0361.2008.00136x
- Knight, J. A. (2012). Physical inactivity: Associated diseases and disorder. *Annals of Clinical laboratory science*. Retrieved on 15/8/2019 from <http://www.annclinlabsci.org/content/47/3/320.full>
- Kokkinos, P. (2012). Physical activity health benefits and mortality risk. *International Scholarly Research Notices*. Retrieved on 7/8/2019 from <https://doi.org/10.5402/2012/718789>
- Kunesh, T. (2020). Social benefits of physical activity for teens. Retrieved on 7/8/2019 from <https://teens.lovetoknow.com/social-benefits-physical-activity-teens>
- Livewellwinona (2020). Physical inactivity. Retrieved on 3/8/2019 from <https://www.livewellwinona.org/facts/risk-factors-related-illnesses/physical-inactivity/>
- Lubans, D. R., Morgan, P. S., Cliff, D. P., Barnett, L. M. & Oakley, A. D. (2010). Fundamental movement skills in children and adolescents: Review of associated health benefits. *Journal of Sports Medicine*, 40(12): 1019-1035
- McKinney, J., Lithwick, D. J., Morrison, B. N., Nazzari, H., Isserow, S., Heilbron, B. & Krahn, A. D. (2016). The health benefits of physical activity and cardiorespiratory fitness. *BC Medical Journal*, 58(3) 131-137
- MedicineNet (2018). Exercise and fitness centre: Tips. . Retrieved on 3/9/2019 from www.medicinenet.com/scriptmain/artasp?articlekey=10074
- Mikaelsson, K. Rutberg, S. Lindqvist, A. & Michaelson, P. (2019). Physical inactive adolescents experiences of engaging in physical activities. *European Journal of Physiotherapy*. Retrieved on 25/8/2019 from <https://www.tandfonline.com/doi/full/10.1080/2166679169.019.1567808>
- Nielsen, G., Pfister, G. & Andersen L. B. (2011). Gender differences in daily physical activities of Danish children. *European Physical Education Review*, 17(1): 69-90
- Orreeskwovic, N. M., Perrin, J., Robinson, A., Locascio, J. J., Blossom, J., Chen, M. L., Winickoff, J. P., Field, A.E., Green, C. & Goodman, E. (2015). *Biomedical central Journal*. Retrieved on 8/9/2019 from <https://bmcpublichealth.bioedcentral.com/articles/10.1186/s12889-015-1596-6>
- Oyeyemi, A. L., Ishaku, C. M., Oyekola, J., Wakawa, H. D.; Lawan, A., Yakubu, S., & Oyeyemi, A. Y. (2016). Patterns and associated factors of physical activity among adolescents in Nigeria. *Plos One Journal*. Retrieved on 19/8/2019 from <https://journals.plos.org/plsone/article?id=10.1371/journal.pone.0150142>
- Oyeyemi, L. O., Oyeyemi, A. Y., Omotara, B. A., Lawan, A., Akinroye, K. K., Adedoyin, R. A. & Ramrez (2018). Physical activity profile of Nigeria: Implications for research surveillance and policy. *Panafrican medical Journal(PAMJ)*,30. Retrieved from <https://www.panafrican-med-journal.com/content/article/30/175/full/>
- Paillard, T.; Rolland, Y. & Barreto (2015). Protective effect of physical exercise in Alzheimer's disease and Parkinson's disease: A narrative review. *Journal of Clinical Neurology*, 11(3): 219-9. Doi:10.3988/jcn2015.11.3.212
- Physio-Pedia (ND). Physical activity and non-communicable diseases. Retrieved from <https://www.physio-pedia.com/physical-Activity-and-Non-communicable-Diseases>
- Poirel, E. (2017). Psychological benefits of physical activity for optimal health. *NIH Journal*, 42 (1): 147-164. Retrieved on 9/9/2019 from <https://pubmed.ncbi.nlm.nih.gov/28795668>
- Rejis, M. F., Oliveira, L. Santos, A. R. M., & Leonidio, A. R. (2016). Urban versus rural lifestyle in adolescents: Associations between environment, physical activity level, and sedentary behaviour *Research Gate*. Retrieved on 18/9/2019 from https://www.researchgate.net/publication/312255522_urban_versus_rural_lifestyle_in_adolescents_association_between_environment_physical_activity_level_and_sedentary_behavior
- Schober, (2018). Psychological benefits of exercise. Retrieved on 5/8/2019 from <https://appliedsportpsych.org/reources/health-fitness-resources/psychological-benefits--of-exercise/>
- Umeifekwem, J. E. (2011). Awareness of health-related benefits of physical activity and habitual participation in physical activity among undergraduates students in selected Nigeria universities. *International Journal of Educational Research*, 11(1): 226-232



- United States Center for Disease Control-Nigeria (2017). Global health-Nigeria. Retrieved from <https://www.cdc.gov/globallyhealth/countries/Nigeria/default.htm>
- Vainoih, S. O. (2002). The contribution of physical activity and sedentary behaviours to the growth and development of children and adolescents. *Journal of Sports Medicine*, 37(6), 533-545.
- Vanegas, S. M., Orbolato, R., Exuperio, I. N., Codogno, J. S., Turi-lynch, B. C., Queiroz, D. C., Christofaro, D. G. D. & Zanuto, E. A. C. (2017). Can participation in sports during childhood influence physical activity in adulthood: the central role of organized sport. *Social Science Medicine*, 56: 363-374
- Vilhjalmsson, R. & Kristjandottir, G. (2003). Gender differences in physical activity in older children and adolescents: The central role of organized sport. Retrieved on 21/9/2020 from <https://www.researchgate.net/publication/10999257>
- Warburton, D. E. R., Nicol, C. W. & Bredin, S.S. D. (2006). Health benefits of physical activity the evidence. *PMC Journal*, 174(6): 801-809. Doi10.1503/cmaj.051351
- World Health Organisation (2010). Global status report on non-communicable diseases. Retrieved from http://www.who.int/nmh/publications/ncd_report2010/en/
- World Health Organisation (2017). Physical activity. Retrieved on 5/9/2019 from <https://www.who.int/entity/mediacentre/factsheets/fs385/en>
- World Health Organisation (2019). 80% of adolescents globally are physically inactive: WHO. Retrieved 12/8/2019 from <https://www.indiatoday-in/education-today/latest-studies/story/80-adolescents-globally-are-physically-inactive-who-1621682-2019-11-22>
- World Health Organisation (ND). New physical activity recommendation for reducing disease and prevent death. Retrieved on 15/8/2019 from <https://www.who.int/dietphysicalactivity/fa>
- Xu, F., Wang, X., Xiang, D., Wang, Z., Ye, Q., & Ware, R. (2017). Awareness of knowledge and practice regarding physical activity: A population-based prospective observational study among students in Nanji, China. *PLOS ONE*, 12(6). Retrieved from <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0179518>