GHANA JOURNAL OF DEPARTMENT OF HEALTH, PHYSICAL EDUCATION AND RECREATION, SPORTS AND DANCE (GJOHPERSD)

Volume 10, Year 2017

A JOURNAL OF THE DEPARTMENT OF HEALTH, PHYSICAL EDUCATION AND RECREATION
(HPER)
UNIVERSITY OF CAPE COAST
GHANA, WEST AFRICA

Published by:
Department of Health Physical Education and Recreation (HPER)
University of Cape Coast, West Africa

EDITORIAL BOARD

Editorial Comment

The Ghana Journal of Health, Physical education, Recreation, Sports and Dance (GJHPERSD) is a journal that published twice a year by the Department of Health, Physical Education and Recreation, University of Cape Coast, Ghana in which topical issues concerning exercise physiology, administration, health, biomechanical and behavioural aspect of physical and health education are publish. Majority of the articles are derived from researches and scientific investigation. Manuscripts in the present volume are selected by the Editorial Board from among submissions made by interested contributors. In this issue, articles were compiled on factors influencing teenage pregnancy, early childhood education, food hygiene practices, Lassa fever, effect of energy drinks, efficacy of cognitive restructuring on test anxiety and weight and performance The final determination is made on the basis of the professional and scientific relevance, need and extent of information to Health and Physical Education. The Editorial Board is receptive to suggestions concerning selections of potential manuscripts and topics worthy of publication. For the present volume, the Editorial Board wishes to acknowledge the contributions of our consultants and reviewers in the manuscripts.

Editorial Board
Ghana Journal of Health, Physical Education
Recreation Sports and Dance (GJOHPERSD)

GHANA JOURNAL OF HEALTH, PHYSICAL EDUCATION RECREATION SPORT AND DANCE

Vision

GJHPERSD is a peer-reviewed, DOUBLE BLIND, Professional Journal intended to meet the needs of Education, Health, Physical Education, Exercise Physiology, Sports Psychology, Nutrition, Sports Education, Sports Administration, and Sports Kinesiology. The journal publishes research that contributes to the knowledge and development of theory as new information, reviews, substantiation or contradiction of precious findings or as application of new or improved techniques to serve as a forum for socioeconomic, educational and ethical issues.

GUIDELINES FOR AUTHORS

The Editorial Board of the Ghana Journal of Health, Physical Education Recreation, Sports and Dance (GJHPERSD) is pleased to invite research articles, from interested scholars in both local and international community for consideration and subsequent publication. The journal is managed by the Department Health, Physical Education Recreation (HPER), under the Faculty of Science and Technology Education of the College of Education Studies, University of Cape Coast, Ghana.

Manuscript submitted to GJOHPERSD must not be published or submitted for publications simultaneously to other journal. Authors are responsible for the scientific content and legal aspect of the articles. There is 15 page limitation for the manuscript, including references. Manuscript acceptance is based on originality of materials significance to GJOHPERSD profession, validity and adherence to the prescribed submission requirements.

Submission of Manuscripts

Manuscript should be submitted electronically as e-mail attachment to

The Editor-In-Chief
GJOHPERSD
Department of Health, Physical Education and Recreation,
University of Cape Coast, Cape Coast, Ghana
E-mail gjohpersd@ucc.edu.gh

All submission must include a cover letter which should be sent as e-mail text; gjohpersd@ucc.edu.gh.

Manuscript Preparation

Manuscript should conform to the Publication manual of the American Psychology Association (APA, 6th edition) style and typed using 12 points Times News Roman with 1.5 line spacing including the following sections in articles. A length of 9-12 pages is a typical size for a manuscript, per the editorial policy of GJOHPERSD.

Title – Capital letters

Authors - Surname followed by initials, academic degree, position, and institutional affiliations of all the authors as well as corresponding author's mail address and telephone numbers.

Abstract - An abstract of not more than 250 words should include the purpose of the study, methods, major findings and conclusions. It should be typed using single line spacing. A maximum of 5 key words typed on a separate page

Text - **The text should** include the following headings

- Introduction

- Methods and Materials
- Results
- Discussion
- Conclusion
- Acknowledgement (if any)
- Reference and
- Appendices (if appropriate)

References – The American Psychological Association (APA 6th edition) format should be used and only references cited in the text should be alphabetically listed in the reference section.

The Review Process

The editor reviews all manuscripts for appropriateness of topics and conformity to GJOHPERSD writing style. If the topic and style are deemed appropriate, manuscripts are sent to at least 2 reviewers (DOUBLE BLIND REVIEW) with expertise in the topic area. Allow four 2 to 4 weeks for the review process.

GJOHPERSD now promotes OPEN ACCESS - OPEN PEER REVIEW SYSTEM and selects the best manuscripts for publication. Thus, the journal promotes total transparency and collaboration between author(s) and reviewer(s). The final decision is taken by the editor based on discussions and clarifications author - reviewer, and based on the final report on the manuscript.

The editorial staff requires that all manuscripts that are sent for publication to be evaluated.
A reviewed manuscript will be subjected to one of four possible outcomes regarding publication in GJOHPERSD.

1. Accept the paper in its current format if manuscript scores 80-100.
2. Accept the paper with minor changes; 65-79.
3. Resubmit with the major changes; 50-64.

4. Reject the manuscript; 0-49.

The decision will be communicated to the author(s) in a strictly anonymous form.

Publication Charges

Articles accepted for publication will attract publication charges that will be communicated to authors. The Accepted articles will be published online on the University E-Journals Website before the print copies. Manuscript will be printed in the earliest appropriate and available issue following acceptance. Authors will receive a complimentary copy of the issue in which their article appears.

A Journal of the Department of Health, Physical Education and Recreation (HPER), University of Cape Coast, Ghana.

TABLE OF CONTENTS

VOLUME 10
ISSUE 1, 2017

Ghana Journal of Health Physical Education Recreation Sports and Dance (GJOHPERSD) Vol. 10, 2017

FACTORS INFLUENCING TEENAGE PREGNANCY IN KOMENDA, EDINA, EGUAFO ABIREM MUNICIPALITY

Thomas Hormenu, Patrick Kwasi Akutu & Stephen Oklu
Department of Health, Physical Education and Recreation,
University of Cape Coast
Email: thormenu@ucc.edu.gh

Abstract

Adolescents are the most important sexually active population in our societies, and given their size and characteristics, majority are exposed to early unplanned and unprotected sexual intercourse leading to unwanted pregnancy and sometimes unsafe abortions. Teenage pregnancy has become very common in the Ghanaian society, especially among adolescents at the Primary and Junior High School (JHS) levels of education. The purpose of this study was to assess the prevalence of teenage pregnancy in the Komenda, Edina, Eguafo Abrem Municipality in the Central Region of Ghana from 2012-2016. The study employed descriptive survey design to purposively sample teenage mothers and pregnant teenagers seeking antenatal and postnatal care at the Elmina Urban Health Centre and Ankaful Leprosy/General Hospital. Questionnaire and secondary data was collected and analyzed using simple frequencies and percentages. The finding revealed 25% prevalence of teenage pregnancy among the adolescents between 2012 and 2016. Poverty, peer pressure, and the influence of the media (electronic and social) were found to be the major risk factors to influence teenage pregnancy among the participants. Birth complications and school dropouts were the major consequences of teenage pregnancy among the participants. It was concluded that the high prevalence of teenage in the municipality could also lead to high presence of sexually

transmitted infections. It was therefore recommended that municipal assemblies establish trade schools as well as use successful indigenes as role models to increase students' ambition for the future and decrease their engagement in the sexual activities. Also, condom usage should be highlighted in the schools to help those who cannot abstain to use protection.

Keywords: Teenage pregnancy, Central region, adolescents

Introduction

In recent past, adolescent pregnancy has become an important public health issue in a multitude of coastal dwellers in both developed and developing countries. Nonetheless, this menace of adolescent pregnancy is not a new occurrence in Ghana. The World Health Organisation [WHO] (2015) defines adolescent pregnancy as a teenage girl, usually within the ages of 13-19, becoming pregnant. Young girls becoming pregnant at such an early age have experienced lots of complications, hence, putting this people in danger of survival and proper development.

Children survival and development depend extensively on government and parental provision of a high standard of health, including nutrition; access to water and sanitation; child care; antenatal, post-natal and preventive care; family planning; and education on child health, nutrition and hygiene, sexual and reproductive health information, among other services (United Nations International Children's Emergency Fund [UNICEF], 2012). To address issues of adolescent sexual reproduction in the developing countries, UNFPA (2013) has postulated two distinctive objectives of relevance to the nations are; to address adolescent sexual and reproductive health issues, including unwanted pregnancy, unsafe abortion, and STIs, including HIV/AIDS, through the promotion of responsible and healthy reproductive and sexual behaviour and to substantially reduce all adolescent pregnancies. More specifically, it called for countries and the international community to protect and promote the right of adolescents to reproductive health education, information and care and greatly reduce the number of adolescent pregnancies.

WHO (2008) defines reproductive health as a state of complete physical, mental and social well-being, and not merely the absence of reproductive disease or infirmity. Reproductive health involves all of the reproductive processes, functions and systems at all stages of human life. This definition implies that people are able to have a satisfying and safe sex life.

According to WHO (2015), men and women have the right to be informed and to have access to safe, effective, affordable and acceptable methods of family planning that are not against the law. Reproductive health is a universal concern, but is of special importance for women particularly during the reproductive years. Reproductive health contributes enormously to physical and psychosocial comfort and closeness between individuals. Poor reproductive health is frequently associated with disease, abuse, exploitation, unwanted pregnancy, and death.

In Ghana, many people hold the view that the youth are healthy since they show low levels of illness compared to younger children and adults. However, a report by Ghana Statistical Service (2010) on the Ghana Demographic Health Survey in 2008 and other studies by Awusabo-Asare, Abane and Kumi-Kyereme (2004) revealed a higher magnitude of sexual and reproductive health problems of the youths, the most crucial being unprotected sex and risky sexual behaviour. According to Homans (2003), the habits and lifestyles that are established during this period have a profound effect on future health and development.

The 2015 Ghana Health Service Report indicates that more than 13,000 teenage girls got pregnant in the Central Region (GHS, 2016). This high prevalence is in line with the ranking of Central Region as the second highest region for the past three years (2013, 2014, and 2015). A 2014 report on teenage pregnancy in Ghana compiled by the Ministry of Gender, Children and Social Protection, observed that people living in the coastal areas particularly the Central and Greater Accra Regions, witnessed high rates of teenage pregnancy prevalence. About 231 of all teenage pregnancies were girls of age 14 and below. Meanwhile, 3576 of the teenage mothers are still single; and 283 married with their partners (Nyabor, 2017). Despite the extensive attention given to adolescent sexuality and teenage pregnancy in the past 30 years, many teenagers were still sexually active and getting pregnant (Van Eijk, 2007).

There is a great cost to individuals, families and society when mere children have children of their own. Mwaba (2000) indicated that teenage pregnancy is more common amongst young people who have been disadvantaged and have poor expectations of either their education or the job market. The alarming figures released by Morake (2011) for the South African Provincial Education Department indicated that schoolgirl pregnancies have doubled in the past year, despite a decade of spending on sex education and Human Immunodeficiency Virus (HIV) and AIDS awareness. Premature sexual intercourse results in high rates of sexually transmitted diseases, HIV transmission, adolescent pregnancy and abortions (Mkhwanazi, 2006). The high rate of teenage pregnancy is not different in the Cape Coast Metropolis. The rate of teenage pregnancy in the Central Region has in the last 5 years seen a decline. However, officials of the Ghana Health Service reported that the current figure of 12,048 recorded in 2016 is still unacceptably high (Nyabor, 2017). Another report by the Central Region Health directorate confirmed that teenage pregnancy in the Region is very high. According to the report, teenage pregnancy especially among teenagers between the ages of 15-19 years was 14.7 percent between 2008 and 2009 (Asiedu-Addo, 2010). However, not much work has been done to elucidate the reasons for teenage pregnancy in KEEA Municipality. It is in the light of this that the study sought to investigate the factors influencing teenage pregnancy in the Komenda, Edina, Eguafo, and Abirem (KEEA) Municipality.

Method

Descriptive survey design was used to select 100 teenage mother or pregnant girls aged 13-19 years. Semi structured questionnaire was used for the collection of data from participants and the Director and Head, of Reproductive and Child Health Unit of the two hospitals in the Municipality. Secondary data was on the records of teenage pregnancy cases reported in the Municipality's Health Directorate from 2012-2016. The questionnaire for the teenagers was made up of three sections; A, B and C. Section A collected data on the demographic information of the respondent.

Section B consisted of the risk factors influencing teenage pregnancy. This section was made up of six items with the scale from one to four expressing Strongly Agree, Agree, Disagree and Strongly Disagree respectively. Section C focuses on the consequences of teenage pregnancy. This section also consisted of five items with the scale from one to four expressing Strongly Disagree, Agree, Disagree and Strongly Disagree respectively. The items on this questionnaire were 18 items. The interview guide for the health staff was made up of two sections; sections A and B. Section A dwelt on the demographic information of the workers, Section B looked at teenage pregnancy prevention strategies being role out in the Municipality. Frequency and simple percentages were used to explain the data and to report on the prevalence of teenage pregnancy in the Municipality.

Results

Research Question 1: What is the Prevalence of Teenage Pregnancy in the KEEA Municipality?

This research question sought to find out the prevalence of teenage pregnancy in the KEEA Municipality. Secondary data was collected on the teenage pregnancy from 2012-2016 at the KEEA Municipality was analyzed to this question. The results are presented in Table 1. The records in Table 1 showed that from 2012-2016; there were 4,126 teenage pregnancy cases in the KEEA Municipality. The highest prevalence of teenage in the Municipality was recorded in 2012 with a total of 908 cases, representing 23%. However, 2016 recorded the least cases of teenage pregnancy, totaling 739 and representing 18% of the teenage pregnancy cases. The table further revealed that most of the pregnant teenagers and mothers were between the ages of 15-19 years, with a total of 4,032 representing (98%) of teenage pregnancy cases recorded in the KEEA Municipality within the five years. It was also evident that the number of teenage pregnancy cases was diminishing as the years go by.

Table 1: Prevalence of Teenage Pregnancy

Year	Age (Years) 10-14	Age (Years) 15-19	Total
2012	24(26%)*	908(23%)	932(23%)
2013	19(20%)	837(21%)	856(21%)
2014	22(23%)	773(19%)	795(19%)
2015	18(19%)	775(19%)	793(19%)
2016	11(12%)	739(18%)	750(18%)
Grand Total	**94**	**4,032**	**4,126**

Source: Elmina Urban Hospital, KEEA (2017).

Prevalence = Total number of old cases + Total number of new cases × 100

$$\text{Prevalence} = \frac{932 + 856 + 795 + 793 + 750}{\text{Population of female teenagers}} \times 100$$

$$\text{Prevalence} = \frac{932 + 856 + 795 + 793 + 750}{16{,}828} \times 100$$

$$\text{Prevalence} = \frac{4{,}126}{16{,}828} \times 100$$

Prevalence = 0.24519 ×100

Prevalence = 24.519.

Therefore the current prevalence of teenage pregnancy in the KEEA Municipality is 25%. From the Table 1, we can conclude that among every 100 adolescent girls in the KEEA, 18 of them are pregnant and this finding post treats to public health in the area. Again, respondents indicated their first pregnancy occurred between 14-16 years (40%, n=40) while 32% (n=32) within 17-19 years and 28% (n=28) became pregnant within 11-13 age range. Again, almost all the respondents 88% (n=88) reported that they were not married while 12% (n=12) indicated that they were married. Moreover, a vast majority 72% (n=72) reported that the one who made them pregnant claimed responsibility of it while 28% (n=28) of the respondents indicated that the one who made them pregnant did not claim responsibility. Furthermore, most of the respondents 43% (n=43) reported that the men who got them pregnant were within the ages of 20-29 years, 33% (n=33) indicated that the men who got them pregnant were 20 years and below, 23% (n=23) reported that the men who got them pregnant

were within the ages of 30-39 years while 1% (n=1) indicated that the man who got her pregnant falls in the 40 years and older category. Again, almost all the respondents 88% (n=88) reported that they were not married while 12% (n=12) indicated that they were married after the pregnancy. The results further revealed that most of the respondents 60% (n=60) indicated that those who got them pregnant were workers in the town, while 25% (n=25) of those who got them pregnant were seniors at JHS/SHS, 9% (n=9) were school mate, 2% (n=2) and 4% (n=4) were seniors at university and teachers respectively.

Table 2: Background Characteristics of Respondents (n=100)

Variables	Frequency	Percentage (%)
Age of first pregnancy		
11-13	28	28.0
14-16	40	40.0
17-19	32	32.0
Are you married		
Yes	12	12.0
No	88	88.0
Did the one who made you pregnant claim responsibility of it?		
Yes	72	72.0
No	28	28.0
Who got you pregnant?		
School mate	9	9.0
Senior at JHS/SHS	25	25.0
Senior at University	2	2.0
Teacher	4	4.0
Worker in the town	60	60.0
How old is the man who got you pregnant?		
Below 20 years	33	33.0
20-29years	43	43.0
30-39 years	23	23.0
Above 40 years	1	1.0

Source: Field Work (2017)

Research Question 2: What Risk Factors are Responsible for Teenage Pregnancy in the KEEA Municipality?

Research question two was posed to ascertain the various factors that influenced teenage pregnancy in the KEEA Municipality. Items in the section B of the research questionnaire catered for this. Respondents were asked to respond to a series of questions and their responses were presented in Table 3.

Results in Table 3 reveal that most of the respondents 60% (n=60) indicated that peer pressure was a major risk factor that influenced teenage pregnancy in the municipality. Also, poverty 75% (n=75) was also found to be a risk factor to have influenced teenage pregnancy. The table further reveals media (electronic and social) 51% (n=51) also as factor that influence teenage pregnancy in the municipality.

Table 3: Risk Factors Influencing Teenage Pregnancy (n=100)

	Agree		**Disagree**	
	F	**%**	**F**	**%**
Peer pressure influence	60	60.0	40	40.0
Adequate knowledge and use of contraceptives	16	16.0	84	84.0
Adequate knowledge about sex education	64	64.0	36	36.0
Sexual abuse	30	30.0	70	70.0
Poverty	75	75.0	15	15.0
Influence from the media	51	51.0	49	49.0

Source: Fieldwork (2017).

Research Question 3: What are the Experienced Consequences of Teenage Pregnancy in the KEEA Municipality?

The intent of this research question was to find the consequences of teenage pregnancy in the KEEA Municipality. Respondents were asked to respond to a series of questions and their responses are presented in Table 4. In Table 4, majority of the

respondents 72% (n=72) reported that they experienced birth complications during delivery. The results further revealed that most of the respondents 93% (n=93) indicated that they had to drop out of school as a result of the teenage pregnancy. Again, majority of the respondents 54% (n=54) indicated that social and psychological stress were not consequences of teenage pregnancy. It was further shown in Table 4 that, most of the respondents 69 (n=69) indicated that they experienced inadequate nutrition and financial hardship as impacts of teenage pregnancy. Again, majority of the respondents 51% (n=51) reported that developmental disabilities were high in children born to teen mothers.

Table 4: Consequences of Teenage Pregnancy (n=100)

	Agree		Disagree	
	F	**%**	**f**	**%**
Birth complications	72	72.0	28	28.0
School dropout	93	93.0	7	7.0
Psychosocial stress	46	46.0	54	54.0
Poverty	69	69.0	31	31.0
Developmental disabilities	51	51.0	49	49.0

Source: Fieldwork (2017)

Research Question 4: What Teenage Pregnancy Prevention Strategies are Available within the KEEA Municipality?

This research question sought to find out the teenage pregnancy prevention strategies available within the KEEA Municipality? Interviews were granted to the heads of the Reproductive and Child Health Unit (RCH) has served for at least one year in the facility as well as the Senior Midwifery Officer who has also worked for seven years in the Elmina Urban hospital. Their responses are illustrated below:

Head of the RCH unit, aged 52 years said that:

"*We have organised adolescent clubs in various schools in the Municipality. We visit these schools to deliver health seminars in other to educate adolescents on the consequences of teenage pregnancy as well as ways of preventing teenage pregnancy. We*

also provide contraceptives to teenage mothers who visit our facility, this however comes with a fee. We also give education at the maternity ward on the dangers of teenage pregnancy. Adolescent clubs are also formed in various communities in order to educate teenagers who are not going to school. I think that teenage pregnancy should be tackled from the homes; starting from parents, because parents do not have control over their children."

Senior Midwifery Officer, aged 50 years said that:

"*Radio programme on the consequences of teenage pregnancy are organised by representatives in the Municipality, Talks are also given to teenage mother by midwives and other workers on how on prevent teenage pregnancy. Secondly, we educate pregnant teenagers on family planning whenever they come to the hospital."*

From the responses of the interview, the first respondent reported that organising adolescents clubs in various schools and delivering seminars to educate teenagers on the consequences of teenage pregnancy are some of the preventive strategies that can be adopted in combatting teenage pregnancy. The first respondent also emphasised the importance of giving family planning education to first time teenage pregnant mothers who visit the hospital, this will help curb the rate of teenage pregnancy in the Municipality. Again, the first respondent highlighted the importance of parental control as a preventative strategy of curbing teenage pregnancy. Again, from the responses of the interview, the second respondent also reported that using the media as a platform to educate teenagers on the consequences of teenage pregnancy and educating teenagers on ways of preventing teenage pregnancy could help reduce the rate of teenage pregnancy.

Discussion

The findings of this study revealed that there was 25% prevalence of teenage pregnancy between 2012-2016 in the KEEA Municipality. This finding could be described as high in the region. The finding means that majority of girls in the municipality with the ages of 10-19 are at risk of becoming and putting the future of the municipality bleak. This outcome could be said to be consistent

with the report of Save the Children (2009) that annually 13 million children are born to women under age 20 worldwide and more than 90% are in developing countries. This possible reason for this similarity could be that today's adolescents are becoming too much sexually active. There is the need to start education that works on the risk factors to help prevent this issues before they become epidemic. The finding also agrees with Traffers (2003), who asserted that the highest rate of teenage pregnancy in the world is in Sub-Saharan Africa, where women tend to marry at an early age. The high prevalence of teenage pregnancy in the municipality could lead to high of complications associated with early pregnancy. Among these complications were birth complications, school dropout, financial challenges, inadequate nutrition as well as giving birth to children with developmental disabilities. Martin (2003) posits that young teenagers are more likely to give birth to an unhealthy, low birth weight infant because the girl's body may not be ready to support pregnancy. Sánchez and Solano (2003) also confirmed that inadequate nutrition during pregnancy is an even more marked problem among teenagers in developing countries.

On the issues of major risk factors of teenage pregnancy in the KEEA municipality, the study found that peer pressure was a risk factor that influenced teenage pregnancy. This finding corroborates with Buga, Amoko and Ncayiyana (1996) and Gyan (2013) who found out that most teenagers initiated sexual activity because of peer pressure. Adolescence is stage characterised with friendship; this socialization exerts great influence on the behaviours adolescents. Another significant issue that increases the fertility of peer influence is parental neglect and communication. Sex education are regarded as taboo in our part of the world couple with lack of communication between parents and their adolescents, hence, creating more rooms for media and peer influence. There is the need for parents; to develop that close connection with their adolescents and regularly discuss issues regarding sexual and reproductive health. Sexual abuse was not found as a risk factor that influenced teenage pregnancy in the municipality and this disagrees with Guttmacher Institute (2009), who found that girls

who had sex before age 15 were coerced by males who on average were six years their senior. Poverty was a major risk factor that influenced teenage pregnancy and this confirms the findings of Kaiser (2000) and the South African Survey (2002) which indicated that 16% of a sample of 2000 teenagers confessed to having sex for money and 20% of teenage boys from the same sample indicated that they had given their girlfriends money in exchange for sex.

On the issue of whether birth complication was a consequence of teenage pregnancy, majority of the respondents indicated that they experienced birth complications during delivery. Births complications are bound to happen with most adolescents are still developing especially in their hips and uterus. Genobaga (2004) opines that teenage mothers are more likely to get complications during pregnancy such as pre-eclampsia, increase in blood pressure and early labour. The findings of this study further revealed that pregnant teenagers were unable to complete their education. This finding concurs with Luong (2008) who found that many adolescents who became pregnant do not complete high school because of the time off required for their pregnancy, recuperation, and child-care. The current study again revealed that psychosocial stress was not a consequence of teenage pregnancy. This is however not in line with Bartell (1999) who asserted that pregnant adolescents experience significant stress which could negatively impact their physical state if it went unmanaged.

It was found in this study that organising developmental and adolescent programmes to educate teenagers on the consequences of teenage pregnancy was one of the preventive strategies for reducing teenage pregnancy. This finding is consistent with Fletcher, Harden, Brunton, Oakley, and Bonell (2008), who asserted that organising youth and developmental programmes can be very effective in modifying behaviour, promoting safe sexual practices and reducing pregnancy rates among high-risk adolescents. Again it was found in this study that effective parental control should be employed by parents as a way

of helping to prevent teenage pregnancy. This finding is also in line with Swann, Bowe, McCormick and Kosmin (2003) who found that family outreach programmes and those programmes that included the adolescents' parents can be effective in preventing risky sexual behaviour and adolescent pregnancy. It was also evident in the findings of this study that giving sexual education on ways of preventing teenage pregnancy can help in curbing the rate of teenage pregnancy. This finding is in agreement with JAH (2008) who found that adolescents who received comprehensive sex education had lower risk of pregnancy than adolescents who received abstinence-only or no sex education. Again, Rozakis (1993) in his studies emphasized that with adolescents' knowledge of sex and sexuality they become aware of the advantages and disadvantages of indulging in sexual activities.

Conclusions

It was evidence that peer pressure, media and poverty were among some of the major factors that influenced teenage pregnancy in the Komenda, Edina, Eguafo, and Abirem Municipality. Birth complications and inability of teenagers to complete their education were some of the consequences of teenage pregnancy in the Municipality. Organising developmental and adolescent programmes, ensuring effective parental control and giving sexual education on ways of preventing teenage pregnancy are some of the preventive strategies that can assist in curbing this menace in the KEEA Municipality.

Recommendations

Based on the findings and conclusions, the following recommendations are made:

1. Parents of teenagers should build a strong bond of parent-child relationship with their children who have reached their adolescent stage and desist from pressuring their children for financial aid. Parents should also endeavour to exercise intense parental control over their children to avoid their children being victims of teenage pregnancy.

2. It is recommended that the Ministry of Health in collaboration with the Planned Parenthood Association of Ghana (PPAG) and National Commission for Civic Education (NCCE) carry out educational programmes in communities to educate the youth on the challenges and dangers of teenage pregnancy and its effect on the individual, society and government at large. This could be done through dawn broadcasts, documentaries, drama and role play, advertisements on television, and mobile van film shows. Lorry parks, community centres, schools, and playgrounds could be targeted.
3. It is also recommended that there should be an establishment of reproductive health units that are friendly and ready to meet the health needs adolescents in the municipality.

References

Asiedu-Addo, S. (2010). *196 Pregnant girls in Central Region.* Retrieved May 3, 2010 from www.graphicghana.com/society%20and%20lifestyle/page. php?news

Awusabo-Asare, K., Abane, A. M., & Kumi-Kyereme, A. (2004). *Adolescent sexual and reproductive health in Ghana:* A synthesis of research evidence. *Occasional Report* No. 13.

Buga, G. A. B., Amoko, D. H. A. & Ncayiyana, D. J. (1996). Adolescent sexual behaviour knowledge and attitudes to sexuality among school girls in Transkei. *South African East African Medical Journal, 73*, 95 -100.

Fletcher, A., Harden, A., Brunton, G., Oakley, A., & Bonell, C. (2008). Interventions addressing the social determinants of teenage pregnancy. *Health Education, 108*, 29-39.

Ghana Health Service (2015). *10,000 teenage pregnancies recorded in Ghana in 2015. Retrieved from* Atinkaonline.com

Ghana Statistical Service (2010). *Population and Housing Census Report*. Accra.

Gyan, C. (2013).The effects of teenage pregnancy on the educational attainment of girls at Chorkor, a suburb of Accra. *Journal of Educational and Social Research MCSER Publishing, Rome-Italy, 3*(3), 53-60.

Homans, H. (2003). *Youth Friendly Health Services: Responding to the Needs of Young People in Europe.* United Nations Inter Agency Group (UNFPA/UNICEF/WHO) Consultant on Youth Friendly Services, Genève, 1-2.

Kaiser, H., J. (2000). *Hot Prospects, cold facts: Potrait of young South Africa*. Johannesburg: Sunday Times Publication.

Martin, R. C. (2003). Understanding sexuality. Chicago: World Book, inc. a Scott Fetzer company.

Mkhwanazi, N., (2006). *Teenage pregnancy and gender*. Department of Anthropology, University of Cambridge.

Morake, A., 2011, *Factors associated with Teenage Pregnancy in Limpopo Province.* Government Printers, Polokwane.

Mwaba, K., (2000). Perceptions of teenage pregnancy among South African adolescents. *Health Gesondheid* 5(3), 30–35.

Nyabor, J. (2017). Teachers, drivers impregnate 977 teenagers in Central Region. Retrieved from https://citifmonline.com/2017/02/27

Swann, C., Bowe, K., McCormick, G., & Kosmin, M. (2003). *Teenage pregnancy and parenthood: A review of reviews.* London, UK: Health Development Agency.

Traffers, P. E. (2003). *Teenage pregnancy, a worldwide problem.* Retrieved from http/www.marchofdimes.com

UNFPA. (2013). *Adolescent pregnancy: A review of the evidence.* New York: UNFPA

Van Eijk, R.T., (2007). *Factors contributing to teenage pregnancies in Rarotonga*, United Nations Population Fund (UNFPA), Avarua.

WHO, (2008). *The reproductive health library*. Retrieved from apps.who.int/rhl/en/index.html

WHO, (2015). *Guidelines on preventing early pregnancy and poor reproductive outcomes among adolescents in developing countries. Geneva: World Health Organization.*Retrievedhttp://whqlibdoc.who.int/publications/2011/9789241502214_eng.pdf

Using Dramatic and Pretend Play to Promote Children's Learning: The Case of Early Childhood Education in Ghana

Aaron Osafo-Acquah
Department of Basic Education University of Cape Coast
aosafo-acquah@ucc.edu.gh
0551536656/0503177764

Abstract
Communities and cultures have a way of passing on their legacies to their young ones for preservation in order to keep the generation and lineage going. Many of these practices are passed on through dramatic or pretend play. Providing children opportunity to learn best should be done through a medium that children find to be interesting and child-friendly. The purpose of this manuscript is to describe dramatic and pretend play and their place in the education of children in early childhood care and development settings in Ghana. This will inform practice, to enable teachers use such dramatic and pretend play to enhance children's learning. This manuscript is important for teachers, policy makers, and Non-Governmental Organizations who are interested in early childhood education in Ghana. Understanding the knowledge that the ecology within which the child lives and grows will be very crucial, to developing a curriculum and pedagogy that are context bound and therefore very appropriate for the children in that ecology.

Keywords: Play, Community, Culture, Ecology, Lineage

Introduction

Providing children opportunity to learn best should be done through a medium that children find to be interesting and child-friendly. Such opportunities are perceived to be important in the lives of the child. Therefore, using them makes the process of learning easier, interesting, and appealing to the children involved. It is also very important to note that every community and hence culture has a way of passing on their legacies to their young ones for preservation in order to keep the generation and lineage going. Many of these practices are passed on through dramatic or pretend play.

Children's learning can be enhanced by the physical and tactile interactions that go on between them and the teacher. Such interactions constitute a worthwhile activity and have a long tradition in education (Dewey, 1959). Participation and engagement through interaction in the form of play is a cherished activity, especially during childhood (Dako-Gyeke, 2013). As a result, children spend considerable hours playing.

According to Morrison (2002), early childhood education in Ghana dates back as early as 1745 when Ghana (then called Gold Coast) was controlled by European nations. In those years, missionaries established the first recorded educational program that included young children as an effort to promote Christianity. Formal education also known as Castle School began in the Elmina castle when the governor established a school to teach the children that the merchants had with their African concubines. Then in 1843, the British Basel Mission Society attached Kindergartens to primary schools (Morrison, 2002). The term "attached" refers to inclusion of children within the group who were younger than the typical age for the identified class (p. 215). This allowed children between the ages of 4 and 5 to attend classes in primary schools, and also 3 – year olds to participate in training programs before they were moved to primary schools.

While previous studies have examined the educational system in Ghana, there seems to be very little or no studies at all that have explored dramatic and pretend play in early childhood education in Ghanaian classrooms. The purpose of this manuscript is to describe dramatic and pretend play and their place in the education of children in early childhood care and development settings in Ghana. This will inform practice, to enable teachers use such dramatic and pretend play to enhance children's learning.

What is the place of dramatic and pretend play in effective teaching and learning?

The key constructs to be addressed in this manuscript include but not limited to play, interaction, participation, and engagement. The contribution to practice is observed from the fact that children start playing very early in life. Much of their learning's is through play activities in very informal environments and activities. It is therefore proper and appropriate that the transition to formal education should take note of the process of learning which should include the play activities that the child has engaged in since infancy. Once the transition is smooth, learning does not become very difficult for the child. Any deviation from this to making the child do some abstract activities that do not convey any form of enjoyment would be very difficult to motivate the child to become engaged in the learning process.

The audience that I am targeting includes teachers of young children particularly those teaching at the lower primary level (Primary 1-3). Administrators and policy makers would also find the manuscript useful because it would create an opportunity for them to appreciate what they find teachers and children doing in the classroom when they visit such schools and facilities. They would be patient enough to wait for the results of the teaching method and not rush to conclude that teachers are lazy and that children only go to school to play.

Serpell and Marfo (2014) advanced the perspective that pedagogy does not entail just the act of teaching but also the connections that exist among teaching, culture, organization, and mechanisms of social control. By this definition, pedagogy is context-bound and value-laden (Marfo & Bisterker, 2011). According to Serpell and Marfo (2014), the starting points for curriculum design and instructional practice in the African context will be knowledge and understanding about the local ecology of development.

Understanding the knowledge that the ecology within which the child lives and grows will be very crucial to developing a curriculum and pedagogy that are context bound and therefore very appropriate for the children in that ecology. The curriculum cannot be divorced from the people who are the direct beneficiaries of the process and the pedagogy should be fashioned in a manner that allow the children to reap the most benefits from the instructional process.

Marfo et al. (2008) argued that in all cultures, an optimal balance among socialization goals gives children the most ideal opportunities for healthy development. They emphasized that "any viable ECD program in the African context must, as a matter of necessity and principle, build on existing assets and initiatives that address the survival, health, and nutritional needs of children"(p. 203). To them, Africa's communal and community legacy is highly celebrated and must observed as such. Unfortunately, the legacy's foundations have been rocked by modernity, urbanization and the social isolation of people from their cultural and ancestral roots.

Providing African children the opportunity to socialize is a great thing that could happen to them. Communal and community legacy have been passed on from one generation to another and it is that which makes Africans unique. If that is taken away from Africa through modernity, then Africa will not have anything to show to the world. Rallying round others who are in need not for

any personal gain is what makes Africa a community that is celebrated by many.

Marfo and Biesteker (Pre-publication use) explained that the emphasis on Western-style schooling in Africa is problematic when measured by the criteria that education must be locally relevant and transmit a society's enduring values and best practices and traditions across generations. They argued that play is a culturally mediated activity that serves a variety of functions, prominent among which is its use as a mechanism for enculturation. They cited an ethnographic research by Lancy (1996) which studied the Kpelle children of Liberia. To them, play is a very useful way and method of transmitting a cultural heritage to the young ones for preservation for generations yet unborn.

Using play to teach and educate children is something that is prevalent in the African culture. Almost everything is reduced to a form of play so that it becomes interesting and enjoyable to do. Children are happy and willing to run errands because running errands offers opportunities for children to play by using their locally made toy vehicles. Many of the cultural dances provide opportunities for even the elderly ones to engage in numeracy. For example, a local all-female activity called "Ampe" deals with counting as the individual hops around a circle made up of play mates.

Oberhuemer (2005), argued that the early childhood curriculum within a democratic and participatory framework is owned by the practitioners, children, parents, and local community contributing to filling that framework with life. The author stated that it is now widely recognized in the early childhood research community, that children are social agents, participating in constructing and influencing their own lives.

Within a democratic dispensation in the classroom, the child must be recognized as an agent of his own learning and encouraged as such to utilize the facilities and opportunities that abound within the environment in which he finds himself. Teacher education and

hence pre service teacher preparation must focus on curriculum that is child-friendly because it is rooted in the fact that the child is capable of helping his own learning.

Marfo et al. (2004), discussed the African proverb "it takes a village to raise a child" about the changing nature of child rearing and early childhood education in Kenya and Africa. The outlined three messages: "the power of a communitarian ethic in building and restoring hope through shared responsibility for the care and wellbeing of other people's children, the resilient nature of children especially in the context of supportive and caring communities, and the well-being of children as the foundation for the survival and future vitality of the community itself" (p. 33).

It really takes a whole village to raise the child. In the African traditional informal education, every child belongs to every adult who is considered a teacher of the cultural heritage of the people. Everywhere is a classroom and the curriculum includes everything that one can think about. The discipline that the child needs is the responsibility of all adults and so any adult could administer punishment on any erring child anywhere that act of indiscipline occurs. Therefore every child respects every adult and not only the biological parents.

Description of dramatic play used to promote Children's Learning in Ghana

A great deal of children's participation and engagement occurs in the context of work and chores (Marfo & Pence (2008),. For example, rural Ghanaian children were known to turn the daily morning chore of fetching water from the river into play by building a simple "vehicle" with two wooden wheels and a long wooden pole connected to the rod that held the wheels together. On the other end of the pole that rested on the driver's shoulder there was also a steering device. Big nails hammered partway through the pole at points closer to the steering device were used as anchors to hold the buckets of water. The joy of driving and outracing siblings or peers with this make-believe transporter could not

escape the attention of onlookers. Thus, children construct their own play objects from whatever they can find in the environment (Marfo &Pence, 2008). Schools should therefore provide safe places where children could practice and rehearse civic responsibilities that they want to model.

During an annual schools' cultural festival held in the Central Region of Ghana, I saw three young school children in a dramatic play. In the dramatic play, the children had assumed the roles of medical personnel and were educating the audience about prevention of malaria. They did that by enacting play that emphasized cleanliness of the immediate surroundings and environment of people in the community. They spoke about the need to clean the environment, and the to destroy the areas that mosquitoes lay their eggs leading to the unfortunate incidence of malaria. The good thing about such dramatic play by children was that people were touched because of the message that the children gave to the people watching and listening. Children who observed the activity also learned from it.

In another dramatic play, I saw a young girl dramatizing how adults in her community carried infants and babies. It is important to know that in the Ghanaian context, one of the duties of siblings is to carry and care for their younger siblings as part of their responsibilities towards their communities. Therefore very early in life, parents especially mothers deliberately teach the children particularly the girls how to carry the child at the back. They start this education by getting a doll for the child and then teaching the child how the doll is placed at the back and then tied with a piece of cloth such that the doll does not drop. After sometime, the child is left on her own, to pick the doll, place it at her back and tie the cloth appropriately. The child is considered successful and ready to carry her younger sibling depending upon how well and safe she keeps the doll without making it drop, bath and breast-feed the doll.

Many of the activities that start at home as part of the traditional African education are continued when the children enter formal schools. It is the responsibility of the school to pass on the traditions of the people to its young generation.

Implications of the study for Practitioners

This study is important for teachers, policy makers, Non-Governmental Organizations who are interested in early childhood education in Ghana. This is to ensure that the appropriate methods are used during the instructional process to enable the children benefit most from the process. Understanding the knowledge that the ecology within which the child lives and grows will be very crucial to developing a curriculum and pedagogy that is context bound and therefore very appropriate for the children in that ecology. The curriculum cannot be divorced from the people who are the direct beneficiaries of the process. The pedagogy should be fashioned in a manner that allow the children to reap the most benefits from the instructional process. Serpell and Marfo (2014), advanced the perspective that pedagogy does not entail just the act of teaching but also the connections that exist among teaching, culture, organization, and mechanisms of social control. By this definition, pedagogy is context-bound and value-laden (Marfo & Bisterker, 2011). Accordingly the starting points for curriculum design and instructional practice in the African context will be knowledge and understanding about the local ecology of development (Serpell and Marfo, 2014).

Teachers would plan and use dramatic play effectively in their lesson delivery. Play naturally has the tendency to create joy and happiness. Therefore, lessons that are taught using play would take away the fear and anxiety which children may have for such lessons. It is important that the transition from home to school is managed well to help children adjust to life outside their homes. Using dramatic play in the delivery of lessons would keep children engaged to facilitate the instructional process.

References

Dako-Gyeke, M. (2013). Using play as a curricular tool in pre-primary classrooms:Challenges encountered by teachers in Ghana. *Journal of Educational Research 3* (1), 15-25

Dewey, J. (1959). The child and the curriculum. Chicago: *University of Chicago Press.EFA Movement. United Nations Educational Scientific Organization*. Retrieved 11th September 2010

Serpell, R., & Marfo, K. (2014). Some growth points in African Child Development Research. In R. Serpell & K. Marfo (Eds.), Child development in African:Views from inside. *New Directions for Child and Adolescent Development,146,* 97-112.

Marfo, K., Biersteker, L., Sagnia, J., & Kabiru, M. (2008). Responding to the challenge Of Meeting the Needs of Children Under 3 in Africa. M. Garcia, A. Pence, & L. Evans (Eds.) (2008). *Africa's future, Africa's challenge: Early childhood care and development in Sub-Saharan Africa*, Washington DC: World Bank.

Marfo, K., Agorsah, F. K., Bairu, W. W., Habtom, A., Ibetoh, C. A., Muheirwe, M.R.,Ngaruiya, S., & Sebatane, E. M. (2004). Children, Families, Communities, and Professionals: Preparation for Competence and Collaboration in ECD Programs.*International Journal of Educational Policy, Research & Practice, 5*(3).

Marfo, K., & Biersteker, L. (2011). Exploring culture, play, and early Childhood education practice in African contexts. Chapter in S. Rogers (Ed.). *Rethinking play pedagogy in early childhood education: Concepts and Cultures. London: Routledge.*

Morrison, J. W. (2002). Teacher training in early Childhood Education: The case of Ghana. West Africa. *Journal of Early Childhood Teacher Education, 23*, 315-31

Oberhuemer, P. (2005). International perspectives on early childhood curricula. *International Journal of Early Childhood, 37*(1), 27-37.

ASSESSMENT OF PERSONAL AND FOOD HYGIENE PRACTICES OF FOOD HANDLERS IN EDUCATIONAL INSTITUTIONS IN THE KWAWU-EAST DISTRICT OF GHANA

Evelyn Asare Antwi

Abetifi Presbyterian College of Education, Eastern Region, Ghana

Abstract

Food hygiene is one of the most pertinent issues in the food service industry today. This research sought to assess the personal and food hygiene practices of food handlers in the three boarding educational institutions in the Kwahu- East District of the Eastern Region of Ghana. The study employed the descriptive survey design. The research instrument used was questionnaire. The data were analyzed using frequencies and percentages. Results showed that foods conveyed to the dining halls were uncovered and not served at the right temperature. Aprons and hair coverings were not worn at all times during food preparation. Only 6.6% of food handlers wore gloves while cooking. It is recommended that District Assemblies should monitor the personal and food hygiene practices of food handlers not only on the streets but also in our institutions. Hand washing basins should be fixed close to washrooms in institutions and detergent provided for proper hand washing immediately after visiting the washroom.

Key Words: Food hygiene, Personal hygiene, Food handlers, Educational institutions/schools.

Introduction

The high incidence of food-borne illnesses has led to global concern about food safety (Tonder, Lues & Theron, 2007). Food safety is a worrying issue particularly when the environment in which the food is handled is heavily contaminated. Food contamination may occur at any point during its journey through production, processing, distribution and preparation (Green, *al.,* 2005). In all these stages, it is the neglect of the food by the handler that causes contamination. It is, therefore, right if Mead, et al., (1999) states that contaminated food can result from the health status of the food handler, his or her personal hygiene practices and the awareness and practice of food hygiene. Practices identified as contributing to outbreaks in schools include improper refrigeration, prolonged handling and inadequate reheating of cooked food and contamination of food by food handlers who worked while ill or had poor personal hygiene (Hedberg et al., 2006).

Bryan, (1988) indicates that most outbreaks of food borne diseases can be prevented if all food handlers understand the importance of unfailing adherence to correct food hygiene practices. Unhygienic food has the potential to cause serious epidemics of infectious diseases such as cholera, typhoid fever and bacillary dysentery. Several food- borne disease outbreaks have been reported to be associated with poor personal hygiene of food handlers.

Students complain of stomachache coupled with diarrhoea every now and then but normally, nobody associates them with food-borne illnesses. Alarming reports received from institutions worldwide are true indications of the gravity of the matter (Angellilo, Viggiani, Rizzio & Bianco, 2000; Daily Graphic, 2011; Joy Online, 2011).

In 2010, a report was made in a Ghana Daily Graphic by Asiedu Marfo that about 100 students of Archbishop Porters Girls' Senior High School in Takoradi, Ghana were rushed to the hospital for suffering from suspected to be suffering from food poisoning. Online news from myjoyonline.com in 2010 also reported of suspected food poisoning at a primary school in Madina, a suburb

of Accra, Ghana. About twenty pupils were rushed to a polyclinic where doctors suspected food poisoning.

Food handlers are supposed to have gone through at least personal hygiene training; however this is not the case in most boarding institutions in Ghana. Some aspects of hygiene are neglected to the detriment of consumers, hence the need for consistent training. These are similar situations prevailing in the three institutions under study. There are lots of research works on ensuring sanitation in primary schools, hospitals and hotels worldwide (Okojie, Wagbatsoma & Ighoroge, 2005). However, studies to improve upon the hygienic practices of food handlers in boarding institutions in Ghana are minimal especially, in Abetifi. Although there was a cholera outbreak in Abetifi long ago which rendered some students victims, there has been no study conducted to find out the hygienic practices of food handlers in Abetifi boarding institutions.

Research Questions

1. What are the personal hygiene practices of food handlers in the three educational institutions in Kwahu-East District?

2. What are the food hygiene practices of food handlers in the three educational institutions in Kwahu-East District?

Methodology

Research Design

The descriptive research design was used because the main purpose of the research was to investigate into the hygienic practices of food handlers in the three boarding institutions (one College of Education and two Senior High Schools). Cohen, Morrison, and Manion (2004) have indicated that in descriptive survey design, researchers gather data at a particular point in time with the intention of describing the nature of existing conditions or identifying standards against which existing conditions can be compared.

The population of the study consists of all food handlers and students in the Kwahu-East District. The sample size for the study was 226. This comprised 30 food handlers, 10 from each institution and 196 students from the three boarding institutions in Abetifi. The simple random sampling method was used selecting respondents for the study.

Data collection instrument

Questionnaire was used in data collection. Two set of questionnaires were used to obtain responses from both the food handlers and the students. The questionnaire for the food handlers consisted of thirty one close-ended items. The socio-demographic characteristics, personal hygiene and food hygiene practices were examined from it. The questionnaire for the students consisted of seventeen items. It was based on their socio-demographic characteristics and observed personal and food hygiene practices of food handlers in their institutions. Questionnaire was used because it served as a highly appropriate method capable of generating and gathering the necessary information for the purpose of the study.

The questionnaires used were pre-tested on 30 students and 20 food handlers who were not part of the actual study at Nkwatia Presbyterian Senior High School. The purposes of the pretesting were to assess the clarity of the questions and to determine the time required, as it was important that they were completed on time. The Cronbach's alpha coefficient was used to determine the reliability of the instruments. They yielded a reliability of 0.72 and 0.76 for the food handlers and the students respectively.

Results

Socio-Demographic Data

Socio-demographic characteristics of both food handlers and students were analysed. These included their gender, age, level of education and occupation. The result is presented in Table 1.

Table 1- *Socio-Demographic Distribution of Respondents*

Characteristics	Food handlers		Students	
	n	%	n	%
Gender				
Male	10	33.0	98	50.0
Female	20	67.0	98	50.0
Age				
20yrs and below	0	0.0	56	28.6
21-30	6	20.0	140	71.4
31-40	15	50.0	0	0.0
41-50	6	20.0	0	0.0
51-60	3	10.0	0	0.0
Educational level				
No formal educ.	1	3.3	0	0.0
Primary sch.	3	10.0	0	0.0
Middle/JHS	14	46.7	0	0.0
Secondary/SHS	5	16.7	126	64.3
College of Educ.	0	0.0	70	35.7
Polytechnic	7	23.3	0	0.0
Occupation				
Domestic Bursar	3	10.0	-	-
Matron	5	16.7	-	-
Store Keeper	1	3.3	-	-
Cooks	13	43.3	-	-
Pantry Hand	8	26.7	-	-

From Table 1, it can be seen that out of the 30 food handlers, 10(33%) were males and 20 representing 67% were females. On the part of students, both males and females were equally sampled; there were 98 males and 98 females.

In addition, 6 food handlers representing 20% were below the age of 30, 15, representing 50% were between the ages of 31-40, six, representing 20% were between the ages of 41-50. Only three (10%) out of the 30 were between the ages of 51-60. The students were as expected younger than the food handlers. 56 of them (28.6%) were below the ages of 20 and 71.4% were between the ages of 21-25.

Table 1 further revealed that only one food handler, representing 3.3% was without formal education, and 3 (10%) respondents had primary education. There were 14 food handlers who had middle school or Junior High School (JHS) education, representing 46.7%. Those with Senior High School (SHS) and Polytechnic education were 5, representing 16.7% and 7, representing 23.3% respectively. Students on the other hand were from only SHS and the College of Education levels. 126 (64.3%) were from Abetifi Presbyterian Secondary School and Abetifi Technical Institute while 70 (35.7%) were from the College of Education.

With respect to their occupation, amongst the food handlers, 3 representing 10% were domestic bursars; 5 representing 16.7% were matrons, 1 representing 3.3% a store keeper, 13 representing 43.3% cooks and 8 representing 26.7% pantry hands.

Research Question 1: What are the personal hygiene practices of food handlers in the three educational institutions in Kwahu-East District?

Table 2 is used to answer research question one.

Table 2- ***The Personal Hygiene Practice of Food Handlers***

Practices	**Responses**					
	Yes		**No**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**
Washing of hands before commencing work	28	93.3	2	6.7	30	100
Washing of hands after using the toilet	29	93.7	1	3.3	30	100

Washing of hands after handling raw food	24	80.0	6	20.0	30	100
Washing of hands after blowing the nose	20	66.7	10	33.3	30	100
Washing of hands after sweeping	21	70.0	9	30.0	30	100
Soap used for washing hands	19	63.3	11	36.7	30	100
Wear long nails	17	56.7	13	43.3	30	100

From Table 2, it can be seen that 28 food handlers, representing 93.3% said they washed their hands before commencing work while 2 (6.7%) said they did not. Almost all of them, (96.7%) washed their hands after visiting the toilet while only 1 of them (3.3%) did not do so. Twenty - four food handlers representing 80%, washed their hands after handling raw food while six, representing 20% did not. Twenty - nine food handlers, representing 66.7% washed their hands after blowing their nose but one of them representing 33.3% did not do so. In the case of washing of hands after sweeping, 21 of them representing 70% said they did so while 9 representing 30% of them did not. Out of the 30 food handlers, 19 (63.3%) used soap in washing their hands. The rest, (36.7%) did not mind using only water. Seventeen food handlers representing 56.7% wore long nails while the rest (45.3) kept them short.

Research Question 2: What are the food hygiene practices of food handlers in the three educational institutions in Kwahu-East District?

Tables 3, 4 and 5 are used to answer research question two.

Table 3- *Wearing of Protective Clothing for Work*

Characteristics	Food handlers				Students' comments			
	Yes		No		Yes		No	Sometimes
	n	%	n	%	n	%	n %	n %
Apron /overall	26	86.7	4	13.3	63	32.1	77 39.3	56 28.6
Hair cap/scarf/net	24	80.0	6	20.0	56	28.6	77 39.3	63 32.1
Gloves	2	6.7	28	93.3	0	0.0	0 0.0	196 100.0
Protective Shoes	1	3.3	29	96.7	-	-	- -	- -

From Table 3, it can be seen that 26 of the food handlers representing 86.7% stated they wore aprons or overalls when cooking while the remaining 4 representing 13.3% did not wear them. Sixty three of the 196 students (32.1%) confirmed that the food handlers use aprons or overalls while 77, (39.3%) said they did not see the food handlers wearing them. Fifty -six of the students (28.6%) said food handlers wore aprons or overalls at times (but not always) when cooking.

Table 3 again indicates that 24 (80%) food handlers claimed they cover their hair while cooking. The students however noted that not even half of the food handlers were seen continuously covering their hair. Fifty -six (28.6%) of the students said they saw them covering their hair while 77, representing 39.3% said they did not use hair coverings. Sixty - three (32.1%) of the students claimed they at times saw the food handlers covering their hair whilst cooking. A large proportion (93.3%) of food handlers testified that, they were not using gloves. None of the students however saw them (food handlers) using gloves. Only one food handler, representing 3.3% admitted wearing protective shoes so the rest were not.

Table 4- *Condition of Food Served to Students*

Practices	**Food handlers**								
	Students								
	Yes		**No**		**Sometimes**		**Yes**		**No**
	Sometimes								
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
	%	**n**	**%**						
Hot foods served	20	66.7	1	3.3	9	30	63	32.1	28
	14.3	105	53.6						
Convey food covered	16	55.2	14	44.8	0	0.0	28	14.3	140
	71.4	28	14.3						
Physical hazard in food	-	-	-	-	-	-	56	28.6	84
	42.8	56	28.6						

Table 4 highlights the condition of food served in the dining hall. Twenty (66.7%) of the food handlers revealed that they served foods hot. Only one, representing 3.3% indicated that foods served were not hot while 9 (30%) food handlers declared that foods were served hot at times. On the other hand, 63 (32.1%) students said foods were served hot while 28, representing 14.3% said foods were not hot. Nevertheless, 105 students (53.6%) stated that foods were sometimes served hot.

Table 4 further states that about half (16), representing 55.2% of the food handlers stated that foods were conveyed covered but 14 of them representing 44.8% stated that foods were not covered when being conveyed to the dining hall. Dining halls have warm temperatures so can easily promote the growth of microbes which can lead to food poisoning. Twenty - eight (14.3%) students claimed that foods were not always covered when being conveyed to the dining hall. Fifty–six students (28.6%) claimed that physical hazards were found in their food while 84, representing 42.8% said physical hazards were not found in the food. On the other hand, 56 (28.6%) students claimed they saw physical hazards in the food at times.

Table 5- *Conditions food handlers work with*

Practices	**Food handlers**	
	n	%
Diarrhoea	3	10.0
Cold	6	20.0
Coughs	5	16.7
Others	15	53.3
Total	**30**	**100.00**

From Table 5, it can be seen that most food handlers were able to absent themselves from work when they had certain health conditions like coughs and colds but about half of the food handlers stated they had to work with other conditions that were equally contagious. The table further reveals that 6(20%) food handlers stated they could come to work when they had colds while 5 (16.7%) and 3,(10%) of them said they could come to work with coughs and diarrhoea respectively which is not ideal for handling food due to food contamination.

Discussion

Food handlers in our educational institutions play a major role in meeting the food needs of students by helping them concentrate on their studies instead of going to buy food from outside. In the case of hand washing, majority of them claimed to wash their hands after visiting the washroom before commencing work and after handling raw food. Majority of the respondents indicated that they do not wear gloves when working. This means that because they at times handled raw food with their bare hands, they ended up contaminating the food. It is improper to handle raw food with bare hands because food could be easily contaminated due to improper hand washing resulting in food-borne illnesses.

Proper hand washing should be enforced to ensure food safety (Paulson *et al.,* 1999). Gloves should be worn at all times when raw food is handled but this was rarely practiced by the food handlers who were blaming school authorities for not providing them with the gloves. Authorities in our institutions are to provide gloves for all food handlers while matrons in charge are to ensure that gloves or tongs are used for handling raw foods.

Twenty - six (86.7%) of the food handlers wore aprons or overalls while 4 (13.3%) did not wear them. A shocking majority (96.7%) of them did not also have protective shoes. The wearing of unprotected shoes could result in kitchen accidents like falls, scalds and cuts. On the contrary only 32.1% of the students believed the food handlers wore aprons or overalls although 78.6% claimed they at times wore them. There is a gap between what the food handlers were saying and what the students were saying. It is believed that the food handlers for fear of painting a bad image of the institution did not truly state the facts as they are.

Despite the fact that only six of the food handlers admitted not wearing hair coverings one must not lose sight of the fact that hair could easily fall into food from these few rendering it unwholesome for consumption. With the exception of one food handler, the rest indicated they did not have the appropriate foot wear. To prevent kitchen accidents, it is envisaged that the right protective shoes are provided for all food handlers in boarding institutions.

Foods served were not hot in some instances but the food handlers' information given created a gap in what the students stated. Students stated that most foods were not served hot while most food handlers said the opposite. Food warmers should be provided in the kitchen so that foods are kept warm before consumption. Microbial growth increases in warm conditions so although foods may be prepared in batches due to inadequate equipment, they should be kept very hot.

Materials which could cause physical hazards were found in food served to students despite the fact that students indicated they were not always seen in foods. Sprenger (1991) emphasized that

food should be prevented from the risk of any harmful bacteria or microorganism and as such, they should be discarded when found.

Conclusions

Good personal hygiene is a legislative requirement, ensuring safe food. Food handlers are a potential source of bacterial and physical contamination of food, and so personal hygiene is a key element in ensuring that food is prepared safely. The Environmental Health and Sanitation Department staff are to ensure that basic hygienic practices are adhered to. Any person suffering from a disease that is likely to be transmitted through food must not be allowed to cook.

Proper hand washing should also be practiced by all food handlers in our institutions in addition to good personal and food hygiene practices. It is believed that if all the suggested recommendations are adhered to, there would be healthier students in boarding institutions who would be able to fulfill their educational dreams in life.

Recommendations

The officers at the Environmental Health and Sanitation Departments of District Assemblies should monitor the hygienic practices of food handlers in institutions. Hand washing basins should be fixed close to wash rooms and detergents provided for proper hand washing immediately after visiting the wash room. Also, proper hand washing techniques should be taught and practiced by all food handlers in our boarding institutions to ensure hygienic foods in institutions.

References

Angellilo, I. F., Viggiani, N. M. A., Rizzio, L., & Bianco, A. (2000). Food handlers and foodborne diseases: Knowledge, attitudes and reported behaviour in Italy. *Journal of Food Protection, 63*(30), 381–385.

Asiedu –Marfo, K. (2010). Calm returns to Archbishop Porter. Daily Graphic, (Accra). Friday, February 12, 2010, Page 1.

Bryan, F. L. (1978). Hazard analysis critical control point: what the system is and what it is not. *Journal of Environmental Health, 50*(7), 400–407.

Cohen, L., Morrison, L., & Manion, K. (2004). *Research methods in education.* London: Routledge Falmer.

Green, L., Selman, C., Banerjee, A., Marcus, R., Medus, R., Angulo, F., Radke, A., & Buchanan S. V. (2005). Food service workers self-reported food preparation practices: An EHS – Net study. *International Journal of Hygiene Environmental Health, 67,* 27-35.

Hedberg, C. W., Smith, S. J., Kirkland, E., Radke, V., Jones, T. F., & Selman, C. A. (2006). Systematic environmental evaluations to identify food safety differences between outbreak and nonoutbreak restaurants. *Journal of Food Protection, 69*(11), 2697–2702.

Mead P.S., Slutsker, L., Dietz, V., McCaig, L. F., Bresee, J. S., Shapiro, C., Griffin, P. M., & Tauxe, R. V. (1999). Food related illness and death the United States: Emerging Infectious Diseases**.** *Global Journal of Health Science, 5*(5), 607-624.

Okojie, O. H., Wagbatsoma, V. A., & Ighoroge, A. D. (2005). An assessment of food hygiene among food handlers in a Nigerian University campus. *The Nigerian Postgraduate Medical Journal, 12*(2) 6-93.

Paulson, D. S., Riccardi, C., Beausoleil, C. M., Fendler, E. J., Dolan, M. J., Dunkerton, L.V., & Williams, R. A. (1999). Efficacy evaluation of four hand cleansing regimens for food handlers. *Dairy, Food and Environmental Sanitation, 19*(10), 680-684**.**

Sprenger, R. A. (1991). *Hygiene for management: A text for food hygiene courses***.** Doncaster, UK: HighWeld Publications.

Tonder, V., Lues, J. F., & Theron, M. M. (2007). The personal and general hygiene practices of food handlers in the delicatessen sections of retail outlets in South Africa. *Journal of Environmental Health, 4*(70), 8-33.

Yeboah, K. (2011). Cholera to spread; if insanitary conditions go unchecked. Daily Graphic (Accra) Friday, March 19, 2011. P.1

KNOWLEDGE AND PERCEIVED IMPLICATION OF LASSA FEVER AMONG RESIDENTS OF OKE-ERO LOCAL GOVERNMENT AREA, KWARA STATE NIGERIA

Oniyangi, Shuaib Olanrewaju, Oladosu Rachael Omoniyepe and Jamiu AbdulQudus Tosin
Department of Health Promotion and Environmental Health Education, Faculty of Education, University of Ilorin. Ilorin, Nigeria.
lanreoniyangi@gmail.com**, +2348034299173**

Abstract
This study investigated the knowledge and perceived implication of Lassa fever among residents of Oke-Ero Local Government Area, Kwara State. The major occupation of the residents of Oke-Ero is farming. During the dry season, some farmers make use of bush burning method as a mean of clearing their lands, during which many of the rats from the bushes find their ways to neighbourhood houses to hide for safety. This gives them access to food stuffs kept by the residents. The purpose of the study was to investigate whether the residents of Oke-Ero Local Government Area, Kwara State have knowledge of transmission of Lassa fever and determine whether death is a perceived implication of Lassa fever among the residents of Oke-Ero Local Government Area, Kwara State. A descriptive research design was adopted for the study. The population for the study comprised of all the residents of Oke-Ero Local Government Area, Kwara State. Multi-stage sampling technique consisting of simple random, proportionate and convenience sampling techniques was used to select a sample size of four hundred and two (402) respondents for the study. A researcher-designed questionnaire validated by three (3) experts from the Department of Health Promotion and Environmental

Health Education, University of Ilorin, Nigeria was used for the data collection. Split half method was used to ascertain the reliability of the instrument. A correlation coefficient (r) of 0.70 was obtained through the use of Cronbach alpha. Data collection was conducted by the researcher and three trained research assistants. Inferential statistics of Chi-square (χ^2) was used to analyse the postulated null hypotheses at 0.05 level of significance, using Statistical Package for Social Science (SPSS) version 20.0 software. The findings of the study showed that residents of Oke-Ero Local Government Area, Kwara State significantly have knowledge on the transmission of Lassa fever. This was because cal. χ^2 value (586.90) is greater than critical value (7.82). Death is significantly perceived as implication of Lassa fever among the residents of Oke-Ero Local Government Area, Kwara State. This was because cal. χ^2 value (271.41) is greater than critical value (16.92). Based on the findings, it was concluded that residents of Oke-Ero Local Government Area Kwara State have knowledge of the transmission of Lassa fever, and death is perceived as implication of Lassa fever among the residents of Oke-Ero Local Government area Kwara State. Therefore, the researcher recommended that residents should not leave food items open, so as not to give rats access to their food and cultivate the habit of cleanliness. It is also recommended that, further knowledge on Lassa fever and implication should be intensified and campaigns and health education should be carried out to improve the knowledge of residents about the Lassa fever disease.

Keywords: Knowledge, Perception, Implication, Lassa fever and Residents

Introduction

Lassa fever (LF) is an acute viral haemorrhagic and febrile illness caused by Lassa virus, a member of the arenavirus family of viruses which is prevalent in West African and is responsible for thousands of death annually (World Health Organization, 2016). According to Oladele (2016), Lassa fever was first described in the 1950s but the virus causing Lassa disease was identified in1969 in the town of Lassa, in Borno State, Nigeria when two missionary nurses died in the town of *Lassa* in Borno State. It was from the name of the town that the disease got its name (Center for Disease Control, 2016). Lassa fever is commonly found in rural communities where over 70% of the population resides (Kelly, Barrie, Ross, Temple, Moses & Bausch, 2003). It is an endemic disease in the West African sub-region (Nigeria inclusive), where about 3-5 million individuals are infected yearly (Daniel, 2016).

Lassa fever occurs within all age groups and both sexes. In Nigeria, there are outbreaks of Lassa fever almost every year in different parts of the country, with yearly peaks observed between December and February (WHO, 2016). Lassa fever is more prevalent during the dry season and is an emerging disease with devastating and life threatening potentials (Ajibulu, 2016). They are of particular public health importance because they have a high case-fatality rate, difficult to recognize and detect rapidly and they have no effective treatment (Briggs, 2015).

The Lassa virus, a member of the virus family *arenaviridae*, is a single-stranded RNA virus and is zoonotic, or animal-borne. The virus is very acute and can affect all the organs of the body (WHO, 2016). The carrier of the virus is the mastomys rat commonly known as the multimammate (having many breasts) rat. Multimammates rats are native to Africa, where they are found in a variety of habitats, excluding deserts and tropical forests. They are often common around human habitations. These rats reproduce at very high rates and like to live in very close proximity to humans, especially where

food is kept (CDC, 2016). Mastomys rats infected with Lassa virus do not become ill but they can shed the virus in their urine and faeces (Omosivie & Briggs, 2015). The density of multimammate rats appears to be linked to land use, where rodent populations fluctuate with the agricultural cycle of harvesting, burning of fields and ploughing (CDC, 2016). The Mastomys natalensis can easily be identified because they have a total of 24 nipples instead of 12 that a normal rat possesses (WHO, 2016).

Transmission of Lassa fever occurs through direct contact of abraded skin and mucous membranes with rodent excreta deposited on surfaces such as floors or beds, or ingestion of food and water contaminated with rodent excreta, or via inhalation of aerosol containing virus particles (Robin & Mark, 2003). Lassa fever can also be transmitted when a human comes in contact with an infected rat's faeces, urine or the body fluids of an infected human (CDC, 2016). According to Fisher-Hoch (2005), primary mode of spread is from rodent to man or during hunting and processing of rats for consumption. The virus has the capacity for person-to-person spread, either within households during care for sick relatives or in health care settings. Lassa fever can also be transmitted, particularly in the hospital environment in the absence of adequate active control measures (Fisher-Hoch, 2005; CDC, 2016).

The virus is estimated to be responsible for ten thousands of deaths annually. The disease accounts for up to one-third of deaths in hospitals within the affected regions and 10 to 16% of total cases between 15-20% of people who are hospitalized for Lassa fever die from the illness but the mortality shoots up to 50% during an epidemic, 90% in third trimester of pregnancies for both expectant mother and fetus. In contrast, about 1% of all infected cases die (CDC, 2016). The mortality rate due to Lassa fever is about 5000 deaths a year out of 100,000 to 300,000 cases. The death rate depends on the severity of illness (Liji, 2015).

According to Emmanuel (2016), death usually occurs within 14 days of onset in fatal cases. High maternal and fetal

mortality is associated with Lassa fever during pregnancy. The increased likelihood of mortality at this stage of pregnancy is due to immunosuppression associated with the third trimester of pregnancy (Wellbeing Foundation Africa, **2016)**. The most common complication of Lassa fever is deafness. Different degrees of deafness happen in around one-third of those who become infected. In many cases, the hearing loss is permanent. The severity of the disease does not affect this particular complication; deafness might develop in mild as well as severe cases, transient hair loss and gait disturbance may occur during recovery (CRA, 2016). Briggs (2015) found that sensorineural hearing deficit in Lassa fever, typically appears during early convalescence, not related to severity of acute illness, occurs in one-third of cases may be bilateral or unilateral, may persist for life in up to one-third of those affected. Lassa fever in children and Infants significant cause of pediatric hospitalizations in some areas of West Africa. Complications include mucosal bleeding, pleural effusion and pericardial effusion. After recovery, the virus remains in body fluids, including semen (Richmond & Baglole, 2004).

Akinbodewa, Adejumo, Alli, Olarewaju, Akinbodewa, Adejumo,Osho, Akinfiresoye and Balogun (2016) also concluded in a study conducted among the students of Adeyemi College of Education, Ondo State on knowledge of Lassa fever, that knowledge of Lassa fever remained poor among the students. Adebimpe (2016) also concluded that poor knowledge of Lassa fever, characterized rural communities studied. In a study conducted by Ajibulu (2016), most of the respondents demonstrated knowledge of Lassa fever by indicating that keeping their environment clean is a primary strategy to avoid being affected by the virus.

Tahir and Yusuf (2016) in their study on knowledge of residents of Bununu and environs, Bauchi State, estimated that, knowledge of Lassa fever among the studied population was good, as more than half of the respondents showed knowledge of how Lassa fever spread. The apparently higher levels of knowledge

may be due to the greater attention given to the disease, both by the government and the press, especially during the outbreak in 2014 (Rine & Silas, 2016).

In Oke-Ero, Kwara State, it was observed by the researcher that rats are found in large number in households and their presence holds much implications on the residents of the Local Government Area, as their droppings and urine get into food items. The researcher also observed that the residents of Oke-Ero Local Government Area have poor method of food preservation such that some residents leave their leftover foods uncovered in order to preserve it from being spoilt and in the process; the rats gain access to the food, eat part of it, urinate or pass excreta on it. The researcher also observed that the methods of waste disposal adopted by the residents of Oke-Ero Local Government Area is very poor, as the resident merely dump their wastes on dunghills, thereby harbouring rats, which breed Lassa fever.

The researcher also observed that, the major occupation of the residents of Oke-Ero is farming. During the dry season, some farmers make use of bush burning method for clearing their lands, during which many of the rats from the bushes find their ways to neighbourhood houses to hide for safety. This gives them access to food stuffs kept by the residents. It is on this premise that the researcher carried out a research on knowledge and perceived implication of Lassa fever among Residents of Oke-Ero Local Government Area, Kwara State.

Research Questions

The following research questions were raised for the study:

i. Will residents of Oke-Ero Local Government Area, Kwara State have knowledge of transmission of Lassa fever?
ii. Will death be perceived as implication of Lassa fever among the residents of Oke-Ero Local Government Area, Kwara State?

Research Hypotheses

The following research hypotheses were formulated for the study:

i. Residents of Oke-Ero Local Government Area, Kwara State will not significantly have knowledge of transmission of Lassa fever.
ii. Death will not significantly be perceived as implication of Lassa fever among the residents of Oke-Ero Local Government Area, Kwara State.

Method

Descriptive research design was adopted for this study. The population of the study comprised all the residents of Oke-Ero Local Government Area, Kwara State which is 57,619 while the target population comprised all the residents that are above 18 years old which contains 29,566. A multi-stage sampling technique consisting simple random, proportionate and convenience sampling techniques was used to select four hundred and two (402) respondents from five selected political wards in Oke-Ero Local Government Area, Kwara State. A researcher-developed structured questionnaire patterned after the two-point likert rating scale with options of Yes, No and four-point Likert rating scale format with options of Strongly Agree, Agree, Disagree and Strongly Disagree were used for the study. The instrument contained eight (8) items based on two variables namely transmission of Lassa fever and death and Lassa fever. In order to ascertain the validity of the instrument, three copies of the questionnaire were given to three experts in the Department of Health Promotion and Environmental Health Education, Faculty of Education, University of Ilorin. Split-half method was used to determine the reliability of the instrument using Cronbach's Alpha. A correlation coefficient (r) of 0.70 was obtained. Descriptive statistics of frequency count and percentage was used to answer the research questions raised for the study. Strongly Agree (SA) and Agree (A) were merged into positive response, while Disagree (D) and Strongly Disagree (SD) were merged into negative response. Inferential statistics of Chi-square

was used to analyze the stated null hypotheses at 0.05 level of significance, using Statistical Package for Social Science (SPSS) version 20.0 software.

Results

Research Question One: Will residents of Oke-Ero Local Government Area, Kwara State have knowledge of transmission of Lassa fever?

Table 1: Descriptive statistics showing knowledge of transmission of Lassa fever among the residents

S/N	ITEMS	Yes (%)	No (%)	Total
1.	Eating food contaminated with rat's urine can transmit Lassa fever	369 (91.8%)	33 (8.2%)	402
2.	Direct contact with infected rat spreads Lassa fever	333 (82.8%)	69 (17.2%)	402
3.	Lassa fever can be transmitted by eating rats	324 (82.8%)	78 (19.4%)	402
4.	Contaminated medical equipment such, such as re-used needles will transmit Lassa fever	309 (76.9%)	93 (23.1%)	402
Total		**334 (83%)**	**68 (17%)**	**1608**

Table 1 shows those respondents that responded to "yes" and have the knowledge of transmission of Lassa fever were 334 (83%) while the respondents that responded to "no" and do not have the knowledge of transmission of Lassa fever were 68 (17%). This implies that majority of the respondents of Oke-Ero Local Government Area, Kwara State have knowledge of transmission of Lassa fever.

Research Question Two: Will death be perceived as implication of Lassa fever among the residents of Oke-Ero Local Government Area, Kwara State?

Table 2: Descriptive statistics on death as a perceived implication of Lassa fever among the residents

Practices	Responses					
	Yes		No		Total	
	n	%	n	%	n	%
Washing of hands before commencing work	28	93.3	2	6.7	30	100
Washing of hands after using the toilet	29	93.7	1	3.3	30	100
Washing of hands after handling raw food	24	80.0	6	20.0	30	100
Washing of hands after blowing the nose	20	66.7	10	33.3	30	100
Washing of hands after sweeping	21	70.0	9	30.0	30	100
Soap used for washing hands	19	63.3	11	36.7	30	100
Wear long nails	17	56.7	13	43.3	30	100

Table 2 shows majority of the respondents 313 (77.8%) have positive responses to the items and perceived death as implication of Lassa fever while 89 (22.2%) respondents responded negatively and do not perceive death as implication of Lassa fever. This implies that, death is perceived as implication of Lassa fever among the residents of Oke-Ero Local Government Area, Kwara State.

Hypotheses Testing

Hypothesis One: Residents of Oke-Ero Local Government Area, Kwara State will not significantly have knowledge of transmission of Lassa fever.

Table 3: Chi-square analysis showing knowledge of transmission of Lassa fever among the residents

Characteristics	Food handlers				Students' comments					
	Yes		No		Yes		No		Sometimes	
	n	%	n	%	n	%	n	%	n	%
Apron /overall	26	86.7	4	13.3	63	32.1	77	39.3	56	28.6
Hair cap/scarf/net	24	80.0	6	20.0	56	28.6	77	39.3	63	32.1
Gloves	2	6.7	28	93.3	0	0.0	0	0.0	196	100.0
Protective Shoes	1	3.3	29	96.7	-	-	-	-	-	-

$\alpha = 0.05$

Table 3 shows the result of the hypothesis which states that Residents of Oke-Ero Local Government Area, Kwara State will not significantly have the knowledge of transmission of Lassa fever.The calculated chi-square value of 586.90 is greater than chi-square table value of 7.82 (cal. χ^2 val> tab. χ^2 val). Hypothesis one was therefore rejected. This implies that Residents of Oke-Ero Local Government Area, Kwara State significantly have the knowledge of transmission of Lassa fever.

Hypothesis Two: Death will not significantly be perceived as implication of Lassa fever among the residents of Oke-Ero Local Government Area, Kwara State.

Table 4: Chi-square analysis showing death as a perceived implication of Lassa fever among the residents

Practices	Food handlers						Students					
	Yes		No		Sometimes		Yes		No		Sometimes	
	n	%	n	%	n	%	n	%	n	%	n	%
Hot foods served	20	66.7	1	3.3	9	30	63	32.1	28	14.3	105	53.6
Convey food covered	16	55.2	14	44.8	0	0.0	28	14.3	140	71.4	28	14.3
Physical hazard in food	-	-	-	-	-	-	56	28.6	84	42.8	56	28.6

$\alpha = 0.05$

Table 4 shows the result of the hypothesis which states that death will not significantly be perceived as implication of Lassa fever among the residents of Oke-Ero Local Government Area, Kwara State.The calculated chi-square value of 271.41 is greater than chi-square table value of 16.92 (cal. χ^2 val$>\chi^2$ tab. val). Hypothesis two was therefore rejected. This implies that death is significantly perceived as implication of Lassa fever among the residents of Oke-Ero Local Government Area, Kwara State.

Discussion of Findings

The hypothesis one was rejected, implying that the residents of Oke-Ero Local Government Area, Kwara State significantly have the knowledge of transmission of Lassa fever. The positive responses of the residents can be attributed to radio and television campaigns aired nationwide to educate the people about Lassa fever. This finding is similar to Tahir and Yusuf (2016) in their study on knowledge of residents of Bununu and environs, Bauchi State, which showed that knowledge of Lassa fever among the studied population was good, as more than half of the respondents showed knowledge of how Lassa fever spread.

Hypothesis two was rejected, implying that, death is significantly perceived as implication of Lassa fever among the residents of Oke-Ero Local Government Area, Kwara State. However, the finding supports Brigg (2015) who asserted that, Lassa fever also causes high foetal mortality and high mortality in pregnant women. The mortality rate is 92% for fetuses in early pregnancy, 75% for fetuses in the third trimester, 100% in the neonatal period for full-term babies. According to CDC (2016), the virus is estimated to be responsible for ten thousands of deaths annually. The disease accounts for up to one-third of deaths in hospitals within the affected regions and 10 to 16% of total cases. The knowledge of transmission of Lassa fever and death as a perceived implication of Lassa fever by residents who participated in this study could be as a result of the jingles or campaigns from the radio or televisions.

Conclusions

Based on the findings of the study, it was concluded that:

i. Residents of Oke-Ero Local Government Area Kwara State have knowledge of transmission of Lassa fever.

ii. Death is perceived as implication of Lassa fever among the residents of Oke-Ero Local Government Area Kwara State.

Recommendations

Based on the findings of the study, the researcher made the following recommendations:

i. Residents should intensify their knowledge on the transmission of Lassa fever in order to further eradicate the diseases from their environment.

ii. Health workers should treat patients infected with Lassa fever immediately in order to avert the incident of death.

References

Adebimpe, W. O. (2015) Awareness and Perception towards Rodent Control: Implication for Prevention and Control of Lassa fever in Urban Slums of South Western Nigeria. Available at http://dx.medraorg/10.14614/LASSANIGERIA retrieved on 30th November,2016.

Ajibulu, D. (2016) Perception of Nigerians regarding the awareness, mode of transmission, symptoms and preventive measures of Lassa fever. Department of Mass Communication Imota, Lagos Caleb University.

Akinbodewa, A. A., Adejumo, O.A., Alli, E.O., Olarewaju, C. A., Akinbodewa, G.O., Adejumo, O.A., Osho, P. O., Akinfiresoye, A.O. & Balogun, F. O. (2016) Knowledge of Lassa fever among Students of College of Education: Call for Inclusion in Curriculum. British Journal of Medicine & Medical Research 16(9), 1-8. Available at www.sciencedomain. Retrieved on 17th January, 2017.

Briggs, D.C (2015) Recent Lassa Fever Outbreaks in Nigeria: The Nigerian response so far Unpublished Postgraduate Seminar. Available at http://www.who.int/ media centre/ factsheets /fs 179 /en/ retrieved on 20th October, 2016.

Centers for Disease Control and Prevention (2016) "Lassa Fever in Nigeria: What is the current situation". Available at http://www.cdc.gov/ncezid/dgmq/index.html retrieved on 1st August 2016.

Chinedu, I. (2015) Lassa Fever Epidemic: Epidemiology, Transmission, Symptoms and signs of Lassa fever: Dept of Community medicine, University of Port Harcourt. Available at http://www.slideshare.net/chineduibeh/2016-

lassa-fever-epidemic#related-tab-content retrieved on 20th October, 2016.

Crib Reporters,Africa, (2016) Everything about Lassa fever: Signs, Symptoms, Treatment and Prevention: Retrieved from http://Daily AfricanGist.com/latest new accessed on August, 1st 2016.

Daniel, G.B. (2016) Current Nigerian epidemic: Tulane School of Public Health and Tropical Medicine, Dept of Tropical Medicine, Tulane Ave, New Orleans, (dbausch@tulane.edu).

Emmanuel, L. (2016) Lassa fever: Symptoms, Prevention and Treatment by WHO. Available at http:// www.who.int/mediacentre/factsheets/fs179/en/ retrieved on 31st November, 2016.

Fisher-Hoch, S. P. & McCormick, J.B. (2004) Lassa fever vaccine: Expert Review of Vaccines. Retrieved from http:/dx.doi.org/10.1586/14760584.3.2.189 accessed on 24th November, 2016.

Fisher-Hoch, S.P. (2005) Lessons from nosocomial viral haemorrhagic fever outbreaks. Britain Medicine Bulletin. 73(1), 123 - 137.

Kelly, J.D., Barrie, M.B., Ross, R.A., Temple, B.A., Moses, L.M. &. Bausc, D.G (2003) A right Based Approach to the control of Lassa fever in post war Sierra Leone International Health and Human Rights. Housing equity for health equity SierraLeone.

Lawal, S. A. (2014) Assessment of Community Knowledge, Attitude and Practice Related to Lassa fever In Odeda Local Govermnent Area, Ogun State, Nigeria. Available at http://www.unaab.edu.ng/attachments/assessmentofcomm

unityknowledgeattitudeandpracticerelatedtolassafeverinodedalocalgovermnentareaogunstatenigeriaretrieved on 27th November, 2016.

Liji T. (2015) What is Lassa Fever? Available at https://www.gov.uk/guidance/lassa-fever origins-reservoirs-transmission-and guidelines. accessed on 27th August 2016.

Luis, M B., Matt, L. B., Kristian, G. A., Jessica, N. G., Lina, M. M., Ivana, J .M. Lee, A. H., (2011) Lassa hemorrhagic fever in a late term pregnancy from Northern Sierra Leone with a positive Maternal Outcome: *Virology Journal 11(8), 401-404.*

National Population Commissions of Nigeria (2006) Report of Nigeria's National Population Commission on the 2006 census.

Oladele, H. (2016) 10 Important Information about Lassa fever. Available at https://www.naij**. com/ retrieved on 24th October,2016.**

Omosivie, M. (2015) Lassa fever prevention and control: what you need to know. Department of Preventive and Social Medicine University of Port Harcourt & Consultant Public Health Port Harcourt. Retrieved from http://www.lassaalert.org accessed on 27th November, 2016.

Richmond, J.K. & Baglole, D.J. (2004) Lassa fever: epidemiology, clinical features, and socialconsequences. British Medicine Journal, 328(74), 90-96. Retrieved from http:// www.bmj.com/content/328/7431/96/ accessed on 1st August, 2016.

Rine, C. R. & Silas, D. G. (2016) knowledge, attitudes and practices of Lassa fever in and around Lafia, central Nigeria. International Journal of Public Health and Epidemiology Research, 2(1), 14-19.

Robin, G. & Mark, S. (2003) Lassa fever and Communicable Disease Surveillance and Control in Sierra Leone. Report and Recommendations of WHO/UNHCR Mission to Sierra Leone. Retrieved from http://www.who.int/mediacentre accessed on 27th July 2016.

Rotimi,O.(2016) Lassa Fever hits Ekiti, one index case recorded. Retrieved from http://www.vanguardngr.com/2016/01/lassa-fever-hits-ekiti-one-index-caserecorded/ Accessed on 5th June, 2017.

Tahir, & Yusuf, R. (2016) Knowledge, Attitude and Practice on Lassa fever at Bununu and environs, Bauchi State Nigeria. Journal Hippocratic Medicus, 1(1), 9 – 15.

Wellbeing Foundation Africa (2016) Outbreak of Lassa fever In Nigeria. Led by Toyin Saraki Benue State. Retrieved from https://politics.naij.com/697168-read-new-revelation-lassa-fever accessed on 24th November, 2016.

World Health Organization (2016) Update on Lassa fever: Available at http://www.who.int/mediacentre/factsheets/fs179/en/ accessed on 31st July, 2016.

EFFECT OF SHORT TERM CONSUMPTION OF ENERGY DRINK ON PHYSIOLOGICAL RESPONSES AND PHYSICAL PERFORMANCE VARIABLES OF ATHLETES IN UCC

Yayra Kluboito* Joseph Babalola & Omoniyi M. Moses

Department of Health Physical Education and Recreation, University of Cape Coast, Ghana.
Email: ykluboito@gmail.com*
Department of Human Kinetics and Health Education, University of Ibadan, Ibadan, Nigeria
Department of Exercise and Sports Science, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

Abstract

Current research has shown varied results when comparing the effects of energy drink on anaerobic exercise measures. Athletes in Ghana have been using energy drink but hardly has any research been conducted on the effect this pre-exercise consumption has on their physical performance. The purpose of this study was to find out the effects of short-term consumption of energy drink on some blood pressure, heart rate, agility, lower body strength and upper body strength of athletes of the University of Cape Coast. To ascertain this, participants were taken through performance tests in a pre-test and a post-test. The intervention in this study was the consumption of 250ml of energy drink. Forty-four athletes (Age: 22.32 ± 2.81 years, height: 167.2 ± 9.83 cm, weight: 61.12± 8.01 kg). Paired sample t test results showed no significant effect of energy drink consumption on systolic blood pressure (t = -0.78, p = 0.437), diastolic blood pressure (t = -0.91, p = 0.366), heart

rate (t = -030, p = 0.759) and lower body strength (t = 0.11, p = 0.916). However, there were significant changes in agility (t = 5.42, p = 0.001) and upper body strength (t = -2.79, p = 0.008). In view of this, athletes, trainers, and coaches could consider recommending the use of energy drink as a pre-exercise supplement, especially in events involving agility and upper body strength.

Keywords: Energy drink, Agility, Strength, Athletes

Introduction

Sports require that participants should possess an expected high level of physical and physiological fitness. This could be attributed to the fact that the demands of sports rely heavily on both the anaerobic and aerobic energy sources (Michael, Rooney & Smith, 2008). Although different kinds of sports require different kinds of skills and fitness variables (Marchetti et al., 2015), the ability to perform effectively and efficiently as well as show skill mastery competence, cuts across all sports disciplines (Gaurav, Singh & Singh, 2011). This gives the need for athletes to acquire appropriate skills, physical and physiological conditioning as well as psychological profile for excellence in their sports (Wang et al., 2013). Some athletes instead of adhering to proper training and conditioning practices, in their bid to perfect their skills resort to other means which include integrating into their training regimens, the consumption of ergogenic supplements (Alsunni, 2011). Among the performance enhancers used by athletes is caffeine, an ingredient often consumed in the form of energy drinks (Salinero et. al., 2014).

Although the concept of 'energy drinks' has been defined in several concise complex ways, Heckman, Sherry and Gonzalez de Mejia (2010) simply defined energy drinks as beverages that contain besides calories, caffeine in combination with other presumed performance enhancing ingredients such as taurine, herbal extracts and B vitamins. Caffeine, the main 'energy' ingredient in energy drinks is a pharmacologically active substance and despite extensive research, its effects and health consequences still form the subject of ongoing debate (Finnegan, 2003, Committee on Nutrition and the Council of Sports Medicine and Fitness, 2011, Sengpiel et al, 2013). When caffeine is absorbed in the body, it stimulates the sympathetic nervous system and results in a rise in plasma catecholamine that allows the body to adapt to the stress created by physical exercise (An, Park, & Kim, 2014).

Paddock (2008) reported that the most widely used medicinal ingredient in energy drinks, apart from caffeine, is the

amino acid taurine. The supplementation of the diet with taurine is known to have many cardiovascular benefits (Militante, &Lombardini, 2004). Various physiological functions have been attributed to taurine, among them are osmoregulation, calcium modulation and anti-oxidation. However, much still has to be understood about the role that taurine plays in the maintenance of life and normal function. In spite of this, the taurine has been promoted as the energy drink industry as a secret potent ingredient despite the controversy surrounding the ingredient. (Aggarwal, Mishra, Crochet, Sirimanna, & Darzi, 2011).

Various researches have been done on different variables to either prove or disprove the ergogenic capability of energy drinks. Carvajal-Sancho and Moncada-Jimenez in 2005 investigating the acute effects of an energy drink on the Physical and Cognitive performance of male athletes found no significant changes in the physical and cognitive variables when comparing energy drink, a placebo and control conditions. However, significant pre-to post-test improvements in strength and power were found regardless of the experimental condition. Contrary to this finding, Alsunni (2011) stated that caffeine has an effective ergogenic agent by delaying fatigue and increasing time to exhaustion during endurance exercise but its efficacy as an ergogenic aid during anaerobic exercise and strength and power events is limited.

There is a rising curiosity of individuals on the effect of energy drinks on physical performance especially in a country like Ghana as television commercials make consumption look really appealing to the general public and athletes (Buxton and Hagan, 2012). Advertising for these products typically features images conjuring great muscle power and endurance.As a result of this phenomenon, there has been the need to investigate into this area in the country. Empirical research on energy drink consumption and the effects amongst Ghanaian populations has been scanty. However, the habit of consuming energy drink to enhance performance appears to be slowly becoming a part of the exercise regimens of most physically active person.

In a research conducted on Ghana University Student athletes by Buxton and Hagan (2012), most of the participants (62.2%) reported consuming at least one can of energy drink in a week. The respondents who drank energy drinks indicated that they did so to replenish lost energy after training or a competition, to provide energy and fluids to the body, to improve performance and to reduce fatigue. Again, Nti, Pecku and Opare-Obisiw (2014), reported that 91.0% of university students use energy drinks to help them study and also reduce fatigue. Even though 21.0% of these participants were aware of and had experienced side effects including stomach pains, headaches, and increased heart beats, they still continue to consume energy drinks neglecting future side effects such as chronic diseases (Seifert, Schaechter, Hershorin, &Lipshultz, 2011). Babu, Church and Lewander (2008) reported that energy drinks are often mistaken for sports drinks, whose primary purpose is rehydration in the event of exercise or fluid loss.

Experiments conducted on the effects of energy drink on physical performance have been in the laboratory setting under very controlled conditions. Meanwhile, athletes and other physically active persons who consume these energy drinks however work in the real-world setting. This has brought about the need to conduct an experiment on the field to examine these effects under conditions that are as close as possible to the real world setting amongst a section of Ghanaian population which has come to accept the practice of consuming energy drinks with the aim of gaining extra energy for performance.

The purpose of this study was to examine the effect of short-term consumption of energy drink on physiological variables (blood pressure and heart rate) and physical performance variables (agility, upper body and lower body strength). For this reason, hypotheses were tested to ascertain the effect of short-term consumption of energy drink on physiological responses and physical performance variables.

Methodology

The study was conducted using the one group pre-test – post-test experimental research design and was conducted on the field for the sake of ecological validity since the field provides a setting which is close enough to the real world setting and conditions under which persons consume and use energy drinks for performance enhancement. Forty-four (44) athletes with ages ranging from 18-33 (M = 22.32, SD = 2.81) participated in the study. The permissions of the participants were sought with an informed consent. Measures of height (131-188, M = 167.2, SD = 9.83) and weight (43.4-80.4, M = 61.12, SD = 8.01) were taken as demographic data.

Participants were asked to refrain from caffeine containing food 48 hours prior to the trial because the half-life of caffeine is about four to six hours (Graham, 2001). The participants were asked to put in maximal effort during the exercise tests as this was the only way the data collected would be a true representation of their performances and also inform the researcher if they felt uncomfortable at any point. Participants were informed that they could back out of the research at any time during the study if they did not feel up to it. Ethical clearance was sought from the Institutional Review Board (IRB) of the University of Cape Coast. The investigation was done without altering the participant's dietary routine. However, the participants fasted for a short while which was practically close to the length of fasting prior to a competition.

All measures were taken with the appropriate tools which have their own psychometric properties. Physical characteristics of height and weight were measured for each participant as demographics using the stadiometer and a weighing scale respectively. Blood pressure and heart rate were measured using a sphygmomanometer (The deluxe auto digital blood pressure monitor) and the physical performance variables were measured using the Illinois agility test, overhead medicine ball throw (upper body strength) and vertical jump test (lower body strength). Pilot testing was done to ascertain their working conditions and also to

find out what to expect in the main study. Data were collected from one group which went through two measures therefore the analysis was done by comparing means within the group. Paired sample t-test was used to find the difference in means of pre-test and post-test measurements of each test variables with $p< 0.05$.

Test Procedure

On arrival on the day of the experimental trial, the participants were briefed and the physical characteristics measured as well as physiological variables of heart rate and blood pressure. Participants were then taken through the performance tests (Illinois agility test, vertical jump test and overhead medicine ball throw). Treatment was administered and the participants relaxed for 60 minutes after which they warmed up and went into the post test.

The same treatment protocol was administered to all the participants as the experiment was a one group design. The volume of the energy drink administered was set at a dose of 250 ml (one can) and was administered 60 minutes before the post-test measurements. This was informed by Paton, Lowe and Irvine (2010) who mentioned in their study that use of caffeine-containing energy drinks containing lower doses of caffeine (1–3 mg/kg body weight) is more practical due to their availability and minimal side effects. The experimental trial consisted of a warm-up and stretch period, a pre-test protocol, intervention, rest, warm up, a post-tests protocol and a cool down. At the beginning of each post-test trial, the participants consumed 250ml of energy drink and waited for sixty (60) minutes before proceeding on to the post-tests. The warm-up was about five minutes where the participants went through general warm-up exercises and then stretching.

Results

Table 1- *T-test analysis results for effect of energy drink on systolic physiological responses, agility, lower body strength and upper body strength.*

Variable	Mean (SD)		t	df	Sig. (2 tailed)
	Pre-test	Post-test			
Systolic blood pressure	126.34 (14.10)	128.27 (12.94)	-0.78	43	.437
Diastolic blood pressure	75.72 (16.06)	78.15 (13.44)	-0.91	43	.366
Heart rate	83.72 (12.22)	84.27 (13.33)	-0.30	43	.759
Agility	18.88 (1.73)	18.46 (5.42)	5.42	43	.000
Lower body strength	45.75 (11.29)	45.65 (11.46)	0.11	43	.916
Upper body strength	5.25 (1.57)	5.52 (1.62)	-2.79	43	.008

$p \leq 0.05$

There were no significant differences in physiological responses (heart rate, systolic and diastolic blood pressure) with significant values (p values) of .759, .437. and .366 respectively. This result indicates that short term consumption of energy drink does not have any significant effect on systolic blood pressure. Therefore, the researcher failed to reject the null hypotheses. Again, there was not a significant difference in the results for pre-test and post-test with a significant value of .916. This implies that the consumption of energy drink did not have a significant effect on lower body strength of the participants. Therefore, the researcher failed to reject the null hypothesis. But, there was a significant difference in the results for pre-test and post-test

measurements of agility and upper body strength with significant values of .000 and .008 respectively. This implies that the consumption of energy drink had a significant effect on agility running time of the participants. Therefore, the null hypotheses were rejected.

Discussion

According to Reissig et al. (2009), when caffeine enters the blood, it makes the body think it is in an emergency and the pituitary gland initiates the body's fight or flight response by releasing adrenaline. This hormone makes the heart beat faster. Keeping this in mind, significant change in the heart rate of the participants after the consumption of the energy drink was expected. This outcome could be associated with the amount of energy drink (250ml) that was consumed in this study and caffeine content (80mg).

The results again could be due to the fact that the participants were trained athletes with improved physiological variables. The warm up, the exercise tests and the intervention together before the post-test were enough to cause changes in the systolic blood pressure but this increase was statistically significant. The performance tests were explosive and of short duration and so elevations in heart rate and blood pressure might not have been eminent. During dynamic exercise after the ingestion of energy drink, blood pressure, especially the systolic blood pressure could be elevated, but the change not being statistically significant could be linked to the quantity of energy drink ingested (Daniels, Mole, Shaffrath & Stebbins, 1998).

Contrary to this finding, caffeine was found to have caused a significant increase in the mean heart rate after 60 minutes of ingestion in twenty male volunteers in a study by Geethavani, Rameswarudu and Rameshwari Reddy (2014). Also, there was a significant difference in the systolic blood pressure recorded in the study (Caffeine caused significant increase in the mean systolic blood pressure (60 minutes' post ingestion) from 116.6 to 128.3 mmHg as compared to placebo conditions. The mean rate increased from 72.9 to 77.3 Bpm in test group (no change was

observed in control group). Caffeine again caused significant increases in systolic blood pressure (SBP) (20 and 40 min post ingestion) and maximal arterial pressure (MAP) (40 min post ingestion) compared with placebo conditions (Daniels, Mole, Shaffrath & Stebbins, 1998). Furthermore, no statistical interaction was found between the effects of caffeine and exercise on blood pressure. Also, in a study by Goldstein et al. (2010), diastolic blood pressure and heart rate were unaffected by caffeine. Systolic blood pressure was however significantly greater in post-exercise with caffeine ($p < 0.05$) (116.8 ± 5.3 mmHg vs. 112.9 ± 4.9 mmHg) in a study by Goldstein et al. (2010). All these studies have shown contradictory effects of caffeine and energy drink on physiological responses during exercise. Treatments in these studies were administered between thirty to sixty minutes' post exercise similar to this study and most other studies out there (Dawes et al., 2014, Stojanovic et al., 2011, Del Coso et al., 2012).

However similar to this study, an independent study by Apatov et al. (2011), in which they investigated the physiological effects of 5-hour energy drink on regular consumers, diastolic blood pressure was found not to be statistically affected by the consumption of the energy drink. Consistent with this data is a study by Daniels et al (1998) which also found that the magnitude of caffeine induced increases in resting and exercise diastolic blood pressure were not statistically different from respective control conditions. Again, in a study by Goldstein et al. (2010), diastolic blood pressure was unaffected by the consumption of caffeine.

Polinski et al (2011) in their study on the analysis of correlation between heart rate and blood pressure found correlations between the two variables, but this correlation was found to be in-consistent and varied from measurement to measurement. It is therefore understandable that there was a no significant change in the heart rate and blood pressure after the intervention. An et al. (2014) in the conclusion of their study stated that low dose caffeine produces no particular difference in heart rate at rest. In this study however, the heart rate was not measured at rest after the consumption of the energy drink indicating that

there could be a significant change when the heart rate is measured after exercise. The inconsistency in the literature regarding the changes that caffeine and energy drink causes in heart rate and blood pressure still continues as the results from this study adds to the negative findings that already exist. Nti et al. (2014) in their study had reported that 75% of the participants had increased heart rates as a result of the consumption of energy drinks. These participants were not athletes unlike the participants of this study, nor did they report that they felt this after going through physical activity.

The physical performance variable agility has been sparingly investigated into when it comes to investigations into the effects of energy drink on the performance variables. The above result implies that agility was a 100% affected by the consumption of energy drink. Variables which are close to agility that is including the components of agility (speed and change of direction) have been investigated into. In Del Coso et al.'s (2012) research into the effect of caffeine containing energy drink on simulated soccer performance, they investigated as part of their study the effect of Red Bull energy drink on the number of sprints run by their participants in a simulated soccer performance. These sprints in the game could be related to agility as running pattern in soccer involves change of direction. The mean running speed during the speed test in this study was also increased as a result of the consumption of the energy drink as against the placebo given. Contrary to the results for this study and the study by Del Coso et al., energy drink treatment did not have any significant effect on reactive sprint test of participants in a study to investigate the effects of a pre-workout energy drink on measures of physical performance buy Dawes et al. (2014). Similarly, a pre-workout consumption of energy drink by participants in another study by Paez et al. (2014) did not cause any significant change in the time taken to complete the test. Issues about reaction time could also be considered in this discussion of agility test results as the participants had to respond to the stimuli for the start in order to make a good time on the agility test.

It was reported in a study by Duvnjak-Zaknich et al. (2011), that there is improved interpretation and response to stimuli of an individual after ingesting caffeine. Their study was to investigate the effect of caffeine on reactive agility time when fresh and fatigued, and faster times were recorded for the reactive agility tests were consistently faster after the ingestion of caffeine. A similar study conducted by Jordan (2012) who tried to find out of reactive agility through the dominant and non-dominant side and found that caffeine supplementation significantly improved players' reaction times to their non-dominant side. This goes to imply that energy drink has been found to improve agility in most studies even though there are still some studies in which agility in whichever form it was had been unaffected by pre-workout energy drink consumption.

Lower body strength was tested in this study using the vertical jump test. A statistical significance value of 0.458, the vertical jump test showed no significant difference after the consumption of energy drink. This implies that the energy drink treatment had no effect on the lower body strength (vertical jump). Similarly, energy drink treatment did not enhance vertical jump performance in the participants of the study by Dawes et al. (2014). Del Coso et al. (2012) also found similar results in their study. Stojanovic et al. (2011), had also tested lower body strength using vertical jump and analyses of variance conducted revealed no differences between placebo and supplement group in vertical jump. Contrary to the results from this study however, increments in the mean jump height of participants after ingesting energy drink in comparison to a placebo was found in a study by Del Coso et al. (2012).

Upper body strength was found to be significantly affected by the short-term consumption of energy drink. This result could be attributed to the age and metabolism of the athletes. Upper body strength in most researches have been tested using other activities such as bench press and hand grip strength test. In Eckerson et al.'s (2011) study, they tested upper body strength using bench press. Participants had to do a 1RM bench press after consuming energy drink and no effect was found. Stojanovic et al. (2011) tested hand

grip in their study the results also showed no significant improvements in performance. Similarly, a moderate dose of caffeine was found to enhance strength performance of resistance trained women in a one repetition maximum barbell bench press test in a study by Goldstein et al. (2010). These results are in agreement with the result of this study. These results are in disagreement with Astorino et al. (2008) as the authors of that investigation reported no significant increase in upper body strength in resistance trained males after consuming 6 mg/kg of caffeine. Similar to the overhead medicine ball throw which was used in this study to test for upper body strength, ballistic bench throw was used by Krammerer et al. (2012) and the caffeine ingested caused a significant increase in the peak performance, peak power and peak velocity.

The outcomes of research investigations that have examined the effects of caffeine ingestion on strength have been inconsistent and most administered caffeine in capsule forms. For this study however, the caffeine was consumed in one 250-mL serving of energy drink containing 80 mg of caffeine. Despite the fact that the caffeine dosage for this study was relatively low, there still were significant changes in agility and upper body strength after the ingestion of energy drink. Lower body strength on the other hand was not increased with the ingestion of the energy drink.

The purpose for this study was to conduct research under condition that are as close to what the Ghanaian athlete usually does hence the reason for this dosage and as Paton et al. (2010) had said, use of caffeine-containing energy drinks containing lower doses of caffeine (1–3 mg/kg body weight) is more practical due to their availability and minimal side effects. Therefore, the athletes' usual choice of caffeine intake was considered for this study. This dosage and the conditions under which the performance test was conducted could be a great influence to the outcomes of the study.

Conclusion

All the physiological measurements were not significantly affected by the ingestion of energy drink. These results may be applied to alter pre-exercise consumption of energy drink. Again, 250ml of energy drink was not enough to cause significant elevations in the blood pressure and heart rates of the athletes implying that this dosage may be a safe dosage to use for short term supplementation with minimal physiological effects. For the physical performance variables, significant changes were recorded after the ingestion of energy drink in the agility and upper body strength but not the lower body strength.

Results of this study suggest that healthy athletes do experience performance benefits from short term energy drink supplementation when consumed before performing short term exercise in this case, agility and upper body strength exercise. However, this short-term supplementation does not have performance benefits on lower body strength. While athletes could have some differences in how their bodies are affected by the short-term consumption of energy drink, it has no significant effects on their physiological responses. Therefore, athletes who consume energy drink for a short term in competition could be said to have no advantage over their fellow athletes who compete without energy drink for events in which lower body strength is predominant therefore, they should reconsider as the short-term consumption of energy drink does not have significant effect on lower body strength.

Trainers and coaches could consider recommending the use of the commercially available energy drink as a short-term pre-exercise supplement, especially in events in which agility and upper body strength are key. Also, athletes who wish to enhance their performances using energy drink can do so knowing that the short-term consumption of energy drink does not have significant effect on their physiological responses (blood pressure and heart rate) during performance.

References

Aggarwal, R., Mishra, A., Crochet, P., Sirimanna, P., & Darzi, A. (2011). Effect of caffeine and taurine on simulated laparoscopy performed following sleep deprivation. *Br J Surg., 98*, 1666-1672

Alsunni, A. A., (2011). Are energy drinks physiological? *Pak J. Physiol* 7(1).

An, S. M., Park, J. S., & Kim, S. H., (2014). Effects of energy drink dose on exercise capacity, heart rate recovery and heart rate variability after high intensity exercise. *J Exerc. Nutr. Biochem., 18*(1), 31-39.

Apatov, D., Eberwein, A., Klein, T., & Schroeder, S. (2011). The physiological effects of 5- Hour energy drink. Unpublished Independent study.

Astorino, T. A., Rohmann, R. L., Firth, K., & Kelly, S. (2008). Effect of caffeine ingestion on one-repetition maximum muscular strength**.** *European Journal of Applied Physiology*, *102*, 127-132.

Babu, K. M., Church, R. J., & Lewander, W., (2008). Energy drinks: The new eye-opener for adolescents. *Clinical Pediatrics Emergency Medicine, 9*, 35-42.

Buxton, C., & Hagan, J. E. (2012). A survey of energy drinks consumption practices among student-athletes in Ghana: Lessons for developing health education intervention programmes. *Journal of the International Society of Sports Nutrition,* 9, 9-12.

Carvajal-Sancho, A., & Moncada-Jimenez, J. (2005). The acute effect of an energy drink on the physical and cognitive performance of male athletes. *Kinesiologia Slovenica, 11*(2), 5-16.

Committee on Nutrition and the Council on Sports Medicine and Fitness. (2011). Clinical report—sports drinks and energy drinks for children and adolescents: Are they appropriate? *Pediatrics*, *127*(6), 1182-89.

Daniels, J. W., Mole, P. A., Shaffrath, J. D., & Stebbins, C. L. (1998). Effects of caffeine on blood pressure, heart rate,

and forearm blood flow during dynamic leg exercise. *Journal of Applied Physiology, 85*(1), 154–159.

Dawes, J. J., Campbell, B. I., Ocker, L. B., Temple, D. R., Jeremy G. Carter, J. G., & Brooks, K. A. (2014). The effects of a pre-workout energy drink on measures of physical performance. *International Journal of Physical Education, Fitness and Sports, 3*(4), 122-131.

Del Coso J., Muñoz-Fernández, V. E., Muñoz, G., Fernández-Elías, V. E., Ortega, J. F., Hamouti, N., Barbero, J. C., & Muñoz-Guerra, J. (2012). Effects of a caffeine-containing energy drink on simulated soccer performance. *PLoS One, 7*(2): e31380. doi:10.1371/journal.pone.0031380.

Del Coso, J., Salinero, J. J., González-Millán, C., Abián-Vicén, J., & Pérez-González, B. (2012). Dose response effects of a caffeine-containing energy drink on muscle performance: A repeated measures design. *Journal of the International Society of Sports Nutrition*, 9, 21-25.

Duvnjak-Zaknich, D. M., Dawson, B. T., Wallman, K. E., & Henry, G. (2011). Effect of caffeine on reactive agility time when fresh and fatigued. *Med. Sci. Sports Exerc., 43*(8),1523–1530.

Eckerson, J., Bull, A., Moore, G., Baechle, T., Yee, J., Egan, S., Fischer, C., O'Brein, D., & Pulverenti, T. (2011). The effect of sugar free energy drinks on upper body strength and muscular endurance in males. *Journal of Strength & Conditioning Research, 25* retrieved from www.journals.lww.com on 16/12/2015.

Finnegan, D. (2003). The health effects of stimulant drinks. *Nutrition Bulletin, 28*(2), 147–155.

Gaurav, V., Singh, A., & Singh, S. (2011). Comparison of physical fitness variables between individual games and team games athletes. *Indian Journal of Science and Technology, 4*(5), 547-549.

Geethavani, G., Rameswarudu, M., & Rameshwari Reddy, R. (2014). Effect of caffeine on heart rate and blood pressure. *International Journal of Scientific and Research Publications, 4*(2), 1-3.

Goldstein, E., Jacobs, P. L., Whitehurst, M., Penhollow, T., & Antonio, J. (2010). Caffeine enhances upper body strength in resistance-trained women. *Journal of the International Society of Sports Nutrition*, *7*(18), 1550-2783.

Graham, T. E. (2001). Caffeine and exercise: Metabolism, endurance and performance. *Sports Medicine, 31,* 785-807.

Heckman, M. A., Sherry, K., & Gonzalez de Mejia, E. (2010). Energy drinks: An assessment of their market size, consumer demographics, ingredient profile, functionality and regulations in the United States. *Comprehensive Review in Food Science and Food Safety* (CRFSFS), 9, 303-317.

Kammerer, E., Krings, T., Wojton, S., Scheckel, E., Kuklinski, E., Jacobs, K., Homan, C., Veldhuizen, J., Siegle, S., Wright, A., McCann, M., Anderson, D., & Lowery, L. (2012). The effects of a caffeine-containing beverage on muscle explosiveness during ballistic bench throws. *Journal of the International Society of Sports Nutrition*, *9*(1), 15-21.

Jordan, J. B. (2012). Caffeine supplementation and reactive agility in elite youth soccer players. Unpublished thesis.

Marchetti, R., Forte, R., Borzacchini, M., Vazon, S., Tomporowski, P. D., & Pesce, C. (2015). Physical and motor fitness sports skills and executive function in adolescents: A moderated prediction model. *Psychology, 6,* 1915-1929.

Micheal, J. S., Rooney, K. B., & Smith, R. (2008). The metallic demands of Kayaking: A review. *Journal of Sports Science and Medicine, 7,* 1-7.

Militante, J. D., & Lombardini, J. B. (2004). Dietary taurine supplementation: Hypolipidemic and antiatherogenic effects. *Nutrition Research*, *24*, 787-80.

Nti, C. A., Pecku, E., & Opare-Obisaw, C. (2014). Energy Drink Consumption among University Students in Accra, Ghana. *Nature and Science*., *12*(8), 85-89.

Paton, C. D., Lowe, T., & Irvine, A. (2010). Caffeinated chewing gum increases repeated sprint performance and augments

increases in testosterone in competitive cyclists. *European Journal of Applied Physiology, 110*(6), 1243-1250.

Paddock, R. (2008). 'Energy drinks' implication for student athletes and athletic departments. *Sports Digest, 16*(4), 1558-6448.

Poliński, A., Kot, J., & Meresta, A. (2011). Analysis of correlation between heart rate and blood pressure. *Proceedings of the Federated Conference on Computer Science and Information Systems, 2*, 417–420.

Reissig, C. J., Strain, E. C., & Griffiths, R. R. (2009). Caffeinated energy drinks: A Growing Problem. *Drug Alcohol Dependence, 99,* 1-10.

Salinero, J. J., Lara, B., Abian-Vicen, J., Gonzalez-Millán, C., Areces, F., Gallo-Salazar, C., Ruiz-Vicente, D., & Del Coso, J. (2014). The use of energy drinks in sport: perceived ergogenicity and side effects in male and female athletes. *British Journal of Nutrition, 112*(09), 1494-1502.

Seifert, S. M., Shaechter, J. L., Hershorin, E. R., & Lipshultz, S. E. (2013). Health effects of energy drinks on children, adolescents and young adults. *Pediatrics, 127*(3), 511-528.

Stojanovic, M. D., Stojanovic, M. D., Kanostrevac, K., Veljovc, Dragoljb, V., Medjedovc, B., & Ostojc, S. M. (2011). The effects of pre-exercise high energy on exercise performance in physically active men and women. *Scientific Research: Advances in Physical Education*, *1*(1), 1-5.

Wang, C., Chang, C., Liang, Y., Shih, C., Chui, W., Tseng, P., Hung, D. L., Tzeng, O. J. L., Muggleton, N. G., & Juan, C. (2013). Open vs closed skill sports and the modulation of inhibitory control. *PloS One, 8*(2), e55773, http://doi.org/10.1371/journal.pone.0055773.

DEVELOPMENT OF INNOVATIONAL STRATEGIES FOR PHYSICAL, HEALTH AND SPORTS EDUCATION

Iember Amua
Federal College of Education, Zaria
Kaduna State, Nigeria

Abstract

In this paper, innovation is seen as a driver of growth and well-being. New technologies, products, services and organizations create jobs and rejuvenate industries. This also presents new opportunities for innovation and improvement in education systems. The paper, therefore, delved into some strategies for education innovation. It was explained that schools need to become places where diverse talents are recognized and nurtured and every student made to feel special. This will give each student opportunity to realize their full potential and succeed on their own terms. Again, innovative education brings about personality development since the creative capacity of students also manifest. Another strategy is that higher education must be developed to adapt and transform the status and ability of students to create the future. The paper further looked into some new strategies for physical education and sport. It was explained that since sports education is for all students, assessment should be a variety of sports and three-dimensional. In addition, the use and operation of multimedia design reflects the innovative aspect with the development of technology in physical education. Another new strategy is that physical educators must be engaged in high quality and sustainable professional development. This can be achieved through developing dynamic and high standard physical education programme that will consider content knowledge, instructional strategies and methods to create an individualized learning

environment that meets the needs of your diverse student population. Another section in the paper looked at the teaching method and innovation of physical education. To enhance the implementation of innovative education, the people-centered education must make way for student-centered, teacher-led education which gives full play to the initiative of students. There is also the need to enhance students' physique by exploring the teaching methods that will affect the students learning enthusiasm and initiative. The paper touched on the personalized sports teaching methods. Here, emphasis was placed on the fact that teaching method design should be changed from "teaching" to "learning method" and the teaching methods changed from "Professor" to "guide". Some recommendations were made for the experts and appropriate stakeholders to take actions.

Keywords: Innovation, Physical Education, Education, Strategy, Sports

Introduction

Innovation is a driver of growth and well-being. New technologies, products, services and organizations create jobs and rejuvenate industries. But to reap those gains, policy makers need to understand how the way we innovate is changing. This has implications for human resources and education systems if they are to feed this innovation society. This also presents new opportunities for innovation and improvement in education systems. Technological change, which not only permits new activities but makes those new activities superior in many important ways over the previous method of operation, creates long lasting innovations in society. Innovation is the soul of a nation's progress which is an inexhaustible motive force for national prosperity. The progress of a nation depends on the innovation of countless individuals. Students are the future of school education. Therefore, there is the need to develop in students' awareness of innovation and innovation capability which has a special status and role in the education activity course. An important way to achieve innovation is to pay attention to teaching classes in all subjects to carry out activities to achieve the students' awareness of innovation and creativity.

Strategies for Education Innovation

Today, meaningful, useful education is something all students need regardless of the career choices they will eventually make. Schools need to do more than just selecting students according to their cognitive abilities. The school needs to become a place where diverse talents are recognized and nurtured, where every student is made to feel special and has an opportunity to realize his or her full potential and succeed on his or her own terms - in other words, it needs to become "New Paradigm" schools.

According to the Organisation for Economic Cooperation and development (OECD), from a purely economic viewpoint, some obvious reasons why adults need to keep learning are seen as important because they contribute to:

1. Boosting productivity and market competitiveness;

2. Minimizing unemployment through developing an adaptive and qualified labour force;
3. and creating an environment for innovation in a world dominated by global competition. From a broader social perspective, knowledge, skills, and competencies are important because of their contributions outside the domain of economics and work. They contribute to increasing individual participation in democratic institutions; social cohesion and justice; and strengthening human rights and autonomy as counterweights to increasing global inequality of opportunities and increasing individual marginalization.

Modern education has been re-viewed and knowledge of talents, abilities and qualities to the transfer of knowledge into power and make quality, innovative education ideas and methods of education meet the physical and mental development of law. Personality is the stability of a person different from the psychological characteristics of other people. Therefore, innovative ability and personality development are mutually reinforcing. The process of developing creative capacity is a manifestation of personality. In short, the process of promoting the quality of education involves the innovation potential of education. This will promote the development of students, while effectively improving the teaching level. Economic and social development needs new ideas, new knowledge, new technology and innovative talents. This requires the development of higher education that will adapt and transform the status and the ability to create the future. This is the inevitable evolution of social functions of higher education. The 21st century is the era of knowledge-based economy with intellectual resources and high technology as the pillar. Therefore, cultivated creative talents will gradually become the primary function of higher education.

Innovation is a driver of growth and well-being. New technologies, products, services and organizations create jobs and rejuvenate industries while making others obsolete. To reap the gains of innovation, policy makers need to understand how the way we

innovate is changing and what this implies for education and training policies.

New Strategies for Physical Education and Sport

Physical education is often advocated as a source of a plethora of positive developmental characteristics from early childhood, through adolescence to late teenage. It is perceived to be a lifelong process throughout adulthood epitomized in the notion of physically educated person. Over the past century and the half, there has been ebb and flow among differing, sometimes contradicting, physical education curriculum themes. They include physical, educational, social control (order, discipline and obedience to authority), physical fitness (labour productivity, military defence and strong mothers), health (therapeutic), body shape, competitive performance related sports and associated physical/motor skills development. The themes also include play and movement concepts, personal, psychosocial, social and moral development (collectively promoting character building), adventure education, individual, lifetime, or recreational activities, antidote to inactivity and sedentary lifestyle, illnesses as well as an alleged obesity epidemic. The perceived role of physical education has expanded (it has been granted a role in achieving broader educational objectives such as whole school improvement, community development and effecting personal behavioural and attitudinal change) over the years and to some extent there has been a re-affirmation of its purposes for which some people have long such argued. Ostensibly as a school subject, with such broad brush scope and potential, physical education is in a relatively unique and indispensable position with some kind of responsibility in some way and somehow. It is also addressing many contemporary issues with its perceived distinctive features within the educational process with characteristics not offered by any other learning or school experience. A paradox here is the perception by many of physical education as a non-cognitive subject, inferior in status to other so-called academic subjects and by association, inferior status of physical education teachers.

Quality education is a comprehensive development of education. Sports education is for all students, therefore, assessment should also be a variety of sports, and three-dimensional. Quality education is not unmindful of the normal examination. For some people the future of physical and health education is a future directed towards young people's future health and well-being and, more specifically, their current and future participation in physical activity and sport.

Today good physical and health education is the top priority, and safety education of students is also a top priority. Every beginning teacher in class takes advantage of the regular class safety education for students. Dress must be sportswear, sports shoes, with its accessories, so as not to cause injury in sports. The teaching process should comply with classroom discipline and attention given to the management of sports equipment. Secondly, the warming part of the activities of the use and operation of multimedia design reflects the innovative aspect. With the development of technology, tape recorders, computer speakers, wireless microphones and other technology has greatly enhanced classroom efficiency and results.

One of the most important elements to developing and sustaining a high quality standard-based physical education programme is the on-going sustainable professional development. Time and again, physical educators are often engaged in professional development that does not address the instructional methods, strategies or content knowledge that is necessary to impact student achievement within physical education. In order to address the systemic change that is necessary to continue the advancement of physical education, it is essential that physical educators are engaged in high quality and sustainable professional development. Develop a high quality, dynamic, and standard-based physical education programme by developing the content knowledge, instructional strategies and methods to create an individualized learning environment that meets the needs of your diverse student population.

Physical education is a dynamic discipline that is continuously evolving through research in kinesiology, exercise physiology, and

biomechanics. To support the development of physically literate learners, educators must continuously build upon their in-depth content knowledge. Physical education serves as the foundation to promote healthful changes that reinforce the importance that tomorrow's healthy lifestyle begin today.

Teaching Method and Innovation of Physical Education

In recent years, with the infiltration of new ideas in physical education, many new teaching methods have emerged. This does not only enriches the sports teaching activities, but also become the focus of education workers. In this paper, the theory and practice of physical education, teaching methods and other concept of innovative education are explained:

1) ***The implementation of innovative education:*** The idea of education in our country is relatively backward. The content method is relatively old and there is heavy academic burden on students. Therefore, quality education is difficult to promote. The sports teachers adhere to the people-centered education but the implementation of innovative education is to be student-centered, teacher-led which gives full play to the initiative of students. This means that teachers must do the following: continue the form of teaching contents, methods; improve teaching quality; promote physical and mental health; improve students physique health, learning ability and innovative ability of students; educate students to obtain knowledge and skills; learn to live; learn to behave; advocate the innovation of physical education teaching methods, such as heuristic teaching, inquiry teaching, discussion teaching; help students master the learning skills and knowledge; stimulate students' curiosity and cultivate students' interest in learning.

2) ***To improve the learning efficiency, and adapt to the curriculum reform needs:*** With the increasing social competition with students' academic burden. Children have no right to learn, and some even appeared to have the spirit of panic, unhealthy psychological phenomenon. While most people are aware of the examination oriented education to bring the child's injury and shortcomings, but also know how to reform, but in fact, it is

difficult to change the fundamentals. The starting point of the curriculum reform is the students, the student's learning effect, ability training as a measure of curriculum reform. Physical education students are often associated with actual teaching is far different, resulting in students of physical education to be disappointed and lose the exercise of confidence and enthusiasm. Study of physical education teaching method not only reveal the physical education curriculum reform problems, it also resolves confusion in the hearts of teachers, and promote students to like physical education and actively take the initiative to participate in sports activities to provide help and reference.

3) ***Enhance students' physique, explore the teaching methods:*** It is well known that the reasonable teaching method cannot only make the teaching effect more effective, but also enable students to benefit from life. The method of organizing teaching or guiding students to practice the method will affect the students learning enthusiasm and initiative. This also will affect the students in the future to exercise habit forming and training of consciousness. The sports teaching method research is the effective way to promote adolescent students physical health. As far as the teaching method is concerned, it is not only a skill but also an art. The selection and use of it directly affects the students' interest in learning. While some teaching methods are enduring, other methods are ephemeral. The key is with changes that will improve the progress of the society and education development. Physical education teaching methods constantly need to be updated.

Modernization of Teaching Methods of Physical Education

The modernization of the teaching method of physical education is presented with the development of modern teaching technology. Multimedia, high-definition video, network, visualization charts, equipment technology are the means of teaching. These do not only enrich the form of physical education, but also play a supporting role in technical action learning. In the course of using teaching methods, it is bound to face the constraints of objective conditions of teaching environment. The

method should be mastered by teachers. Therefore, the level of teachers' teaching ability, innovative thinking, innovative consciousness and ability all determine the innovation of teaching methods, and also determine the effect of the implementation of the method.

Personalized Sports Teaching Methods

Teaching is the teachers and students put together. The students as the main body play the role of internal. To achieve good teaching effect, play the enthusiasm of the students by teaching students according to their aptitude. Modern physical education teaching reflects the distinction between treatments and respect for the students. This helps to carry out democratic teaching. To explain, demonstration, error correction based teaching methods have to explore independent, small groups based form. The reform of physical education teaching methods should also set up a new concept of education; pay more attention to the students' subjectivity; the whole society; the innovation and so on. To cultivate students' learning initiative and creativity has become a trend of teaching, and the teaching of physical education is no exception. With the change of physical education thought from "sports method theory" to "sports aim theory", the emphasis of teaching method design is changed from "teaching" to "learning method", and the teaching method is changed from "Professor" to "guide". Just as sex education is every student's right, “don't let every student behind” is the responsibility of teachers. The design and application of sports teaching methods pay more and more attention to the differences between students of different levels. Each student can then experience the joy of success to ensure that all students can be made to improve and develop.

Concern about the Students being Creative and Social

Cultivating students' innovative ability is the sacred mission of education. Physical education teachers should also be good at tapping the students' creative potential and cultivating innovative consciousness and creativity, such as technological innovation, rules innovation, organizational form innovation,

learning innovation. Physical education teachers should allow students to take the detour to explore; to stimulate students' curiosity, innovative thinking; to give friendly encouragement and guidance and to provide students with innovative opportunities and environment. Physical education is an effective way to cultivate students' cooperation, competition, justice, dedication and other social virtues. The creation of physical education teaching methods can provide students with such conditions and opportunities, such as cooperative learning, group discussion, guidance and help methods. Model motivation cannot only cultivate students' teamwork spirit and collective consciousness, but also can help people to help others, regulate behavior and friendly exchanges.

Conclusions

Physical education is developing with the development of school education. Sports teaching method is gradually developing along with the development of the discipline, from the training and mentoring of missionary methods become the method system of its own characteristics. It does not only contain the general education method, and the sports special subject specific method. The continuous development and improvement of sports teaching methods, enrich the content of physical education class, realize the goal of physical education, and complete the task of physical education teaching. Its history also has left a profound reflection: first, the teaching methods of physical education is along with the development of school education and continuous development; second, sports teaching method of native complex rubbing phenomenon is obvious. It not only shows the local function of instruction, but highlights the cultural characteristics of Western; third, the teaching methods of physical education from pedagogy, psychology, physiology and subject concept has more and more influence and transplantation method is also increasing.

For some people the future for physical education is a future directed towards young people’s future health and well-being and, more specifically, their current and future participation in physical activity and sport. Sport, play and physical education occupy an important role in human development. By their very nature, sport,

play and physical education are about participation, inclusion and a sense of belonging. They bring individuals and communities together, highlighting commonalties and bridging cultural and ethnic divides. Sport, play and physical education provide a forum to learn skills such as discipline, confidence and leadership and they convey core principles that are important in democracy, such as tolerance, cooperation and respect.

Sport and physical education teach the fundamental value of effort and how to manage essential steps in life such as victory or defeat. At the same time, physical education classes are often the first ones to be reduced or cancelled in schools in hard economic times, conflict or under the pressure from other academic fields. Development is a process of enlarging people's choices and increasing the opportunities available to all members of society. Based on the principles of inclusion, equity and sustainability, emphasis is on the importance of increasing opportunities for the current generation as well as generations to come. The basic human capabilities that are necessary for this are to live long and healthy lives, to be knowledgeable, to have access to the resources needed for a decent standard of living and to be able to participate in the life of community. Sport can directly help built these capabilities.

The rapid development of science and technology in the 21st century, the era of knowledge economy, the growing characteristics and talents in various fields should have made the "creativity" of the quality requirements. Universal Physical Education should be based on the quality of the new era of talent to this request, the students of innovation and creative thinking as the focus of teaching objectives.

Recommendations

Based on the above observations, it is envisaged that innovative strategies for physical education and sport in Nigeria will still need to be given close attention by physical education experts and all stakeholders. It is in the light of this that the following recommendations are made:

1. ICT should be integrated into the Curriculum of the Health and Physical Education

2. The computer and internet use related programmes should be integrated into the school Health and Physical education curriculum to enhance students' use of ICT.
3. Employers of labour should make computer literacy requirement for employment for health and physical education teachers.
4. Sport facilities around the school should be well-maintained and taken care of.
5. Students be provided with the necessary modern materials and apparatus needed for practical classes.
6. Exercise laboratories such as gymnasiums be made available and accessible for physical and health education students so as to enable them do their practical effectively and not only concentrate on the theory aspect of the learning process.
7. In-service training on computer literacy should be organized periodically for teachers of health and physical education.
8. Schools should provide computer and internet facilities for use by the Health and Physical Education teachers.
9. Physical education curriculum in Nigeria should not be restricted in terms of its orientation and administration particularly at the tertiary institutions. Students and teachers here should be allowed to use modern technological apparatus in achieving; teaching and learning process respectively.
10. The teaching practice programme should be given a wide coverage to enable students go to other non-teaching areas and sports related industries to acquire the required experience.
11. The National Association for Physical, Health Education, Recreation, Sports and Dance (NAPHER-SD), which is a professional body in charge of physical education should be reorganized to be active in order to achieve its set goals.

References

Dai, W., & Fan, L. (2012). Discussion about the pros and cons and recommendations for multimedia teaching in local vocational schools. *Physics Procedia, 33,* 1144-1148.

Griggs, G. (2016) Spending the primary Physical Education and sport premium: A West Midlands case study. *Education, 44*(5), 547–555.

Hardman, K. (2010). *Physical education: "The future ain't what it used to be".* Youth Sport Congress, Ljubljana, 2-4 December.

Janta H., & Lugosi, P. (2012). Migrant networks, language learning and tourism employment. *Tourism Management, 2*(33), 431-439.

Kim, A. K., & Davies, J. (2014). A teacher's perspective on student centred learning: Towards the development of best practice in an undergraduate tourism course. *Journal of Hospitality, Leisure, Sport & Tourism Education, 25*, 6-14.

Krstev C., & Trtovac, A. (2014). Teaching multimedia documents to LIS students. *The Journal of Academic Librarianship, 2*(40), 152-162.

Nair, P. (2008). 30 *Strategies for education innovation*. Retrieved from http://www. designshare.com Organisation for Economic Cooperation and Development. (2008). *Lifelong learning and sectors of education.* Organisation for Economic Cooperation and Development. Building Partnerships for Progress.

Penne, D., & Jess, M. (2004). Physical education and physically active lives: A lifelong approach to curriculum development sport. *Education and Society, 2*(9), 269 287.

Sigala, M. (2012). Investigating the role and impact of geovisualisation and geocollaborative portals on collaborative e-learning in tourism education. *Journal of Hospitality, Leisure, Sport & Tourism Education, 11,* 50-66.

Sue, F., & Mary, P. (2001). Managing change: The use of mixed delivery modes to increase learning opportunities.

Australian Journal of Education Technology, 1(17), 37-49.

Wang, R. (2017). Research on physical education problems and management reform of Chinese colleges and universities. *EURASIA Journal of Mathematics Science and Technology Education, 13*(10), 7057-7069.

Zhang, C., & Chen, X. (2012). Use of multimedia in gross infective pathogen experimental teaching. *Procedia Engineering, 37*, 64-67.

Zhang, H. (2016). Research on innovation of physical education teaching method based on inquiry teaching: A survey based on online questionnaire. *International Journal of Future Generation Communication and Networking, 2*(9), 37-48.

Zhang, B., & Peng, P. (2017). Research on the development of education resources for the internet plus universities in the national health field. *Eurasia Journal of Mathematics Science and Technology Education*, *13*(8), 5085–5093.

MAKING WEIGHT FOR SPORTS PERFORMANCE: IMPLICATIONS FOR HEALTH OF COMBAT SPORT ATHLETES IN NIGERIA

***[1]Dominic, O. L., [2]Talabi, A. E., [3]Sarpong, E. O., [4]Musa, M. O. [2]Seidina, I. Y., [2]Abubakar, N. O. & [2]Bakinde, S.T.**

[1]Department of Health, Physical Education and Recreation University of University of cape Coast, Ghana
[2]Department of Human Kinetics Education, University of Ilorin, Nigeria
[3]Department of Health, Physical Education, Recreation and Sports, University of Education, Winneba, Ghana
[4]Federal College of Education, Okene

Abstract

The purpose of this study was to determine implication of weight-making practice (WMP) on health of combat sport athletes. Descriptive correlational design was used. The population comprised 80 combat sports athletes who participated in Kongfu, Wrestling, Boxing, Judo, Karate and Taekwondo in Kwara State of Nigeria. Sixty-four (64) of them (age range = 15 – 54 years; males n = 73.3% (44), weight 69.3 ± 10.6 kg and females n = 26.7% (20), weight 61.5 ± 11.6 kg) were selected using stratified random sampling technique. Data was collected using a researcher-developed questionnaire, which was validated and tested for reliability (r = .86). The SPSS version 20.0-application software was used for statistical analyses. Frequency counts and percentage were used to describe demographic data; mean and standard deviation were used for describing body composition. Chi-square was used to analyse the association between WMP and health, one-way ANOVA for the effect of sport on WMP and health. Hypotheses were tested for statistical significance at 0.05 alpha level. There was significant association between WMP and general health χ^2 (1) = 4.158, p = .034; Cramer's V = .27, p = .034; odds = 1.2. There was significant association between WMP and health

after competition χ^2 (1) = 8.531, p = .003; Cramer's V = .38, p = .003; odds = 1.4. There was no significant association between WMP and health during competition χ^2 (1) = 2.347, p = .187. Type of sport significantly influenced WMP, F (5, 58) = 2.458, p = .004, η^2 = 0.228$_{(22.8\%)}$; general health F (5, 58) = 4.240, p = .003, η^2 = 0.185$_{(18.5\%)}$; and health after competition; F (5, 58) = 2.597, p = .035, η^2 = 0.194 $_{(19.4\%)}$. In conclusion, the participants' WMP may lead to physiological deviations and long-term health consequences. It was recommended that combat athletes and their coaches should be educated about the long-term effects of WMP on health and sports performance of athletes. Input of Exercise and Sport Scientists is vital for best practices in weight making.

Keywords: Combat sports, Health, Performance, Weight, Weight-making practice

Introduction

Making weight is the practice used by weight class athletes to lose weight prior to competitive events in order to compete in a favourable weight category where they believe their chances of winning might be higher. As a basic rule in all combat sports, athletes must be classified according to their body mass, age and gender so that the matches are more equitable in terms of body size, strength and agility (Burke & Cox, 2009; Langan-Evans, Close, & Morton, 2011), to ensure fair and interesting matches as well as reducing the potential injuries caused by large differences in body mass and strength (Artioli et al., 2010). In order to achieve the target weight, many athletes use a combination of acute and chronic means that involves severe energy restriction and dehydration (Kons, Da Silva Athayde, Follmer & Detanico, 2017). Dehydration is mostly used in the days preceding the weigh-in, a process commonly known in combat sports as "drying out" (Morton, Robertson, Sutton & MacLaren, 2010). In addition, Langan-Evans et al. (2011) and Kons et al (2017) listed meal skipping, fasting, sauna use, sweat suits, laxatives use, diuretics, diet pills and vomiting as common approaches employed by combat sports athletes to make their desired weights. Pettersson, Ekstrom and Berg (2012), observed that delay in weigh-in till the match may allow acute recovery strategies, subsequent to severe food and fluid intake restrictions with dehydration associated with vigorous exercise done with sweat suits or saunas.

Many athletes acutely reduce body mass in an attempt to get an advantage by competing against lighter, smaller and weaker opponents (Artioli et al., 2010; Langan-Evans et al., 2011). The National Collegiate Athletic Association of Wrestling (NCAA) recommends weight loss not exceeding 1.5% total body weight per week. Similarly, Reale, Slater and Burke (2016) and Pallarés et al. (2016) noted that the American College of Sports Medicine, the Association of Ringside Physicians and the National Athletic Trainers Association warned against extreme practices. In fact, they recommended rule changes to discourage specific weight loss techniques and large magnitudes of acute weight loss (AWL) as well as recommended minimum body fat levels of 5% and 12% in

males and females respectively. Unfortunately, many athletes including medalists exceed this limit in order to achieved better classification than those who lost less weight (Cicioglu et al, 2017). Thus, athletes who had practiced more aggressive weight cutting procedures presented better competitive results than their counterparts who were more conscious with their health (Reale et al, 2016; Cicioglu et al, 2017).

Evidence based studies have reported that athletes undergoing rapid weight loss (RWL), a process of 2–10% of body weight reduction over 5–7 days, have psychological issues like decrease in short-term memory, vigour, concentration and self-esteem as well as increased confusion, rage, fatigue, depression and isolation (da Silva Santos, Takito, Artioli & Franchini, 2016). A drastic reduction in body weight before competition has been associated with alterations in basal metabolism, muscle glycogen, aerobic capacity, cardiac output, immunological system, cognitive problems, memory loss and poor information processing (Kons et al, 2017). These conditions are highly associated with performance impairments, delayed recovery from fatigue and might contribute to chronic health problems. Some epidemiological studies associated RWL with increased risk for injuries (Agel, Ransone, Dick, Oppliger & Marshall, 2007), others found that a 5% reduction in body mass affected metabolism and muscle contraction pattern, thereby increasing exposure to injury (Oopik et al., 1996; Green, Petrou, Fogarty-Hover & Rolf, 2007).

Violation of weight making regulations continues to increase as athletes aim to perform better in competitions. According to Magraken (2014) several athletes have reportedly tested positive to diuretics, failed to make weight, and have withdrawn from contests due to adverse effects of weight cutting for example, nausea, vomiting, headaches, cramping, seizures, feinting and flu-like symptoms. It was reported in Spain, that weight making practice accounted for high prevalence of hypohydration among combat athletes at weigh-in, and this could not be fully reversed 13–18h before competition (Reale *et al,* 2016). In November 1997, three American wrestlers died during making weight using food and fluid restriction, vapour

impermeable suits and exercise in hot and humid environment (Magraken, 2014). Brazilian mixed martial arts (MMA) athlete, Leandro Souza also died in a sauna after attempting to lose 20% (≅ 15 kg) of body mass within 7 days. Extreme dehydration and chronic use of non-steroidal anti-inflammatory drugs (NSAIDs) to lose weight has resulted in hospitalization of high-profile combat athletes some of whom were forced to retire prematurely with kidney disease (Crighton, Close & Morton, 2015) or various levels of internal damages (Jenness, 2017).

While the benefits of weight making for performance remain equivocal, the practice is consistent among combat athletes. Currently, few researches have considered the implications of weight making on combat sport athletes in Nigeria. Hence, the need for the current study, which examined the practice among Nigeria combat sports athletes. Specifically, the study considered the association of weight making practice with general health of combat athletes, and their health during and after competition. The effect of type of combat sport, gender, age range, marital status and academic qualification on weight making practice was also examined.

Methods

The study was cross-sectional survey of 80 combat sports athletes who partook in wrestling, boxing, judo, kungfu, karate and taekwondo training at the Kwara State Stadium Complex. Stratified random sampling technique was used to select 64 of the athletes, which comprised 10 Kungfus, 11 Wrestlers, 10 Boxers, 10 Judokas, 12 Karate-Dos and 11 Taekwondoist. The sample was made up of 73.3% (44) males and 26.7% (20) females whose age range consisted of four decade groups; 15 to 24 years (51.7%), 25 to 34 years (23.3%), 35 to 44 years (20.0%) and 45 to 54 years (5.0%). In addition, 54.7% (35) were single while 45.3% (29) were married. Majority of the combat athletes had formal education as follows; 33.3% (20) secondary education, 23.4% (15) National Certificate of Education and National Diploma, 30.3% (20) Bachelor degree, 3.1% (2) Master degree and 10.9% (7) had other type of education. The University of Ilorin Ethical

Committee approved the study, all the participant were properly enlightened about the study and fully consented by filing and signing the informed consent form.

Data Collection

A validated researcher-designed questionnaire with two sections A and B was used to elicit information about weight making practice (WMP) and its effects on weight and health of the participants. Section A had seven items that elicited demographic information of participants. Section B had four sub-sections. Sub-section (i) had 10 items on practice of weight making, (ii) had 10 items on effects of weight making, (iii) had 7 items on weight making and health implications during performance while (iv) had 5 items on after competition health implications. All the statements in section B followed a positive trend with scores assigned as follows; "Always" (4); "Often" (3); "Rarely" (2) and "Never" (1). For sub-section (i), the highest score was 40 and the lowest 10. Sub-section (ii) was scored 40 as highest with 10 as the lowest. The status of the general effect of weight making was designated with the following cut-off points: (a) 1-20: no effect; (b) 21-40: very serious effect. Sub-section (iii) which covered the implications on athletes' health during performance had cut-off as follows: (a) 1-14: no effect on performance; (b) 15-28: totally affected performance. In sub-section (iv) the highest score was 20 and the lowest was 5. It covered the after competition health implications and had the following cut-off point: (a) 1-10: no after competition effect; (b) 11-20: serious after competition effect. Other instruments, standardized non-elastic anthropometric tape rule (Lufkin W606PM) was used to measure waist and hip circumferences (to the nearest 0.1cm) and body fat/hydration monitor scale (7032497, China) was used for measurement of body weight. Participants wore light clothing and removed their shows during measurements. Waist-to-hip ratio (WHR) was calculated as waist circumference divided by hip circumference. The ACSM (2013) health rating for waist circumference (WC) and WHR was used. WC was rated as follows: very low risk (female = <70cm, male = <80cm); low risk (female = 70-89cm, male = 80-99cm);

high risk (female = 90-109cm, male = 100-120cm); and very high risk (female = >110cm, male = >120cm). WHR was rated as: desirable (female = ≤0.86, male = ≤0.95) and very high risk (female = >0.86, male = >0.95)

Data Analysis

The SPSS version 20.0-application software was used for data analysis. Frequency count and percentage were used for analyses of demographic data, WC and WHR. Mean and standard deviation was used for analysis of body weight. Pearson Chi-square for independence was used to test the association between WMP and health. Cross tabulation with 2 x 2 contingency table were used to determine the proportion of association between the dependent and independent variables. To test for significant difference among the athletes, One-way ANOVA was conducted to examine the difference in WMP and its effect on their weight and health based on the type of sport they participated in. Marital status, gender, age range and educational qualification were considered as confounders and examined for their effects on WMP, weight change and implication for health. T-test was used to examine the effect of gender and marital status while One-way ANOVA was conducted to test the effect of age range, educational qualification. All tested hypotheses were considered to be statistically significant if $p \leq 0.05$.

Results

Table 1: Descriptive Analysis of Body Composition of Combat Athletes

Variable	Mean ± SD	Frequency	Percentage
Weight			
Male (n = 44)	69. 3± 10.6		
Female (n = 20)	61.5 ± 11.6		
Waist Circumference (WC)in cm			

Male (n = 44)	76.3 ± 16.5		
Female (n = 20)	76.5 ± 12.7		
Rating (Male and Female)			
Very low risk		31	48.4
Low risk		27	42.2
High risk		6	9.4
Total		**64**	**100.0**
Waist-to-hip Ratio (WHR)	.84 ± .08		
Male (n = 44)	.86 ± .11		
Female (n = 20)			
Rating (Male and Female)			
Desirable (Low risk)		48	75
Very High risk		16	25
Total		**64**	**100.0**

All the athletes reported they had engaged in practices of weight making to fit into certain combat category of the various sports and to improve their performances in competitions. These had impact on their body mass and body compositions. Table 1 shows descriptive analysis of the participants' WC and WHR. Average waist circumference for male participants was *76.3 ± 16.5* while that of female participants was *76.5 ± 12.7*. Rating for health shows that *9.4% (6)* had high risk WC that could predispose them to cardio-metabolic diseases. WHR indicated the male participants had an average of *.84 ± .08* and female participants had *.86 ± .11*, the rating for disease risk shows that as much as *25% (16)* participants had high risk for diseases. This implies WHR might be a more sensitive measure for detecting weight-related health risk among the participants.

Table 2: Association between Weight Making Practice (WMP) and Health of Combat Athletes

Variables	n	Value	df	Sig
General Health				
Pearson Chi-square (χ^2)		4.158	1	.034
Likelihood ratio	64	4.656	1	.031
Cramer's V		.27		.034
Health during Competition				
Pearson Chi-square (χ^2)		2.347	1	.184
Likelihood ratio	64	2.361	1	.184
Cramer's V		.194		.126
Health after Competition				
Pearson Chi-square (χ^2)		8.531	1	.003
Likelihood ratio	64	8.803	1	.003
Cramer's V		.38		.003

$p \leq 0.05$

The findings showed that WMP was associated with the participants' health. Based on the observed responses, *61.7%* of the participants reported that WMP had no effect on their general health and health after competition while *38.3%* of them reported serious effects. Pearson Chi-square test for independence (table 2) revealed a significant association between WMP and general health; *n = 64, χ^2 (1) = 4.158, p = .034*. The corresponding likelihood ratio was *4.656, p = .031*. Overall, the effect of WMP on general health of these combat athletes was medium; *Cramer's V = .27, p = .034.* The odd that the participants would have any general health problems was 1.2 times due to the weight making practices they adopted. The association between WMP and the participants' health after competition was significant; n = 64, *χ^2 (1) = 8.531, p = .003.* The likelihood ratio for this association was *8.803, p = .003*; the size of health effect was medium *Cramer's V = .38, p = .003.* Odds that WMP had effect on the athletes' health after competitions were 1.14 times. There was no significant association between WMP and the participants' health during competition; n = 64, *χ^2 (1) = 2.347, p = .187.*

Table 3: Effect of Sport on WMP and Health of Combat Athletes

		SS	df	MS	F	Sig
Effect on WMP	Between groups	2.630	5	.526		
	Within Groups	11.554	58	.214	2.458	.004
	Total	**14.183**	**63**			
General health effect	Between groups	4.154	5	.831		
	Within Groups	10.580	58	.196	4.240	.003
	Total	**14.733**	**63**			
Effect during Competition	Between groups	1.619	5	.324		
	Within Groups	13.365	58	.247	1.308	.274
	Total	**14.983**	**63**			
Health effect after Competition	Between groups	2.908	5	.582		
	Within Groups	12.092	58	.224	2.597	.035
	Total	**15.000**	**63**			

$n = 64$; $p \leq 0.05$

Most of the athletes reported that WMP resulted in weight change. Table 3 shows the effect of sport on WMP and health of the participants. It was revealed that type of combat sport had significant effect on WMP; *n = 64, F (5, 58) = 2.458, p = .004*. The size of this effect was large; $\eta^2 = 0.228_{(22.8\%),}$ post-hoc analysis show that actual difference was among the taekwondo athletes; *MD = .616, p = .049, 95% CI* ranging from *.002 to 1.234* and wrestling athletes; *MD = -.616, p = .049, 95% CI = -1.234 to -.002*. There was no significant difference in WMP of other

athletes. There was a significant effect on general health; *n = 64, F (5, 58) = 4.240, p = .003;* the extent of this effect on the athletes was large, $\eta^2 = 0.185_{(18.5\%)}$. Post-hoc analysis revealed two sports had the largest difference; boxing, *MD = .616, p = .035, 95% CI = .028 to 1.204 and* karate, *MD = .798, p = .002, 95% CI = .210 – 1.386.* Furthermore, the type of sport had significant effect on health after competition; *n = 64, F (5, 58)* = 2.597, p = .035. This effect was also large, η^2 = 0.194 $_{(19.4\%)}$; post-hoc result shows the effect was mostly observed among the taekwondo athletes; *MD = .678, p =.024, 95% CI = .056 – 1.315* and karate athletes, MD = -.687, p = .024, 95% CI = -1.315 to -.059. Our result showed type of combat sport had no significant effect on the athletes' health during competition; *n = 64, F (5, 58) = 1.308, p = .274.*

Some variables: gender, age range, marital status and educational qualification considered potential confounders were analysed for effect on WMP, weight change, and health of the combat athletes. T-test analysis revealed no significant effect of gender and marital status on WMP, weight and health of the participants. One-way ANOVA revealed no significant effect of age range on WMP and health. However, the result shown in table 4 revealed that educational qualification of the athletes had significant effect on only their health after competition. n = 64, F *(5, 58) = 4.930, p = .274.* The size of the effect was large η^2 = .264 $_{(26.4\%)}$, and particularly differed among the most educated of the athletes. Post hoc analysis revealed that athletes who had bachelor degree *MD = .571, p = .003, 95% CI = .155 to .989* and those who had master degree had *MD = .737, p = .009, 95% CI = -.203 to 1.676* were significantly different from athletes with others forms of education.

Table 4: Effect of Educational Qualification on WMP and Health of Combat Athletes

		SS	df	MS	F	Sig
Effect on WMP	Between groups	.875	5	.219		
	Within Groups	13.308	58	.242	.904	.468
	Total	**14.183**	**63**			
General health effect	Between groups	1.676	5	.419		
	Within Groups	13.057	58	.237	1.765	.149
	Total	**14.733**	**63**			
During Effect Competition	Between groups	1.624	5	.406		
	Within Groups	13.057	58	.243	1.672	.170
	Total	**14.733**	**63**			
Health effect after Competition	Between groups	3.959	5	.990		
	Within Groups	11.041	58	.201	4.930	.002
	Total	**15.000**	**63**			

$n = 64$; $p \leq 0.05$

Frequency distribution for health effect of WMP after competition indicated that among secondary school education level; *n = 19*, no health effect = *26.3% (5)* participants, very serious effect = *57.1% (14)* participants. The NCE/diploma level was *n = 14*, those who reported no health effect were *42.9% (6)* participants, and very serious health effect were *57.1% (8)* participants. The Bachelor degree holders *n = 18, 83.3% (15)* participants reported no health effect, while very serious health effect were *16.7% (3)*. All the Master holders *n = 2 (100%)* reported no health effect. Among participants who had other educational qualification *n = 7*, only *28.6% (2)* participants

reported no health effect while *71.4% (5)* participants had very serious health effect.

Discussion

The study was conducted to determine the implications of making weight on the health of combat athletes. Body composition assessment revealed the male athletes were heavier than the female athletes were. Body mass index (BMI) was not considered in analyzing body composition since it could be a misleading assessment for classifying athletes (Okorodudu, et al, 2010; Etchison, Bloodgood, & Minton, 2011; Torstveit, & Sundgot-Borgen, 2012; Buss, 2014), WC and WHR which are more consistent measurements in detecting body weight-related disease risk (Tagurum et al, 2015; Walther, Philipp, Lozza & Ehlert, 2017) were used.

WC rating showed a few of the athletes 9.4% had high health risk while WHR indicated more of them 25% had very high health risk. This implies that WHR is a more sensitive measure for assessing the risk of overweight and obesity related diseases in combat athletes. Although this could be misleading as a number of studies have reported varying amount of sensitivity with the use of either WC or WHR for health assessment, some favoured WC (Oladapo et al, 2010) while others argued in favour of WHR (Odo, Ezeanyika & Uchendu, 2015; Talabi, 2016; Walther et al, 2017). Based on the finding of this study, we suggest both measures are useful. Additional study following larger sample over time would better explain the most sensitive of these body composition measurements for weight-class athletes.

WMP alters metabolic activities, cardiovascular functions, electrolyte activity, thermo-regulation and renal function, that leads to decline in the ratio of fat mass (FM) to fat-free mass (FFM) and changes in total body water (TBW) (Sagayama, Yoshimura et al, 2014). This could affect the health of combat athletes (Langan-Evans, Close & Morton, 2011; Sagayama et al, 2014; da Silva Santos et al, 2016; Kons et al, 2017) in several ways. Considering this, association of WMP with participants'

health was assessed in the domains of general health (physiological and functional state every other day), health during (physiological and functional state while participating in competition), and after competition (physiological and functional state 24 hours up to 2 weeks after competition). This was quite different from other studies that mostly reported health effect of weight making without reference to periods before or after competition. Finding revealed no significant association between WMP and health of the participants during competition. In order to lose weight rapidly, some of the methods that combat athletes adopt include dehydration, fasting, skipping meals, laxatives and diuretics (Morton et al, 2010; Langan-Evans et al, 2011; Kons et al, 2017) that have impact on fuel supply, energetics and impairment of athletic performance (Dominic & Onifade, 2005; Clark, Lucett & Sutton, 2012; Papadopoulou, 2015). This have caused health problems such as poor blood circulation, anticipation skills, decision-making, cardiac arrhythmia, reduced bone mineral density and decreased muscle mass (Abedelmalek, Chtourou, Souissi & Tabka, 2105; Chapman & Woodman, 2016). During competitions, health status of athletes is crucial to their performance and is directly influenced by nutrition. It could be argued that WMP might have influenced the health of our participant in some ways, which they did not notice considering the fact that during competitions, athletes and coaches are mainly interested in winning and may easily attribute any physiological changes to demands of the competition. Similarly, Reale, Burke and Slater (2016) suggested that performance of a weight-class athlete is mostly considered relative to their opponents rather than the individual's absolute best, as such the effects of WMP practice on performance are often not known if the athlete have won an opponent.

WMP was significantly associated with the participants' health after competition and generally. In periods when the competitions were ended it is expected that recovery commences immediately with replenishment of depleted glycogen stores. However, practice of weight-making is reported to interfere with recovery due to compromised functions of organs and might lead

to chronic health problems of various degrees (Jenness, 2017). In addition, chronic WMP resulted in energy deficits among athletes who use chronic weight loss and regain practices to manage their body mass leading to impairment in lean mass maintenance, immune function, bone health, metabolic and hormonal function (Franchini, Brito & Artioli, 2012). This suggest a high tendency that combat athletes in Kwara State, Nigeria could have experienced symptoms of some of these health problems since it was found that they had health problems that affect their recovery after the competition and their health generally. It has been documented also that restriction of energy and nutrients compromises the immune system and decreased resistance to infection (Abdelmalek, Chtourou, Souissi & Tabka, 2015), which also explains the health problems after competition and the extension to general health issues found in this study.

The type of combat sport participants engaged in had significant effect on their WMP; about 22.8% of the combination of methods adopted was determined by type of sport. This implied that athletes of each combat sport had unique WMP that they adopted to lose and regain weight. This finding confirmed previous studies that identified specific patterns of weight-making among different type of combat sport athletes (Andreato et al, 2014; da Silva Santos et al, 2016). The effect of sport on WMP was large and particularly highest among the taekwondo and wrestling athletes. Using a different protocol, some studies have shown that body mass gained between weight-in and success in competition suggest that apart from type of sport, the level of competition also have influence on WMP of combat athletes. For example, Reale et al. (2106) found that WMP of high school wrestlers was different from collegiate and national championship wrestlers. In addition, the number of competitions the athletes participated within the year might also account for variations in WMP since athletes always attempt to lose weight in order to fit into a desirable weight-class each time they compete (Kazemi, Rahman & De Ciantis , 2011; Brito et al, 2012). As such, they are likely to try out a number of new methods to lose weight rapidly. There was significant difference in after competition and general health

implication of WMP among the athletes. This further confirms our finding that WMP differed based on the type of combat sport of the participants. Regarding general health, type of sport accounted for a large difference of 18.5%, which mostly affected the boxing and karate athletes. Similarly, WMP accounted for a large difference of 19.4% in after competition health among the athletes that affected mostly taekwondo and karate athletes. Since the type of sport affected WMP of the participants, it was expected that the same would be applicable to health during competition. Our finding however proved the type of combat sport did not significantly affect the participants' health during competition. This is in line with previous reports that RWL and WMP have negative consequences on health and performance of athletes during competitions (Reale et al, 2016; Cicioglu et al, 2017; Kons et al, 2017).

Among the hypothesized confounding variables (gender, age range, marital status and educational qualification), only educational qualification had significant effect on the participants' health after competition. Education is one of the factors that is strongly linked to health behaviours. Irrespective of socio-economic status, people with higher level of education have increased positive health behaviours and better health status than those with lower education status (Feinstein et al, 2006; Çelebi, Gündoğdu & Kızılkaya, 2017). This was confirmed in our study as it was discovered that high educational status significantly abated negative consequences of WMP on health after competition. Reported after competition health effect indicated that all the Masters holders had no health effect, just 3% of the Bachelor degrees had health problems and 57.1% of NCE/Diploma and Secondary Education each had serious health effect. This suggest a need for nutritional and health enlightenment programme for the athletes in order to help them adopt healthy WMP that improve their performance and general wellbeing.

Conclusions

Based on the findings of this study we conclude that WMP influences health after competition and general health. This was specifically determined by type of combat sport and the level of

education of the athletes. For type of sport, the taekwondo, karate, wrestling and boxing athletes were most affected while those with lower levels of education (secondary and NCE/diploma) had more health problems. Despite proven competitive advantage of RWL, the long-term health implications may be deleterious if the athletes do not adopt healthy WMP. Therefore we recommend that:

1. Sports authorities in Nigeria should embark on enlightenment programmes to educate combat sport athletes and coaches about the long term hazards of RWL practices in order to prevent reduce the effect of prevailing practices and to abate unfortunate consequence during and after competitions.
2. Professionals in Exercise and Sport Science should help to proffer healthy alternatives for improving performance so that combat sports athletes and their coaches can avoid the use of rapid weight loss.

References

Abedelmalek, S., Chtourou, H., Souissi, N. & Tabka Z. (2105). Caloric Restriction Effect on Proinflammatory Cytokines, Growth Hormone, and Steroid Hormone Concentrations during Exercise in Judokas. *Oxidative Medicine and Cellular Longevity 3*, 492-500.

Abedelmalek, S., Chtourou, H., Souissi, N. & Tabka, Z. (2015). Caloric restriction effect on proinflammatory cytokines, growth hormone, and steroid hormone concentrations during exercise in judokas. Oxidative *Medicine and Cellular Longevity*, 1 – 9.

Agel, J., Ransone, J., Dick, R., Oppliger, R., & Marshall, S. W. (2007). Descriptive epidemiology of collegiate men's wrestling injuries: National Collegiate Athletic Association Injury Surveillance System 1988-2004. *Journal of Athletics Training, 42*, 303-310.

Alderman, B. L., Landers, D. M., Carlson, J., & Scott, J. R. (2004). Factors related to rapid weight loss practices among

international-style wrestlers. *Medicine and Science in Sports and Exercise, 36,* 249-252.

Andreato, L. V., Thaís Vidal Andreato, T. V., da Silva Santos, J. F., Del Conti Esteves, J. V., de Moraes, S. M. F., Emerson Franchini, E. (2014). Weight loss in mixed martial arts athletes. *Journal of Combat Sports and Martial Arts 2*(2), 125-131.

Artioli, G. G., Gualano, B., Franchini, E., Scagluisi, F. B., Takesian, M., Fuchs, M., & Lancha, A. H. (2010). Prevalence, magnitude and methods of rapid weight loss among judo competitors. *Journal of Sports Medicine and Exercise Science, 42,* 436-442.

Artioli, G. G., Iglesias, R. T., Franchini, E., Gualano, B., Kashiwagura, D. B., Solis, M. Y… Lancha Junior, A. H. (2010). Rapid weight loss followed by recovery time does not affect judo-related performance. *Journal of Sports Sciences, 28,* 21-32.

Brito, C. J., Roas, A. F. C., Brito, I. S. S., Marins, J. C. B., Córdova, C. & Franchini, E. (2012). Methods of body mass reduction by combat sport athletes. *International Journal of Sport Nutrition and Exercise Metabolism 22,* 89-97.

Burke, L. M., & Cox, G. R. (2009). Nutrition in combat sports. In Combat Sports Medicine. 1st edition. Edited by Kordi, R, Maffuli N, Woble R. R., & Wallace, W. A. London: Springer- Verlag; 1-20.

Buss, J. (2014). Limitations of body mass index to assess body fat. *SAGE Journals 62*(6), 264 -264.

Çelebi, E., Gündoğdu, C. & Kızılkaya, A. (2017). Determination of Healthy Lifestyle Behaviours of High School Students. *Universal Journal of Educational Research 5*(8), 1279-1287.

Chapman, J. & Woodman, T. (2016). Disordered eating in male athletes: a meta-analysis. *Journal of Sports Science 34*(2), 101-109.

Cicioglu, H. I., Isik, O., Yildirim, I., Unveren, A. & Karagoz, S. (2017). The effects of dehydration before competition upon

body compositions, leptin hormone and ghrelin hormone among elite wrestlers. *Biomedical Research 28*(10), 4335-4341.

Clark, M. A., Lucett, S. C. & Sutton, B. G. (2012). *Essentials of personal fitness training*. National Academy of Sport Medicine (NASM) (4th ed.). USA: Lippincott Williams & Wilkins Baltimore.

Crighton, B., Close, G. & Morton, J. (2015). Alarming weight cutting behaviours in mixed martial arts: a cause for concern and a call for action. *British Journal of Sports Medicine 0*(0), 1 -2.

da Silva Santos, J. F., Takito, M. Y., Artioli, G. G. & Franchini, E. (2016). Weight loss practices in Taekwondo athletes of different competitive levels. *Journal of Exercise Rehabilitation 12*(3), 202-208.

Degoutte, F., Jouanel, P., Begue, R. J., Colombier, M., Lac, G., Pequignot, J. M., & Filaire, E. (2006). Food restriction, performance, biochemical, psychological, and endocrine changes in judo athletes. *International Journal of Sports Medicine, 27,* 9-18.

Dominic, O. L. & Onifade, A. O. (2005). Dietary attitude of University of Ilorin athletes. *Ilorin Journal of Health, Physical Education and Recreation (IJOHPER) 4*, 51 -56.

Etchison, W. C., Bloodgood, E. A., Minton, C. P. (2011). Body mass index and percentage body fat as indicators for obesity in an adolescent athletic population. *Sports Health 3*(3), 249 -252.

Feinstein, L., Sabates, R., Anderson, T. M., Sorhaindo, A. & Hammond, C. (2006). Measuring the Effects of Education on Health and Civic Engagement: Proceedings of The Copenhagen Symposium. Retrieved November 2, 2017 from http://*www.oecd.org/education/innovation-education/37425753.pdf.*

Filaire, E., Rouveix, M., Pannafieux, C., & Ferrand, C. (2007). Eating attitudes, perfectionism and body-esteem of elite

male judoists and cyclists. *Journal of Sports Science and Medicine, 6,* 50-57.

Fleming, S. & Costarelli, V. (2009). Eating behaviours and general practices used by Taekwondo players in order to make weight before competition. *Nutrition and Food Science 39*(1), 16-23.

Flemming, S., & Costarelli, V. (2007). Nutrient intake and body composition in relation to making weight in young male Taekwondo players. *Journal of Nutrition Science, 37,* 358-366.

Fogelholm, G. M., Koskinen, R., Laakso, J., Rankinen, T., Ruokonen, I. (1993). Gradual and rapid weight loss: Effects on nutrition and performance in male athletes. *Journal of Sports Medicine and Exercise Science, 25,* 371-377.

Fogelholm, M. (1994). Effects of bodyweight reduction on sports performance. *Journal of Sports Medicine, 18,* 249-267.

Franchini, E., Brito, C. J. & Artioli, G. G. (2102). Weight loss in combat sports: physiological, psychological and performance effects. *Journal of the International Society for Sports Nutrition 9* (52), 1-6.

Franchini, E., Brito, C. J., & Artioli, G. G., (2012). Weight loss in combat sports: physiological, psychological and performance effects. *Journal of International Society of Sports Nutrition 9*(1), 52

Green, O. M., Petrou, M. J., Fogarty-Hover, M. L. S., & Rolf, C. G. (2007). Injuries among judokas during competition. *Scandinavian Journal of Medicine and Sports Science, 17,* 205-210.

Hoswill, C. A., Park, S. H., & Roemmich, J. N. (1990). Changes in protein nutritional status of adolescent wrestlers. *Journal of Sports Medicine and Exercise Science, 22,* 599-604.

Jenness, K. (2017). MMA Fighter in Critical Condition. Retrieved November 26, 2017 from http://www.mixedmartialarts.com/news/mma-fighter-in-critical-condition.

Kazemi, M., Rahman, A. & De Ciantis, M. (2011). Weight cycling in adolescent taekwondo athletes. *Journal of Canadian Chiropractic Association 55,* 318-324.

Kons, R. L., Da Silva Athayde M. S., Follmer B, & Detanico, D. (2017). Methods and magnitudes of rapid weight loss in judo athletes over pre-competition periods. *Human Movement 8*(2), 49–55.

Langan-Evans, C., Close, G. L., & Morton, J. P. (2011). Making weight in combat sports. *Journal of Sports and Exercise Science, 33*(6), 25-39.

Magraken, E. (2014). Documenting the toll of rapid extreme weight cuts in MMA. Retrieved Janury 18, 2108 from http://combatsportslaw.com/2014/09/03/yes-athletes-have-been-hurt-fromweight-cutting-in-mma/.

Morton, J. P., Robertson, C., & MacLaren, D. P. (2010). Making weight: A case study from professional boxing. *International Journal of Sports Nutrition and Exercise Metabolism, 20,* 80-85.

Odo I., Ezeanyika U. & Uchendu N. (2015). The relationship among body composition and body mass index in population of adolescents in Enugu State, Nigeria. *International Journal of Current Microbiology and Applied Sciences 4*(1), 884-897.

Okorodudu, D. O., Jumean, M. F., Montori, V. M., et al. (2010). Diagnostic performance of body mass index to identify obesity as defined by body adiposity: a systematic review and meta-analysis. *International Journal of Obesity* 34, 791–799.

Oladapo, O. O., Salako, L. Sodiq, O. Shoyinka, K., Adedapo, K. & Falase, A. O. (2010). A prevalence of cardiometabolic risk factors among a rural Yoruba south-western Nigerian population: a population-based survey. *Cardiovascular Journal of Africa 21*(1), 26 –31.

Oopik, V., Paasuke, M., Sikku, T., Timpmann, S., Medijainen, L., Ereline, J… Gapejeva, E. (1996). Effect of rapid weight loss on metabolism and isokinetic performance capacity. A

case study of two well- trained wrestlers. *Journal of Sports Medicine and Physical Fitness, 36,* 127-131.

Pallarés, J. G., Martínez-Abellán, A., López-Gullón, J. M., Morán-Navarro, R., De la Cruz-Sánchez, E. & Mora-Rodríguez, R. (2016). Muscle contraction velocity, strength and power output changes following different degrees of hypohydration in competitive Olympic combat sports. *Journal of the International Society of Sports Nutrition 13*(10), 1-9. http//:dx.10.1186/s12970-016-0121-3.

Papadopoulou, S. D. (2015). Impact of energy intake and balance on the athletic performance and health of top female volleyball athletes. *Medicina Sportiva 9*(1), 2477-2481.

Pettersson, S., Ekstrom, M. P., & Berg, C. M. (2012). The food and weight combat. A problematic fight for the elite combat sports athlete. *Appetite, 59,* 234-242.

Reale, R., Slater, G. & Burke, L. M. (2016). Acute Weight Loss Strategies for Combat Sports and Applications to Olympic Success. Retrieved January 18, 2018 from https://www.researchgate.net/publication/304529333.

Saami, S. E., Rissanen, A., Sama, S., Koskenvuo, M., & Kaprio, J. (2006). Weight cycling of athletes and subsequent weight gain in middle age. *International Journal Obesity, 30,* 1639-1644.

Steen, S. N., & Brownell, K. D. (1990). Patterns of weight loss and gain in wrestlers: Has the tradition changed? *Journal of Sports Medicine and Exercise Science, 22,* 762-768.

Tagurum, Y. O., Okoh, O. E., Inalegwu, E., Ozoilo, J. U., Banwat, M. E. & Zoakah, A. I. (2015).
Non-communicable diseases: Prevalence and risk factors among adults in a rural community in Plateau State, Nigeria. *International Journal of Biomedical Research* 6(04), 228 - 234. http://dx.doi.org.10.7439/ijbr

Talabi A. E. (2016). Heaven is far - only the fit can make it. Retrieved March 28, 2016 from http://www.unilorin.ng

Torstveit, M. K. & Sundgot-Borgen, J. (2012). Are under- and overweight female elite athletes thin and fat? a controlled study. *Medicine & Science in Sports & Exercise,* 949 -957.

Walther, A., Philipp, M., Lozza, N. & Ehlert, U. (2017). Emotional support, depressive symptoms, and age-related alterations in male body composition: cross-sectional findings from the men's health 40+ study. *Front. Psychol. 8,* 1075. http://dx.doi.org.10.3389/fpsyg.2017.01075.

Webster, S., Rutt, R., & Weltman, A. (1990). Physiological effects of a weight loss regimen practiced by college wrestlers. *Journal of Sports Medicine and Exercise Science, 22,* 229-234.

Wroble, R. R., & Moxley, D. P. (1998). Weight loss patterns and success rates in high school wrestlers. *Journal of Sports Medicine and Exercise Science, 30,* 625-628.

PREVALENCE OF OVERWEIGHT AND OBESITY AMONG SECONDARY SCHOOL STUDENTS IN ILORIN METROPOLIS KWARA STATE, NIGERIA.

[1]Adeoye, S.A., [1]Dominic, O. L., [2]Yusuf, A.N.
[1]Department of Human Kinetics Education, Faculty of Education, University of Ilorin, Ilorin, Kwara State, Nigeria.

[2]Federal College of Education (Technical), Gusau, Zamfara State, Nigeria
Corresponding Author: Adeoye, S.A
E-mail: sayhi2wale001@gmail.com / +234-7031562842

Abstract

Obesity became recognized in the classification of diseases 79 years ago (1948-2017). Since then, it has risen exponentially to become a global treat to health affecting different populations. The estimation of obesity prevalence cannot be overstressed. Therefore, this study investigated the prevalence of overweight and obesity among secondary school students in Ilorin Metropolis, Nigeria. A cross-sectional design was adopted for this study; the population for this study comprised all the secondary school students in the metropolis. Multistage sampling method comprising stratified; proportionate and simple random was used to select 1,569 participants for this study. Four research questions and hypotheses were answered and tested for this study. Frequency counts and percentage was used to answer the questions and independent sample t-test was used to test the hypotheses at 0.05 significance level. Anthropometric measures of Body Mass Index

(BMI) and Waist-Hip Ratio (WHR) conducted for classifications into overweight and obesity using percentile ranking. The standardized instruments for data collection were weight scale (BF9015B model) and inelastic tape rule that provides 100g tension. All the measurements for this study were ISAK compliant. The four hypotheses were rejected and the percentage analysis of the data indicated that; 28.1% of the male students in the private schools were obese, 20.1% were obese in the public schools. In the female category, 23.0% were obese in the private schools while 21.8% were obese in the Public schools. The mean WHR for female in the private and public schools were 0.87 and 0.80 respectively. It was concluded that; overweight and obesity was prevalent in the schools but higher prevalent was recorded in the private schools. Regular participation in physical activity and routine assessment of overweight and obesity status of the students using BMI and WHR methods for monitoring and timely interventions were part of the recommendations.

Keywords: *Overweight, Obesity, Participants, Body Mass Index and Waist-Hip Ratio*

Introduction

Obesity was first included in the international classification of diseases in 1948 (Ruth, Rusell & Debbie, 2008) affecting all age groups and since then, it has risen to an epidemic proportion globally. Obesity is a condition in which excess fat accumulation in the body causes life threatening diseases. Childhood obesity is a condition where excess body fat negatively affects a child's health or well-being. As methods to determine body fat directly are difficult, the diagnosis of obesity is often based on estimation of body mass index (BMI). It is a health hazard and a detriment to well-being which is reflected in the increased morbidity and mortality worldwide (Park, 2010).

Obesity is major risk factor in the history of other chronic and non- communicable diseases. Due to the rising prevalence of obesity in children and its many adverse health effects, it is now being recognized as a serious public health concern. Obesity is one of the core symptoms of cardiovascular disease and insulin resistance syndrome (Dominic, Onifade & Lajide, 2010).The incidence of chronic diseases is escalating much more rapidly in developing countries than in industrialized countries.

There is strong evidence that childhood obesity is also becoming increasingly prevalent in developing countries and especially, among sedentary citizens (Monteiro, 2004), considering Nigeria as the most populous developing nation in Africa, it is logical to say that it is likely to have higher prevalence. Obesity has many health complications. The first problems to occur in these obese children are usually emotional or psychological. Kelishadi (2007) stated that, childhood obesity can also lead to serious conditions such as diabetes mellitus, high blood pressure, heart disease, sleep problems and cancer. Other disorders include liver disease, early puberty or menarche, eating disorders such as

anorexia, bulimia, skin infections, asthma and other respiratory problems.

In the developed world, obesity and overweight is now the most common disease of childhood and adolescence (Reilly, 2006). Hill (2006) submitted that since 1980, the entire population, both in the United States of America and throughout the world has been increasing in weight, so also in Nigeria (Ojofeitimi & Sabageh, 2013). The prevalence and increasing incidence also seem to cut across socio-economic status, level of education, physical activity level, age and the level of development of the population (Caterson & Gill, 2002; Ward & Maziak, 2006 Fontana, 2007; Shisslak & Crago, 2006; Fouad, Rastam, Hippel, Powel, Downey & Rowland, 2007; Senf,). In Africa and other developing countries, there have been acute transitions from traditional to a westernized or modern-world life-style. For instance, in Nigeria (West Africa), fast food outlets have increased in the last 10 years (Ojofeitimi & Sabageh, 2013).

Working and non-working citizens of all age categories have deemed it fashionable and convenient to buy and eat at the fast food outlets rather than prepare their food and eat at home. Researchers have classified obesity into central and general (Ascaso, 2003; Okura, 2003; Brunner, Gutin & Willis, 2007). The most widely used measures of total or general and abdominal obesity or adiposity are the body mass index (BMI) and waist circumference respectively. While abdominal obesity is recognized as a major risk factor for coronary heart diseases (CHD), waist circumference and waist hip ratio (WHR) are more strongly associated with metabolic risk factors, incident cardiovascular disease (CVD) events and deaths (Heitmann, 2004;Fouad, 2006;).

According to Senf (2006), there is an increasing prevalence of weight-related diseases in children. Excess body adiposity is a major component of Metabolic Syndrome (MS), a consortium of

diseases which have been traced to later lead to type 2 diabetes, heart diseases and cerebro-vascular accident, if not properly controlled and treated (Kaslimal, 2006;Bakker, 2007;). MS is a cluster of health threatening and life-style related conditions.

According to Bakker, Gansevoort and de Xeeuw (2007), the criterion used to define MS are, increased waist circumference, increased triglycerides, decreased high density lipoprotein (HDL), cholesterol, increased blood pressure and increased plasma glucose. Anyone who has three or more of these criteria is diagnosed as having metabolic syndrome. Among children, the epidemic of childhood inactivity and consequent obesity appear to be fuelled by several factors including societal, cultural, industrial, financial, environmental and family factors. Park (2010) asserted that parental obesity, low economic status, lack of regular bodily activity and early maturation were some of the major factors that predispose to overweight and obesity in childhood, findings and research reports indicated increasing prevalence of overweight and obesity to be independent of socio-economic status (Corvalan, 2007; Fouad et al. 2006; McCarthy, 2005).

Ogden and Carroll (2007) reported significant positive association between size at birth, infant, early and later childhood growth and adult body composition. They found increased BMI in infancy and later childhood to be positively associated with four adult body composition measures of Body BMI, percent body fat, abdominal circumference and fat-free mass. Indeed overweight and obese children and adolescents have been known to shun physical activities, are socially inept, lazy and possess negative self-image. It has also been linked with breathing problems (CDC-NCHS, 2007). Ochs-Balcom (2006) reported significant inverse relationship between abdominal adiposity and pulmonary function.

Obesity affects the quality of life and increases health care costs (Bowman, 2006; Journal of America Medical Association,

2006). Anthropometric measures of relative fatness are inexpensive and easy to use. The indirect methods of estimating body composition include measuring Body mass index (BMI), waist circumference, hip circumference and waist hip ratio (WHR). According to the Council on Sports Medicine and Fitness and Council on School Health (2006), BMI tends to correlate well with more precise measures of adiposity. This implies that BMI estimation is adequate for determination of central obesity. International Obesity Task Force (IOTF) BMI cutoff points for children was used to define overweight and obesity. These age- and gender-specific cut off points were derived from a large international sample with regression techniques, by passing a line through the adult cutoff points at 18 years.

Participants with BMI values corresponding to an adult BMI of <25 kg/m2 were classified as normal weight, participants with BMI values corresponding to an adult BMI of 25 to 29.9 kg/m2 were classified as overweight and participants with BMI values corresponding to an adult BMI of 30 kg/m2 were classified as obese. Centers for Disease Control (C.D.C, 2000) sets the rankings at ≤ 5th percentile as underweight, 5th -85th percentile as normal weight, 85th- 95th percentile as overweight and over 95th percentile as being obese for adolescents. However, the National Health and Nutrition Examination Survey (2012) classification for waist hip ratio was adopted for this study. The table below indicates the rankings:

Gender	**Excellent**	**Good**	**Average**	**At Risk**
Male	< 0.85	< 0.85-0.89	< 0.90-0.95	≥ 0.95
Female	<0.75	< 0.75-0.79	<0.80-0.86	≥ 0.86

Source: NHANES (2012).

Many countries in Africa including Nigeria are going through economic, physical activity and nutritional transition. The nutrition transition is associated with a change in dietary habits, decreasing physical activity and rising prevalence of obesity. Overweight and obesity are major risk factors for a number of chronic diseases, including diabetes, cardiovascular diseases and cancer. Obesity in children and adolescents is gradually becoming a major public health problem in many developing countries, including Nigeria. One-half of obese school children become obese adults, this implies that, obese child has a higher chance of becoming obese adult. The World Health Organisation (2016) reported that; more than 1.9 billion adults aged 18 years and older were overweight. Of these, over 650 million adults were obese.

WHO (2016) further reported that, 39% of adults aged 18 years and over (39% of men and 40% of women) were overweight. Generally, about 13% of the world's adult population (11% of men and 15% of women) was obese in 2016. The worldwide prevalence of obesity nearly tripled between 1975 and 2016. The prevalence of overweight and obesity among children and adolescents aged 5-19 has risen exponentially from just 4% in 1975 to over 18% in 2016. The rise has occurred similarly among both boys and girls: in 2016 18% of girls and 19% of boys were overweight. While just less than 1% of children and adolescents aged 5-19 were obese in 1975, more 124 million children and adolescents (6% of girls and 8% of boys) were obese in 2016.

The World health Organisation also reported that in 2016 (W.H.O, 2016), an estimated 41 million children under the age of 5 years were overweight or obese. Overweight and obesity which was once considered a high-income country burden, overweight and obesity are now on the rise in low- and middle-income countries, particularly in urban settings. In Africa, the number of

overweight children under 5 has increased by nearly 50 per cent since 2000. Over 340 million children and adolescents aged 5-19 were overweight or obese in 2016. It could be deduced from the report that obesity prevalence has continued to rise both in adult and childhood over the years. Lokuruka (2013) asserted that literature on obesity syndrome status in Africa is still very scanty.

Sabageh and Ojofeitimi (2013) conducted a study among secondary students and found that; 44% had normal weight, 1.2% were overweight, 1.2% obese and had mean waist -hip ratio of 0.85 for males and 0.82 for females. Akinpelu, Oyewole and Oritogun (2008) found that the prevalence rate for female adolescents was 2.7%. Another study conducted by Ansa, Odigwe and Anah (2001) reported that 4% females were obese while 3% males respectively. A study conducted by Abah et.al (2012) reported 5.71% as overweight and 0.9% obese among students in the Public secondary schools compared to 11.5% as overweight and 1% among their private counterparts. Another study conducted by Ekpenyong and Akpan (2013) found that obesity was more prevalent in girls living in the urban areas and attending private school than their public colleagues. Similarly, Ojofeitimi and Sabageh (2013) asserted that studies on the prevalence of childhood overweight and obesity and their association with chronic diseases in adulthood are still under appreciated in Nigeria.

Furthermore, Mustapha and Sanusi (2013) affirmed that there is no current national figure on adolescent overweight and obesity in Nigeria. The assertions from these authors imply that there is need to conduct empirical studies in different countries of Africa to generate national data for adequate information and subsequent planning. Therefore, the significance of estimating prevalence of childhood obesity cannot be overemphasized.

Objectives of the Study

The objective of this study was to investigate the prevalence of overweight and obesity among secondary school students in Ilorin metropolis using BMI and WHR estimation.

Research Questions

The following questions were raised to provide focus for this study:

1. What is the prevalence rate of obesity among male students in private secondary schools in Ilorin Metropolis?
2. What is the prevalence rate of obesity among male students in public secondary schools in Ilorin Metropolis?
3. What is the prevalence rate of obesity among female students in private secondary schools in Ilorin Metropolis?
4. What is the prevalence rate of obesity among female students in public secondary schools in Ilorin Metropolis?

Hypotheses

The following null hypotheses were formulated to guide this study;

1. There is no significant difference between Body Mass index (BMI) of male students in the Private and Public Secondary Schools in Ilorin Metropolis.
2. There is no significant difference between Body Mass index of female students in the Private and Public Secondary Schools in Ilorin Metropolis.
3. There is no significant difference between the Waist – to hip ratio (WHR) of female students in the Private and Public Secondary Schools in Ilorin Metropolis.

4. There is no significant difference between the waist – to hip ratio of male students in the Private and Public Secondary Schools in Ilorin Metropolis.

Methods and Materials

Cross-sectional anthropometric data were collected for this study. The study population comprised all the students in the public and private secondary schools in Ilorin Metropolis. A multistage sampling technique was employed for this study; there are three local governments in the metropolis (South, East and West), stratified sampling technique was used to classify the students into Public and Private schools. There were 82 schools in the south, 54 in the West and 56 in the East. Proportionate sampling technique was also used to select 10% of the total schools in each stratum and finally, simple random sampling technique of ballot dip technique was employed to select 639 students in Ilorin south, 456 students in Ilorin west and 501 students in Ilorin east. The sample size for this study was 1,569.

The data for this study was collected using standardized and calibrated instruments. The weight of the participants was measured using weight scale (Camry Model BF9015B). The Participants were weighed to the nearest 0.1kg under light clothing without their shoes, wrist watches and caps. Stadiometre was used to measure the height to the nearest 0.1cm for estimation of Body Mass Index (BMI) and inextensible tape rule that provides 100g tension calibrated to 150cm was used to measure the Waist Circumference (WC) and Hip Circumference (HC) for estimation of WHR of the study participants. All the measurements for this study were ISAK (2006) compliant. BMI was calculated as weight (kg) divided by height (m) squared. The inextensible tape was used to measure the circumference of the buttocks.

Waist circumference was measured at a level midway between the lowest rib and the crista iliac superior. The

measurement was carried out at the end of a normal expiration while the subject stood upright with feet together an arms hanging freely at the sides. Hip circumference was measured at the maximum point below the waist, without compressing the skin. WHR was calculated by dividing the waist measurement by the hip measurement.

The demographic data was analyzed with frequency, percentile ranking and percentage, while, inferential statistics of independent sample t-test was used to test the null hypotheses formulated. WC and HC ratio was calculated to obtain WHR of the participants. The Statistical Package for Social Science (SPSS 20.0 version) was used for computation of the data. The significance was tested at 0.05 alpha.

Results and Discussion of Findings

Table 2: Showing Frequency Distribution of the Male Participants in the Private and Public Secondary Schools in Ilorin Metropolis by Age.

Age	Frequency Private	Percentage	Frequency Percentage Public	
10-12yrs	219	42.5	194	42.7
13-15yrs	168	32.6	160	35.2
16-18yrs	96	18.7	66	14.6
19-21yrs	19	2.5%	25	5.5
22-24yrs	13	3.7%	9	2.0
Total	**515**	**100**	**454**	**100**

Table 2 shows that the majority 219 (42.5%) of the participants in the private schools belonged to the age category of

10-12yrs and a similar trend was observed in among the participants in the public schools with 194(42.7%) being the majority (10-12yrs old).

Table 3: **Showing Frequency Distribution of the Female Participants in the Private and Public Secondary Schools in Ilorin Metropolis by Age.**

Age	Frequency Private	Percentage	Frequency Public	Percentage
10-12yrs	105	37.4	109	31.5
13-15yrs	106	37.7	134	38.7
16-18yrs	46	16.4	74	21.4
19-21yrs	18	6.4	28	8.1
22-24yrs	6	2.1	1	0.3
Total	**281**	**100**	**346**	**100**

Table 3 shows that the majority 106 (37.7%) of the participants were between the age range of 13-15yrs and closely followed by 10-12yrs old 106 (37.4%). However, 10-12yrs old 105(37.4%) in the public category formed the majority of the participants 109 (31.5%). This revealed that in the female category, the public students were relatively older.

Table 4: Showing Frequency Distribution and Percentile Rank of the Body Mass Index of the Male Participants in the Public Secondary Schools in Ilorin Metropolis.

Body Mass Index	Frequency	Percentage (%)	Percentile Range
14.2	5	1.1	$\leq 5^{th}$
15.4	14	3.1	$\leq 5^{th}$
16.7	20	4.4	5^{th} - 85^{th}
17.2	35	7.8	5^{th} - 85^{th}
18.6	170	37.4	5^{th} - 85^{th}
19.6	4	0.9	5^{th} - 85^{th}
20.1	78	17.2	85^{th} - 85^{th}
21.5	54	11.9	85^{th} - 95^{th}
22.3	36	7.9	85^{th} - 95^{th}
23.9	9	2.0	85^{th} - 95^{th}
24.2	8	1.8	95^{th} above
25.7	7	1.5	95^{th} above
26.8	3	0.7	95^{th} above
27.1	7	1.5	95^{th} above
30.2	2	0.4	95^{th} above
31.3	2	0.4	95^{th} above
Total	**454**	**100**	

Table 4 revealed that 19 (4.2%) among the male participants in the public secondary school were underweight ($\leq 5^{th}$ percentile), 225 (49.6%) had healthy weight (5^{th} – 85^{th} percentile), 82 (18.1%) among the participant were overweight and 128(28.1%) were obese among the participants respectively.

Table 5: Showing Frequency Distribution and Percentile Ranking of the Body Mass Index of the Male Participants in the Private Secondary Schools in Ilorin Metropolis.

Body Mass Index	Frequency	Percentage (%)	Percentile Rank
13.0	1	0.2	$\leq 5^{th}$
15.4	9	1.7	$\leq 5^{th}$
16.6	32	6.2	5^{th} 85^{th}
17.8	53	10.3	5^{th} 85^{th}
18.6	102	19.4	5^{th} 85^{th}
19.7	100	19.8	$85^{th} – 95^{th}$
20.5	61	11.4	$85^{th} – 95^{th}$
21.4	56	10.9	$85^{th} – 95^{th}$
22.8	29	5.6	$\geq 95^{th}$
23.7	31	6.0	$\geq 95^{th}$
24.9	2	0.4	$\geq 95^{th}$
25.8	11	2.1	$\geq 95^{th}$
26.4	9	1.7	$\geq 95^{th}$
27.0	4	0.8	$\geq 95^{th}$
29.3	4	1.3	$\geq 95^{th}$
30.8	1	0.2	$\geq 95^{th}$
31.1	4	0.8	$\geq 95^{th}$
35.3	6	1.2	$\geq 95^{th}$
Total	**515**	**100**	

Table 5 revealed that 10 (1.9%) were underweight(less than 5^{th} percentile), 187 (35.9%) of the participants had healthy weight (5^{th} – 85^{th} percentile), 217 (42.1%) were overweight and 101 (20.1%) were obese ($\geq 95^{th}$ percentile) among the male participant in the private schools.

Table 6: Showing Frequency Distribution of Waist-to Hip Ratio (WHR) of the Male Participants in the Private and Public Secondary Schools in Ilorin Metropolis.

Public			Private		
WHR	**Frequency**	**Percentage (%)**	**WHR**	**Frequency**	**Percentage (%)**
0.5	5	1.1	0.50	5	0.1
0.6	9	2.0	0.60	9	1.7
0.65	1	0.2	0.65	1	0.2
0.66	2	0.8	0.66	1	0.2
0.67	6	1.2	0.67	1	0.2
0.70	2	0.4	0.70	46	8.9
0.76	2	0.4	0.71	2	0.4
0.77	6	1.2	0.72	2	0.4
0.78	5	1.1	0.73	1	0.2
0.79	2	0.4	0.74	1	0.2
0.80	57	12.6	0.75	1	0.2
0.82	31	6.8	0.76	1	0.2
0.83	11	2.4	0.77	11	2.1
0.84	12	2.6	0.78	10	1.9
0.85	32	7.0	0.79	9	1.7
0.86	51	11.2	0.80	39	7.6
0.87	24	5.3	0.81	7	1.4
0.90	49	10.8	0.84	4	0.8
0.91	62	13.7	0.85	23	4.5
0.93	14	3.1	0.86	24	4.7
0.93	53	11.7	0.87	31	6.7
0.94	12	2.7	0.88	44	8.5
0.95	4	0.9	0.89	39	7.7
0.96	2	0.4	0.90	109	22.1
			0.91	24	4.7
			0.92	10	1.9
			0.93	11	2.1
			0.94	4	0.8
			0.99	5	0.1
			1.0	40	7.8
Total	**454**	**100**	**Total**	**515**	**100**

Table 10 indicates the percentage analysis of waist-hip ratio (WHR) classification of the male participants in the public and

private schools. Among the participants in the public, 151(33.2%) were underweight (WHR of ≤ 0.85), 107 (23.5%) had healthy WHR (0.85-0.89), 194(42.9%) of the participants were at borderline (0.9-0.95) 2 (0.4%) were at risk of abdominal fat (≥0.95) according to CDC classification. Also, the percentage analysis for the male participants in the private school revealed that 151(28.4%) were underweight (≤ 0.85 WHR), 161 (32.1%) had healthy WHR (0.85-0.89), 158 (36.1%) were at borderline and 45 (7.9%) of the participants were at risk of abdominal fat (WHR ≥ 0.95).

Table 7: Showing Frequency Distribution and Percentile Rank of the Body Mass Index of the Female Participants in the Private and Public Secondary Schools in Ilorin Metropolis.

			Public				
Private							
BMI	**Frequency**	**Percentage**	**Percentile Rank**	**BMI**	**Frequency**	**Percentage**	**Percentile Rank**
14.0	12	3.5	≤ 5th	14.8	3	0.9	≤ 5th
14.2	1	0.3	≤ 5th	15.8	9	2.6	≤ 5th
14.5	5	1.4	≤ 5th	16.5	45	13.0	5th – 85th
15.6	17	4.9	≤ 5th	17.4	46	13.3	5th – 85th
16.4	51	14.7	5th – 85th	18.7	44	12.3	5th – 85th
17.7	35	10.1	5th – 85th	19.6	68	19.6	85th – 95th
18.4	64	18.5	5th – 85th	20.3	31	9.0	85th – 95th
19.6	43	12.2	85th - 95th	21.7	24	6.9	≥95th

20.5	46	13.3	85th – 95th	22.5	12	3.8	≥95th
21.3	15	4.3	≥95th	23.4	36	10.4	≥95th
22.4	19	5.5	≥95th	24.8	4	1.2	≥95th
23.7	9	2.8	≥95th	25.1	10	2.9	≥95th
24.4	4	1.2	≥95th	26.3	5	1.4	≥95th
25.6	7	2.0	≥95th	28.5	4	1.2	≥95th
26.2	9	2.6	≥95th	29.6	2	0.6	≥95th
28.6	3	0.9	≥95th	30.5	2	0.6	≥95th
29.4	3	0.9	≥95th	30.7	1	0.3	≥95th
30.3	3	0.9	≥95th				
Total	**346**	**100**		**Total**	**281**	**100**	

Table 7 indicates that 35 (10.1%) were underweight (≤ 5th percentile), 150 (43.3%) had healthy weight (5th – 85th percentile), 89 (25.5%) were overweight (85th -95th percentile) and 72 (21.8%) were obese among the female participants in the public schools. The percentage analysis also in table 11 reveals that 11 (3.5%) were underweight (≤ 5th percentile), 135 (44.9%) had healthy weight (5th – 85th percentile), 99 (28.6%) were overweight (85th - 95th percentile) and 76 (23.0%) were obese among the female participants in the private schools based on CDC classification for BMI.

Table 8: Waist-to -Hip Ratio (WHR) of the Female Participants in the Secondary Schools

WHR	Frequency Private	Percentage	WHR	Frequency Public	Percentage
0.66	1	0.4	0.70	26	7.5
0.67	1	0.4	0.71	2	0.6
0.71	1	0.4	0.74	2	0.6
0.76	6	2.1	0.75	2	0.6
0.77	8	2.8	0.76	6	1.7
0.78	6	2.1	0.77	7	2.0
0.79	4	1.4	0.78	6	1.7
0.80	2	0.7	0.79	6	1.2
0.81	24	8.5	0.80	4	2.3
0.82	6	2.1	0.82	8	2.9
0.83	3	1.1	0.83	10	2.3
0.84	7	2.5	0.84	8	6.4
0.85	14	5.0	0.85	33	9.5
0.86	26	9.3	0.86	30	8.0
0.87	26	9.3	0.87	19	5.5
0.88	43	15.3	0.88	43	11.4
0.89	49	17.4	0.89	52	13.0
0.90	23	8.2	0.90	30	8.7
0.92	3	1.1	0.91	23	6.6
0.93	11	4.0	0.94	2	0.6
0.94	5	1.8	0.95	5	1.4
0.95	2	0.7	0.97	4	1.2
0.96	1	0.4	0.99	4	1.2

0.97	3	1.1	1.0	14	3.1
0.99	2	0.7			
1.0	4	1.4			
Total	**281**	**100**	**Total**	**346**	**100**

The percentage analysis in table 8 shows that 3 (1.2%) were underweight (WHR ≤ 0.75), 24 (8.4%) had healthy WHR (0.75-0.79), 82 (29.2%) were at borderline waist-hip ratio (0.80-0.86) and 172 (61.2%) were at the risk of abdominal fat (WHR ≥0.86) among the female participants in the public secondary schools. In the same vein, 30 (8.7%) were underweight, 27 (7.2%) had healthy WHR, 93 (31.4%) were at borderline and 196 (52.6%) were at the risk of abdominal fat among the female participants in the private secondary schools in this study locale.

Hypotheses Testing

Hypothesis One: There is no significant difference between mean Body Mass Index of Male Students in the Private and Public Secondary Schools in Ilorin Metropolis.

Table 9: Showing t-test Analysis of Body Mass Index (BMI) of Male Students in the Private and Public Secondary Schools in Ilorin Metropolis

Variable	N	Mean	St. Dev.	Calc.t	Crit.t	df	Decision
BMI	515	18.9	2.8	7.41	1.96	967	Ho Rejected
	454	20.3	3.1				

P ≤ 0.05

The t-test analysis in the table 9 above revealed that the calculated t-value of 7.41 is greater than the critical t- value of 1.96 and mean of 18.9 at the degree of freedom of 967(∞) and 0.05 significance level.

Therefore, the hypothesis which states that there is no significant difference between mean Body Mass Index of Male Students in the Private and Public Secondary Schools in Ilorin Metropolis is rejected. This means that significant different existed between the Body Mass Index of the two groups (Private and Public)

Hypothesis Two: There is no significant difference between means of Waist-Hip Ratio (WHR) of Male Students in the Private and Public Secondary Schools in Ilorin Metropolis.

Table 10: Showing t-test Analysis of Waist-to-Hip Ratio (WHR) of Male Students in the Private and Public Secondary Schools in Ilorin Metropolis.

Variable	N	Mean	St. Dev.	Calc.t	Crit.t	df	Decision
WHR	515	0.87	0.08	8.92	1.96	967	Ho Rejected
	454	0.76	0.24				

P ≤ 0.05

Table 10 reveals that the calculated t-value of 8.92 is greater than the critical value of 1.96 and mean of 0.87 at the degree of freedom of 967 and 0.05 alpha level. This implies that significant difference also existed between the mean WHR of Male Students in the Private and Public Secondary Schools in Ilorin Metropolis.

Hypothesis Three: There is no significant difference between mean Body Mass Index of Male Students in the Private and Public Secondary Schools in Ilorin Metropolis.

Table 11: Showing t-test Analysis of Body Mass Index (BMI) of Female Students in the Private and Public Secondary Schools in Ilorin Metropolis.

Variable	N	□±SD	Calc.t	Crit.t	df	Decision
BMI	281	19.2±3.1	2.83	1.96	625	Ho Rejected
	346	18.7±3.2				
	P ≤ 0.05					

Table 11 indicates that calculated t-value of 2.83 is greater than the critical value of 1.96 and mean of 19.2 at the degree of freedom of 625 at 0.05 significance level. Therefore, the hypothesis which states that there is no significant difference between mean Body Mass Index of Male Students in the Private and Public Secondary Schools in Ilorin Metropolis is rejected. This connotes that there is statistically significant difference between the mean BMI of female Students in Public and Private Secondary Schools in Ilorin metropolis.

Hypothesis Four: There is no significant difference between mean Waist-Hip Ratio (WHR) of Male Students in the Private and Public Secondary Schools in Ilorin Metropolis.

Table 12: Showing t-test Analysis of Waist-to-Hip Ratio (WHR) of Female Students in the Private and Public Secondary Schools in Ilorin Metropolis.

Variable	N	□±SD	Calc. t	Crit.t	df	Decision
WHR	281	0.87±0.05	4.8	1.96	625	**Ho Rejected**
	346	0.80±0.23				

P ≤ 0.05

It can be deduced from table 12 that the calculated t-value of 4.8 is greater than the table value of 1.96 and mean of 0.87 at 625 degree of freedom and 0.05 level of significance. This indicates that significant difference existed between the mean Waist-Hip Ratio of the Female students in the Private and Public Students in Ilorin metropolis.

Answer to Research Questions

The four research questions were answered serially as they were stated earlier:

1. the percentage analysis revealed that 18.1% were overweight and 28.1% were obese based on BMI classification. The WHR analysis revealed that, 42.9% were at borderline while 0.4% was at risk of abdominal fat based on waist-hip ratio classification among the male participants in the public secondary schools.
2. among the male students in the private schools, the BMI analysis indicated that 42.1% were overweight and 20.1% were obese while classification based on waist-hip ratio shows that, 36.1% were at borderline and 7.9% were at risk of abdominal fat among the male participants in the private schools.

3. the percentage analysis also revealed that, 25.5% were overweight and 21.8% were obese among the female participants in the public secondary schools while waist-ration classification indicated that, 29.2% were at borderline and 61.2% were at risk of abdominal fat.
4. the BMI classification for female students in the private schools shows that, 28.6% were overweight and 23.0% were obese. The WHR classification also shows that, 36.1% were at borderline and 7.9% were at risk of abdominal fat respectively.

Discussions

This study investigated the prevalence of overweight and obesity among secondary school students in Ilorin metropolis. Four hypotheses were formulated for the study. Hypothesis one which stated that there is no significant difference between mean Body Mass Index(BMI) of male students in the Private and Public Secondary Schools in Ilorin Metropolis was rejected. The rejection of the hypothesis indicates that the Body Mass Index of the male students in the public and private differs and private students had higher BMI.

The percentage and frequency analysis of the BMI of the two categories also revealed that 4.2% were underweight, 49.6% had healthy weight, 18.1% were overweight and 28.1% were obese among the male students in the private schools, while 1.9% were underweight, 35.9% had healthy weight, 42.1% were overweight and 20.1% were obese among the participants in the public schools. Obesity and overweight was more prevalent among the private students (28.1%). that if effective interventions are not provided; more students will be obese among the private schools students as more overweight was also recorded. Expectedly, more students were underweight (4.2%) among the male students in the

public school compared to their counterparts in the private (1.9%) schools.

The difference in the overweight and obesity status could be linked to hypokinetic lifestyle of the male students attending the private schools such as increase in number hours for playing computer games, watching television, reduced physical movement to schools and probably disordered eating pattern (Ogunjimi, 2009; Wang & Lobstein 2012; Ekpenyong & Akpan, 2012). This finding was also corroborated by Akinlade, Afolabi, Oguntona and Agbonlahor (2012) who also reported a higher prevalence among the students in the private schools than in the public. Several studies that had been conducted revealed that pupils in the private high schools tend to be overweight than their public counterparts and this study is no deviation from the established claims. Ekpenyong and Akpan (2013) also recorded a higher prevalence among the boys in the private schools. The difference could be traceable to the improved socioeconomic status and changing pattern of life of parents and their wards which is more commonly observed among the adolescents in the private schools (Shebang, 2011).

The hypothesis two which stated that there is no significant difference between mean Body Mass Index (BMI) of female Students in the Private and Public Secondary Schools in Ilorin Metropolis was also rejected. A similar trend was observed between the females in the private and public secondary schools in Ilorin metropolis. This study found that 28.6% were overweight, 23.0% obese among the female students in the private schools, while, 25.5% were overweight and 21.80% were obese among the females in the public schools. Similarly, more students were underweight among the public students (10.1%) than their counterparts in the private (3.5%).

Overweight and obesity was more prevalent among the female students in the private schools than their mates in the public. The observed difference could be traceable to the improved socioeconomic status of the parents of female students attending private schools which might have possibly influenced the lifestyle of the students leading to obesogenic behaviours such as reduced physical movement or lack of regular physical activities as majority of them go to school by cars, tricycle or motor bikes instead of walking, regular consumption of junks (ice-cream, burger, caffeinated soft drinks, chocolate candy and so on) while these practices are less common among the females in the public schools as most of them will have to walk some distance before getting to school, hawk goods for their parents in the street after school hours and act involvement in the domestic chores as observed by the researcher.

This finding is also supported by the report of Mustapha and Sanusi (2013) who recorded a higher prevalence among in-school female adolescents in the private schools with 7.4% overweight and 4.4% obese. Ekpenyong and Akpan (2013) asserted that overweight and obesity is higher among girls residing in the urban areas and attending private schools. Ansa, Odigwe and Anah (2008) reported 4% females as overweight and 3% males obese respectively. However, the reported figures by the previous researchers were lower than the findings of this study as 28.1% of the males in the private schools were obese and 20.1% in the public schools, while, 23.0% were obese among the females in the private schools and 21.8% in the public schools. The findings is also in line with the report of Salazer & Allen (2006) in which female students were more obese (6.2%) compared to the male (4.2%). A study in South Africa conducted among boys and girls in the high schools by Kruger and Macintyre (2006) also documented a higher prevalence among the girls. The reported

higher prevalence among female in various studies indicated that in the near future, the female students will likely be more confronted with problem of overweight and obesity which will ultimately lead to cardiovascular diseases incidents than their counterparts in the public schools.

The hypothesis three which stated the there is no significant difference in the WHR of female students in the private and public was also rejected. The prevalence of abdominal obesity (visceral fat) among public and private secondary school students in Ilorin metropolis as indicated by percentage and mean values analysis and t-test statistics revealed that female in private schools were more at risk of abdominal fat with the mean WHR of 0.87 and this suggests that metabolic syndrome is likely to be rampant in the near future if left unchecked. The mean WHR of private and public female students were 0.80 and 0.76 respectively. This finding is also similar to that of Abah and Akpede (2012) who recorded a higher WHR among female adolescents in the private secondary schools in their study.

The findings of this study was further corroborated by the observations of Karayianis, Yanakoulia and Terzidou (2003), in which females had more weight. However, a higher percentage was observed across the two groups (male and female) in this study. Expectedly, a similar observations was made as seen in BMI of the two categories (public and private). The students in the private schools were more at risk of abdominal fat as indicated by the mean values. This finding is not too distant from that of Ojofeitimi and Sabageh (2013) who also recorded higher WHR among girls than boys. The difference in overweight and obesity pattern observed between male and female students indicated that in the future, there will be more obese female than male in the study locale if proper and adequate interventions are not given.

The implications of the findings are that; more female students tend to be overweight and hence more predisposed to cardiovascular diseases risks, also, the students in the private schools are more at risk of obesity compared to the ones attending public schools. This observed overweight and obesity among the students could be traceable factors such as technological advancement, increased in production and availability of high calorie energy densed foods outlets, improved socioeconomic status of the parents, reduced or lack of physical exercise among others.

Hypothesis four which stated that there is no significant difference in the WHR of female students in the public and private secondary schools in Ilorin metropolis was also rejected. This connotes that there is significant difference in the WHR of the male in both categories with mean values of 0.87 and 0.76 in the private and public respectively. The values obtained among the male students in the public schools imply that they were within healthy WHR and they may likely not experience abdominal fat in their adulthood. The trend among the male in the private schools revealed a higher mean value (0.87) which is suggestive of abdominal obesity in the near future if effective interventions are not provided.

Conclusion

Based on the findings of this study, the following inferences were drawn:

1. Male students in the private secondary schools in Ilorin Metropolis had higher prevalence of overweight and obesity compared to their counterparts in the public
2. Female students in the private secondary schools were at higher risk of abdominal fat than their public counterparts.

3. The mean WHR and BMI were significantly high both in male and female students in Ilorin metropolis as determined by the mean values.

Recommendations

The study recommended based on the findings that;

1. Regular physical exercise should be given priority. This can be achieved by making physical education a compulsory subject at all levels of education in the secondary schools in Ilorin metropolis so that positive habits towards lifestyle of physical fitness and exercise can be developed.
2. There should be periodic assessment of students' overweight and obesity status using WHR and BMI methods in private and public secondary schools in Ilorin metropolis for proper monitoring and timely interventions.
3. There should be mass public enlightenment on the dangers of overweight and obesity.

References

Abah, S .O, Aigbiremolen, A. O, Duru C.B, Awunor N.S, Asogun A.D, Enahoro F.O & Akpede, M.E. (2012). Prevalence of overweight and obesity among students in private and public secondary schools in a peri-urban Nigerian town. *Journal of Nutrition Health Food Science*: 2(4): 1-5.

Akinpelu, A.O, Oyewole, O.O & Oritogun K.S. (2012). Overweight and obesity: Does it

Ansa, V.O, Odigwe, C.O, & Anah M.I.(2001). Profile of body mass index and obesity in Nigerian children and adolescents. *Nigeria Journal of Medicine*: 2008. Apr-Jun;10 (2):78–80.

Akinlade, A.R, Afolabi W.A.O, Oguntona, E.B. & Agbonlahor, M. (2012). Prevalence of
obesity among adolescents in senior secondary schools in Oyo, Nigeria. *Journal of Health Food Science:* 2(4):1-5.

CDC, 2010. CDC 2000 growth charts. Centers for Disease Contro l. Available athttp://www.cdc.gov/growthcharts/cdc_charts .htm. Retrieved on November 26,2017.Centers for Disease Control and Prevention (2000). Growth charts for the United States:

Dominic, O.L, Onifade, O.A. & Olajide, E.O. (2010). Body Mass Index and the Waist/Hip Ratio among the female workers of Ilorin University, Nigeria. Medicina Sportiva. *Journal of Romanian Sports Medicine Society*: 7(4), 1467-1472.

Ekpenyong, C.E., & Akpan, E.E., (2013).Urbanization Drift and Obesity Epidemic in Sub-Saharan Africa: A Review of Situation in Nigeria. *European Journal of Sustainable Development.* 2, 4, 141-164.

Hill, J.O. (2006). Understanding and addressing the epidemic of obesity: An energy balance perspective. Endocrine Reviews:27(7):750761.https://www.ncbi.nlm.nih.gov/pubmed/1177354**.** Retrieved on December 6, 2017.

improvements to the 1977 National Center for Health Statistics version. Available at

Karayiannis, D., Yannakoulia, M., Terzidou, M . (2003). Prevalence of overweight and obesity in Greek school-aged children and adolescents. *European Journal of Clinical Nutrition*: 57:1189 –11 92.

Kelishadi, R. (2007). Childhood obesity in the eastern mediterranean region. In: R. K. Flamenbaum (Ed.), Global Dimensions of Childhood obesity New York, NY: NOVA Science Publishers.

Kruger, R. & Macintyre, U.E. (2006). The determinants of overweight and obesity among10 –to-15 year -old schoolchildren in the North West Province, South Africa – The THUSA BANA (Transition and Health during Urbanization of South Africans; BANA, children) Study. Public Health Nutrition. 2006; 9:351–358.

Lokuruka, M., (2013). A literature review of role of obesity in adult health with reference to Africa. African Journal of Food, Agriculture, Nutrition and Development. 13(1). 43-56.

Monteiro, C. A, & Conde, W.L., (2004). Obesity and inequities in health in the developing world. International Journal of Obesetics. 28: 1181 –1186.

Mustapha, R.A. & Sanusi, R.A.(2013). Overweight and obesity among adolescents in Ondo State, Southwest, Nigeria. Africal Journal of Biomedical Research.16 (3). 205-210.

occur in Nigerian adolescents in an urban community? *International Journal of Biomedical and Health Sciences*: 2008;4 (1):11–7.

National Health and Nutrition Examination Survey (2012). Prevalence of Overweight, Obesity, and Extreme Obesity Among Children: United States; the trends. Retrieved on December 15, 2017availableat:https://www.cdc.gov/nchs/data/hestat/obesity_adult_09_10/obesity_adult_09_10.pdf

Ochs-Balcom, H. (2006). Pulmonary function and abdominal adiposity in the general population. Chest. 129: 853-862.

Ogden, C. L., Carrol, M. D. & Flegal, K. M. (2007). High body mass index for age among US children and adolescents, 2003 – 2006. *American Journal of Medical Association.* 299 (20), 2401 –2405.

Ojofeitimi, & E.O. & Sabageh, A.O.(2013). Obesity and Body image Discrepancy among

Park, K. (2010). Epidemiology of chronic non-communicable diseases and Conditions: Obesity.Park's Textbook of Preventive and Social Medicine: Banarsidas Bhanot: India Prem Nagar, Jabalpur press.

Reilly, J.J., (2006). Descriptive epidemiology and health consequences of childhood obesity Best Practice. *Journal Clinical Endocrinology Metabolism*., 19: 327-341.

Ruth, R.K., Russel, J. & Debbie, A.L. (2008). Obesity in children part 1: Epidemiology, measurement, risk factors and screening. BMJ 2008; 337:a1824.

Salazar-Martinez, E.&Allen, B. (2006). Overweight and obesity status among adolescents from Mexico and Egypt. American Medical Resource. 37: 535 –542.

Senf, J.H., Shisslak, C.M. & Crago, M.A.(2006). Does dieting lead to weight gain? A four-year longitudinal study of middle school girls in sub-Saharan Africa: A Review of Situation in Nigeria. *European Journal of Sustainable Development.* 2, (4), 141-164. Waist/Hip Ratio among the female workers of Ilorin University, Nigeria.

Wang, Y. & Lobstein, T. W. (2012). Worldwide trends in Childhood Overweight and Obesity. *International Journal of Paediatric Obesity.* 1:11-25.

WorldHealthOrganisation(2016).Facts about overweight and Obesi ty. Available athttp://www.who.int/mediacentre/factsheets/f s311/en/Retrieved on November 6, 2017 .

REACTION TIME AND SPEED AS CORRELATES OF SPORTS INJURY AMONG STUDENTS OF FOOTBALL ACADEMIES IN NIGERIA

Tony Dansu, Rafiu, O. Okuneye & Bidemi Idowu
Department of Human Kinetics, Sports and Health Education
Lagos State University, Ojo, Lagos, Nigeria

ABSTRACT

Sports participation carries a risk for injuries, which may in some cases lead to permanent disability or death, hence; the need for attention on prevention. Physical fitness is a factor of sports injury. However, there is lack of sufficient evidence on relationship between specific components of physical fitness and sports injuries. This study therefore investigated reaction time and speed as they relate to sports injuries among students of football academies in Nigeria. Correlational research design was adopted for this study, and purposive sampling technique was used to select 128 students from three football academies. Standardised instruments and tests were used to measure the key parameters [i.e. speed and reaction time]. Physical characteristics that included weight, height, position of play, age, dominant leg and experience. Type of injury, part of body affected, event of injury and severity were also recorded. The data collection period was twelve weeks, and the data collected were analysed using percentage, mean, and Pearson's product moment correlation coefficient [PPMC] statistical tools. WINKS SDA package was used for analysis and hypothesis were tested at 0.05 level of significance. Findings of this study show that reaction time correlates with sports injuries sustained[r (107) =0.23, p = 0.02], while speed indicates no correlation[r (107) =0.12, p = 0.21].

It is concluded that the level of reaction time acquired and maintained by students of football academies influence the frequency of injury sustained as well as the severity of such injury; while speed level does not have any significant influence on sustenance of injury among the target group.

Key Words: Speed, Reaction Time, Sports Injury, Football Academy, Injury Severity.

Introduction

Issue of injury is a phenomenon of concern in sports, and it is very essential to employ every means of preventing it, especially in young sportsmen. Several authors (McCall et al, 2015; Saragiotto et al, 2014; Lauersen et al, 2013; Carol & Eustice, 2006; Nader, 2005; Okuneye, 2001; Adegoke and Ogungbengbe, 2001; Odebiyi, Olalekan and Odunuga, 2001; Ituh, 1995; Gaya, 1991; Adeniyi 1991; Onuigbo, 1991; Adelekan 1991; Onifade, Agbojinmi and Ososanya, 1991) have emphasized the need to pay serious attention to various strategies for preventing sports injury.

According to Nader (2005), sports injury is preventable if factors that predispose players are identified and dealt with. Carol and Eustice (2006) identify some of these factors to include poor training methods, improper facilities and equipment, lack of conditioning and insufficient warm-up. Many authors (Ahmed et al, 2015; McCall et al, 2015; Ruddock, 2007; Ratzloff, Gillies & Kochoorn, 2007; Ituh, 2005; Gieck, 2004; Conti, 2004; Pray and Pray, 2004; Lyon, 2001 Anderson, 2008; Okuneye, 2001; Adegoke and Ogungbengbe, 2001; Bello, 2000; Verstappen, Tweller, Hartgens & Van-Mechelen, 1998) assert that physical fitness is a strong factor in the prevention of sports injury. Identifying areas of consideration for injury prevention, Gieck (2004) emphasises preseason-screening process, which should focus mainly on physical fitness. Emphatically, Ratzlaff, Gillies and Kochoorn (2007) state that being physically fit, is strongly associated with lower risk of strain injury.

Although, there are literatures on association between physical fitness and sports injury, there seems to be a lack of sufficient evidence on the relationship between specific components of physical fitness and sports injury (Blum and Beaudoin, 2000). Based on this gap, this study was designed to investigate the relationship between two components of physical fitness – reaction time and speed, and sports injury among students of Football Academies in Nigeria.

Reaction time, according to Piing (2009) is one of the required components of skill-related fitness, and it can be divided

to 3 main phases, i.e., stimulus detecting, stimulus interpreting and response programming. It is influenced by reaction delay and this kind of delay is mainly because of the time consumed for one to make a decision before initiating an action, where afferent nerve needs some time to send an impulse to Central Nervous System to be interpreted, and the brain needs time to decide what to do during response programming phase. There are many factors affecting reaction time, ranging from the nature of the stimulus information to the type of movement being performed (Piing, 2009; Schmidt & Wrisberg, 2004). Citing Kosinski, Piing (2009) mentions that these factors are such as number of stimulus-response alternatives, stimulus-response compatibility, arousal, age, gender, type of stimulus, exercise, fasting and stimulant drugs.

In relation to injury, Jacobson (2006) sees poor judgement and reaction time as major factors of injury among female football players. In line with this finding, Roshdi (2008; & 2003) strongly recommends that good reaction time development should be one of the focuses of any good trainer for the purpose of injury prevention.

Speed is one of those physical qualities required for excellent performance in sports and it is needed to make sportsmen move their bodies or implements fast on the ground, in the water or in the air (Adeloye, 2003). It is usually difficult to separate or discuss speed in isolation of other qualities needed for sports performance. Indices such as strength and endurance are related to speed as they often influence it (Corbin, Welk, Corbin & Welk, 2004; Wuest & Bucher, 2003; Fahey, Insel & Roth, 2001; Prentice, 1999; Howley & Frank, 1992). There is dearth of literature on the relationship of speed to sports injury; however, Adeloye (2003) identifies this important component of physical fitness as vital in prevention of sports injury. Similarly, Gieck (2004) mentioned categorically that speed should be among the basic factors that must not be ignored while preparing sportsmen for competition and one of the major reasons for this emphasis is injury prevention.

This study is therefore set to investigate if

i. there would be no significant correlation between reaction time and sports injury among the football academies' students;
ii. there would be no significant correlation between speed level and sports injury among the football academies' students.

Methods and Procedure

Research Design

The **Correlational Research Design** was employed in this study:

Where 

P = Participants – (Selected Students of Football Academies)

O_1 = Observation on dependent variables (sports injury)

O_2 = Observation on independent variables (Reaction time and speed)

Participants

Participants were purposively selected from three football academies at two different locations in Nigeria. The academies were selected based on criteria of students' population, availability of personnel/facilities and programmes/curricula. The academies include Pepsi Football Academy, Agege Lagos, FAKREM Football Academy, Surulere, Lagos, and Kwara Football Academy, Ilorin.

The table below shows the pattern of sample selection from the academies

Table 1
Frequency and Percentage of distributions on Sample Size of the Study

Academy	Initial Sample	Mortality	Completion Sample
Pepsi (Male)	44(34.4%)	8 (6.3%)	36 (28.1%)
Pepsi (Female)	11 (8.6%)	3(2.3%)	8(6.3%)
KFA	46 (35.9%)	3 (2.3%)	43 (33.6%)
FAKREM	27 (21.1%)	5 (3.9%)	22 (17.2%)
Total	128 (100%)	19 (14.8%)	109 (85.2%)

Table 1 shows that the initial research sample was 128 with mortality of 19 (14.8%) and latter sample that completed the study was 109 (85.2%). Of this sample size, 44 (34.4%) were male students from Pepsi with mortality rate of 8 (6.3%), while only 11 (8.6%) were female students from Pepsi Academy with mortality rate of 3 (2.3%). From Kwara Football Academy (KFA), there were 46 (35.9%) students with 3 (2.3%) mortality rate, and 27 (21.1%) from FAKREM Football academy, having a mortality rate of 5 (3.9%).

The use of purposive sampling technique was achieved through documentary analysis of the records of the academies with the permission of the managements of the academies, using regular attendance as the basis for sampling, to reduce drop-out rate. In the case of Pepsi and FAKREM Academies, all the students who were regular at training and were free from injury at the time of study served as sample of the study. But for Kwara Football Academy (KFA), only the junior and intermediate categories that were free from injury were involved in the study. The participants of the study were addressed on the purpose of the study, and their consents were gotten to participate in this study via duly filled

copies of informed consent form. The Academy's management excused the senior category from taking part in the study due to tight schedule of programme.

Instrumentation

For the purpose of data collection, 50-metre Dash and Nelson Choice-Response Movement Test as described by Prentice (1999) were used to measure speed and reaction time of the participants respectively. The height and weight of the participants were measured following standards described by International Society for the Advancement of Kinanthropometry (ISAK, 2001). Their ages were sought from the official records of the academies and were cross-checked via interview of the participants. These were recorded in years to the nearest birthday.

A self-developed data recording form titled *Physical Fitness and Sports Injury (PFSI) Data Form* was designed by the researchers. This form is in three parts. Part A records information on physical characteristics and personal data of participants. These include age, height, weight, and sex. Part B records data on the measured physical fitness components, and the third part (Part C) deals with data on sports injury, which included date of injury, type of injury, affected part of body and severity of injury

Administration of Instrument

All tests and measurements were carried out at the training complex of each of the academies, and this spanned over the period of twelve weeks. During this period, measurement on selected physical fitness components were taken three times; each at the beginning of every four weeks, counting from the first day of tests and measurements. This is to ascertain current fitness level of participants as at the period they sustain injury, if there is any case. Duplicates of Physical Fitness and Sports Injury (PFSI) data form for the participants were kept with a designated officer in each of the academies who served as research assistant for recording and keeping records of injury sustained by the students. The original copies of the data forms were with the researcher, and these were

often updated as at when due. This is to avoid loss of the original sources of data.

Data Analysis

The injuries sustained by the participants of this study were scored based on their severity as defined by Federation Internationale de Football Association (FIFA) Medical Assessment and Research Centre (F-MARC, 2006) and Union of European Football Association (UEFA) Consensus Discussion (Hagglund, Walden, Bahr, & Ekstrnad, 2005). The cut-off points for the different categories of injury severity were then allotted points as follows:

- ✓ *slight (1-3 days) =1 point*
- ✓ *minor (4-7 days) =2 points*
- ✓ *mild (8-15 days) =3 points*
- ✓ *moderate (16-28 days) =4 points; and*
- ✓ *major (above 28 days) =5 points.*

Note: *Days in the brackets indicate number of days the injured players spent out of active participation.*

All data collected were coded and subjected to statistical analysis. Descriptive statistics of Frequency Counts, Simple Percentage, Mean, Range and Standard Deviation were used to describe the results, while Pearson's Product Moment Correlation Coefficient was used to test the stated hypotheses at 0.05 level of significance. Pictorial analysis of scatter plots was also used to further explain results of tested hypotheses. Data analysis was carried out using statistical package of TexaSoft, WINKS SDA Software (6th Ed, 2007).

Results

Table 2

PPMC Result on Reaction Time of Participants and Sports Injury

Variables	No	X	SD	df	r	r^2	T	P
Reaction T.	109	2.10	0.38	107	0.23	0.05	2.40	**0.02***
Injury	109	1.75	2.04					

***** *= significant at 0.05*

The result presented in table 2 was on the test of the hypothesis *that there would be no significant correlation between reaction time and sports injury among the football academies' students.* An evaluation was made of the linear relationship between *Reaction Time* and *Injury* using Pearson's correlation. This analysis indicates a statistically significant linear relationship between reaction times of the participants and sports injury sustained by them during the course of this study [r (107) =0.23, p = 0.02]. This result is further described in Figure 1.

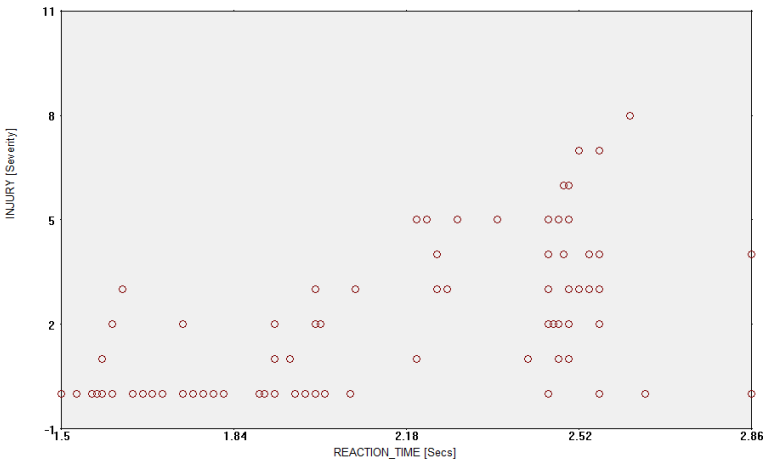

Figure 1: *Scatter plot on Reaction Time and Sports Injury*

The scatter plot in figure 1 indicates that participants with poor reaction time sustained most of the injuries as well as injuries with greater severity recorded in this study. Most of those who sustained injury in this study recorded reaction time greater than 2 seconds, which indicates poor level of reaction time for footballers.

Table 3

PPMC Result on Speed Level of Participants and Sports Injury

Variables	No	X	SD	df	r	r^2	T	P
Speed	109	7.29	1.00					
				107	0.12	0.02	1.26	**0.21**
Injury	109	1.75	2.04					

The result presented in table 3 was on test of the hypothesis *that there would be no significant correlation between speed level and sports injury among the football academies' students.* An evaluation was made of the linear relationship between *Speed* and *Injury* using Pearson's correlation. This analysis indicates no statistically significant relationship between speed levels of the participants and injury sustained during the course of this study [r (107) =0.12, p = 0.21]. Figure 2 describes this result further.

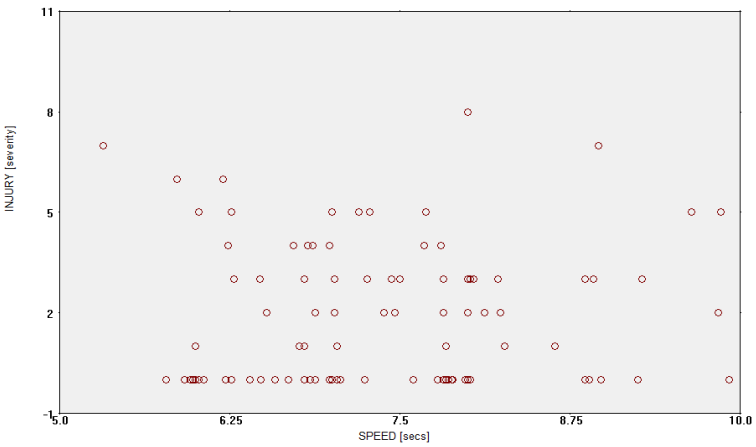

Figure 13: *Scatter Plot on Speed Level and Injury*

The above scatter plot shows no relationship between speed level of the participants and injury sustained during the course of this study, as there is no definite direction shown in the plot.

Discussion

Results of this study show a significant correlation between reaction time and sports injury (see table 2 and figure 1). According to Piing (2009), reaction time is one of the required components of skill-related fitness, and in relation to sports injury, Jacobson (2006) sees poor judgement and reaction time as major factors of injury among female football players. This study

establishes that most football players who sustained injury recorded reaction times greater than 2 seconds, which is an indication of poor level of reaction time for footballers. In line with this finding, Roshdi (2008) strongly recommends that good reaction time development should be one of the focuses of any good trainer for the purpose of injury prevention. Along with speed, coordination and agility, Gieck (2004) opines that good reaction time will keep one out of potential injury producing situations.

This study found no correlation between speed and sports injury among football players. Result indicates no clear speed-based cut-off point for injury sustenance among the players (see table 3 and figure 2). There is a dearth of literature on the relationship between speed and sports injury. Although, Adeloye (2003) identifies this component of physical fitness as vital in prevention of sports injury, and Gieck (2004) states that speed should be among the basic factors that must not be ignored while preparing sportsmen for competition; but these positions have no empirical bases. However, speed is one of those physical qualities required for excellent performance in sports and it is needed to make sportsmen react fast or move their bodies or implements fast on the ground, in the water or in the air as the case may be (Adeloye, 2003). It is usually difficult to separate or discuss speed in isolation of other qualities needed for sports performance. Indices such as strength and endurance are related to speed as they often influence it (Corbin, Welk, Corbin & Welk, 2004; Wuest & Bucher, 2003; Fahey, Insel & Roth, 2001; Prentice, 1999; Howley & Frank, 1992). The finding of this study could be as a result of variation of playing positions of footballers. Different roles by players in football may require different levels of speed.

Conclusion

Based on the findings of this study, the level of reaction time acquired and maintained by students of football academies influence the frequency of injury sustained as well as the severity of such injury; while speed level does not have any significant influence on sustenance of injury among the target group.

Recommendations

This study recommends the following:

i. Football academies, club owners, state and national football administrators should endeavour to engage exercise physiologists as part of their academies, clubs or teams' personnel. This is to ensure adequate and appropriate training programme management for the sportsmen for development of appropriate level of each component of physical fitness. Football academies and club managements should have database on physical fitness of all their students and players respectively. This will enable proper monitoring of students' fitness levels and necessary adjustment when the need arises.

ii. Further studies on relationship between other physical fitness indices and sports injury should be carried out on footballers of similar age. This will form basis for comparison with this study to identify areas of differences in terms of sports injury and physical fitness. Further studies should also be extended to other sports, especially team and contact sports such as basketball and handball that also record high rate of injury.

iii. Training programmes should be well planned such that adequate coverage for the build up of reaction time and other components of physical fitness by students of football academies is ensured.

References

Adegoke, B. O. A. & Ogungbangbe, S. T. (2001). Prevalence of joint laxity in athletic and non-athletic undergraduates. *Journal of the Nigeria Medical Rehabilitation Therapists*, 6 (2), 26-29.

Adelekan, T. A. (1991). Injury at the NATCEGA '90 Games. *Sports Science and Medicine*, 1, 301-308.

Adeloye E. O. (2003). Developing and evaluating norms on selected health and performance fitness variables for university female athletes in South West of Nigeria.

Unpublished Doctoral Research Proposal. Ibadan: University of Ibadan.

Adeniyi, B. (1991). Injury prevention in school sports. *Sports Science and Medicine,* 1, 249-254.

Ahmed O. H., Hussain AW, Beasley I, et al (2015). Enhancing performance and sport injury prevention in disability sport: moving forwards in the field of football. *British Journal of Sports Medicine,* 49:566-567

Anderson, O. (2008). Injury prevention tips (online). Available: *http://www.sportsinjurybulletin.com.* 18/02/08.

Bello, N. (2000). Lack of physical fitness causes higher sports injury rates among women (online). Available: http://hbns.org 14/04/08.

Blum, J.W. & Beaudoin C.M. (2000). Does Flexibility Affect Sport Injury and Performance? (online). Available: http://findarticles.com 12/02/09.

Carol, B. & Eustice. R. (2006). Sports injury guide: The common types of sports injury (online). Available: http://www.healthline.com. 10/02/08.

Conti, J. V. (2004). Relationship between flexibility and sports injury (online). Available: http://www.efdeportes.com. 12/02/08.

Corbin, C. B., Welk, G. J., Corbin, W. R. & Welk, K. A. (2004) *Concepts of physical fitness: Active life styles for wellness.* Boston: McGraw Hill Company.

Fahey, T.D. Insel P.M. & Roth, W.T. (2001). *Fit and well: Core concepts and labs in physical fitness and wellness.* California: Mayffield Publishing Co.

FIFA Medical Assessment and Research Centre (F-MARC, 2006) FIFA sets new definitions and procedures for injury in football(online).Available: http://www.medicalnewstoday.com 14/02/08.

Gaya, M. W. U. (1991). Injury prevention in sports. *Sports Science and Medicine,* 1, 243-248.

Gieck, J. H. (2004). Sports injury prevention for optimal athletic performance (online). Available: http://www.theacc.com. 10/02/08.

Hagglund, M. Walden, M. Bahr R & Ekstrand, J. (2005). Methods for epidemiological study of injury to professional football players: Developing the UEFA model. *British Journal of Sports Medicine,* 39, 340-346.

Howley, E. T. & Frank, B. D. (1992) *Health fitness instructor's handbook.* Champaign: Human Kinetics Books.

International Society for the Advancement of Kinanthropometry (ISAK, 2001). *International Standard for anthropometrics assessment.* Potchefstroom:ISAK

Ituh, M. C. (1995). Fitness for athletes: The way to prevent sports injury. *Sports Science and Medicine Journal,* 5, 95-99.

Jacobson, I. [2006]. Injury among female football players. Unpublished Doctoral Thesis. Department of Health Science, Division of Physiotherapy, Lulea University of Technology, Lulea.

Lauersen J.B, Bertelsen D.M. & Andersen L.B. (2013). The effectiveness of exercise interventions to prevent sports injuries: a systematic review and meta-analysis of randomised controlled trials (online). *British Journal of Sports Medicine Online*. doi: 10.1136/bjsports-2013-092538

Lyon, R. M. (2001). Preventing injury in young football players (online). Available: http://healthlink.mcw.edu. 14/02/08.

McCall A, Davison M, Andersen TE, et al (2015). Injury prevention strategies at the FIFA 2014 World Cup: perceptions and practices of the physicians from the 32 participating national teams. *British Journal of Sports Medicine,* 49:603-608.

Nader, R. (2005). Sports injury prevention (online). Available: http://two.pairlist.net. 10/02/08.

Odebiyi, D. O., Olalekan, A. T. & Odunuga, O. A. C. (2001). Sports medicine: the role of a sports physiotherapist. *Journal of the Medical Rehabilitation Therapists,* 6(1), 21-24.

Okuneye, R. O. (2001). Sports behaviour of students in Lagos area: Effect on knowledge of sports injury. *Journal of the Medical Rehabilitation Therapist,* 6(1), 1-3.

Onifade, A., Agbonjinmi, A., and Ososanya, D. (1991). Sports injury among University athletes. *Sports Science and Medicine,* 1, 255-262.

Onuigbo, G. O. C. (1991). Injury prevention in sports. *Sports Science and Medicine,* 1, 263-266.

Piing, Y.N. (2009). Reaction time and sports performance [online]. Available: http://www.medic.usm. 18/04/09.

Pray, W. S. & Pray, J. J. (2004). Prevalence of sports injury and epidemiology(online).Available:http://www.medscrape.com . 12/02/08.

Prentice, W. E. (1999). *Fitness and wellness for life (6th Ed).* Boston: McGraw Hill. Ratzloff, C. R., Gillies, J. H. & Koehroorn, M. W. (2007). Work-related repetitive strain injury and leisure-time physical activity. *Arthritis Care & Research,* 57(3), 495-500.

Roshdi, R. (2003). Tips to prevent football injury (online). Available: http://www.ameinfo.com. 14/02/08.

Roshdi, R. (2008). Tips to preventing football injury [online]. Available: http://www.ameinfo.com 14/02.08.
Roshdi, R. (2008). Tips to preventing football injury [online]. Available: http://www.ameinfo.com 14/02.08.
Ruddock, A. (2007). Injury prevention, agility and technique (online). Available: http://www.peakspeed.net. 16/02/08.

Saragiotto, B. T., Di Pierro, C., & Lopes, A. D. (2014). Risk factors and injury prevention in elite athletes: a descriptive study of the opinions of physical therapists, doctors and trainers. *Brazilian Journal of Physical Therapy, 18*(2), 137–143.

Schmidt, R. A., and Wrisberg, C. A. (2004). *Motor learning and performance. (3rd Ed.*). USA: Human Kinetics.

Verstappen, F. T., Twellaar, M., Hartgens, F. & Van-Machelen, W. (1998). Physical fitness and sports skills in relation to sports injury: A four-years prospective investigation of sports injury among physical education students.

International Journal of Sports Medicine, 19(8), 586-591.

WINKS Statistical Data Analysis Package (2007).*TexaSoft, WINKS SDA Software (6th Ed).* Texas: Cedar Hill.

Wuest, A. W. & Bucher, C.A. (2003). *Foundations of physical education, exercise science and sport (14th Ed.).* Boston: McGraw Hill.

Efficacy of Combined Therapy of Cognitive Restructuring and Study Skills Counselling on Test Anxiety among Senior High School Students in Ghana

Barbara Frimpong Manso, Godwin Awabil* & Edward Kofi Ntim
1 Department of Guidance and Counselling
2 Counselling Centre
[3] Department of Education and Psychology
University of Cape Coast, Ghana
Corresponding author's email: gawabil1@ucc.edu.gh and phone number: +233246573716

Abstract

Test anxiety is a serious problem for many students. It is a major obstacle to academic performance. In view of this, it is necessary to help students manage test anxiety through psychological interventions. This study investigated the combined effects of cognitive restructuring therapy and study skills counselling on test anxiety among senior high school students in Ghana. The population for this study was all second year senior high School students in the Komenda Edina Eguafo Abrem Municipality. Quasi-experimental, pre-test, post-test control group design guided the study. Simple random sampling technique was used to select 40 respondents to participate in the study. Two research hypotheses were formulated for the study and tested at 0.05 level of significance. The data were analysed using independent samples t-test. The study revealed that cognitive restructuring and study skills counselling had significant effect on the test anxiety of participants in the experimental group at post-test when compared with the control. Again, the results showed that there was no significant influence of gender on the test anxiety scores of the

participants in the experimental group at post-test. Based on the findings, it was recommended that counsellors should make use of cognitive restructuring and study skills counselling in order to reduce or manage test anxiety among senior high school students.

Keywords: Test anxiety; cognitive restructuring; study skills counselling; quasi-experimental; senior high school students

Introduction

From the time we are born till the time we depart from the world, anxiety is experienced. This is because life is full of challenges and without effective coping skills, the result is anxiety. According to Ngwoke, Ossai and Obikwelu (2013), anxiety is one of the emotional components of human life. Every task performance to an extent is accomplished by some measures of anxiety. Anxiety is regarded as a common psychological problem among human beings with physical, emotional and social manifestations. One of the types of anxiety that affects students is called test anxiety.

Test anxiety has been defined in several ways. Test anxiety is the physiological state of the mind of a candidate about a test as expressed by the level of worry, fear, uncertainty, concern and hopelessness before and during a test or an examination (Olatoye & Afuwape as cited in Olorunfemi-Olabisi, 2014). According to Farooqi, Ghani and Speilberger (as cited in Akinsola & Nwajei, 2012), test anxiety is a psychological condition in which people experience extreme distress and anxiety in testing situations. While many experience some degree of distress and anxiety before and during test, anxiety can actually impair learning and hurt test performance. Dusek (as cited in Farooqi, Ghani & Speilberger, 2012) described test anxiety as an unpleasant feeling or emotional state that has both physiological and behavioural components and that is experienced in formal testing or other evaluative situations. According to Ergene (2003), in test anxiety literature, Speilberger's test anxiety definition of 1972 is widely accepted. Speilberger (1972) defined test anxiety as an unpleasant state characterized by feelings of tension and apprehension, worrisome thoughts and the activation of the autonomic nervous system when an individual faces evaluative achievement-demanding situations.

Ziedner (as cited in Akinsola & Nwajei, 2013) identified and described three components of test anxiety, namely, cognitive, affective and behavioural. The cognitive component involves worry or negative thoughts, depreciating self-statements that occur during assessments and performance inhibiting difficulties that

may arise from anxiety (e.g. problem in recalling facts, difficulty in reading and understanding questions). The affective component includes the person's appraisal of his or her physiological state such as tension, tight muscles and trembling. The behavioural component, on the other hand, includes poor study skills, avoidance and procrastination of work.

Matto and Nabi (as cited in Parvez & Shakir, 2014) described the influence of test anxiety on motivation and academic performance. According to them, without any anxiety, most of us would lack the motivation to do anything in life. Therefore, moderate level of test anxiety is essential to motivate students to study and may incline them for better achievement. A high level of anxiety, on the other hand, interferes with concentration and affects our memory. In this way, high test anxiety may be one of the obstacles to academic achievement. If not tackled properly on time, it can have far reaching negative consequences. Similarly, Sarason (as cited in Farooqi, Ghani & Speilberger, 2012) argued that test anxiety is a major devastating factor for all academic performance from the elementary level to the university level.

Empirical evidence relating to the effects of test anxiety on academic performance has been thoroughly investigated. Several researchers have reported statistically significant inverse relationship (negative correlation) between test anxiety and students' academic achievement (e.g. Cassady & Johnson 2002; Chapell et al., 2005; Oludipe, 2009; Khalid & Hasan, 2009; Udeani, 2012; Ali, Awan, Batool & Muhammad, 2013; Ali & Moshin, 2013). In other words, students with high test anxiety have low academic performance whereas those with low test anxiety have high academic performance. In Ghana, Ntim (2016) concluded from his study that test anxiety exists among students and discovered that it leads to impaired academic performance. In an earlier study, Bruce (2015) found that test anxiety exists among students and leads to poor academic performance. Test anxiety, therefore, has negative effect on students' academic performance.

The negative effects of test anxiety on academic performance can be explained by two models: the interference

model and the learning deficit model (Wine as cited in Ossai, 2012). According to the interference model, test anxious students are distracted due to negative thoughts. The learning deficit model, on the other hand, proposes that it is students' ineffective study skills during preparation for a test that causes them to be anxious and which affects performance on the test (Neveh-Benjamin as cited in Ossai, 2012). Therefore, to improve academic performance, counsellors often focus on the underlying causes of test anxiety by utilizing cognitive therapies to modify negative thought patterns and improving study skills (Topman & Jansen as cited in Ossai, 2012).

However, a meta-analysis conducted by Ergene (2003) on test anxiety reduction interventions has revealed results that are contrary to the learning deficit model. The synthesis of the results showed that study skills training alone had a small effect size (E_+ = 0.28). This shows that test anxiety cannot be explained by a learning deficit model which indicates the lack of effective study skills is the cause of test anxiety. The results further indicated that among cognitive therapies, cognitive restructuring produced the largest effect size (E_+ = 1.11). However, the effectiveness of cognitive or behavioural interventions is increased when they are combined with skilled-focused techniques such as study skills training.

Cognitive restructuring therapy involves modifying the negative thought patterns and inappropriate beliefs of a client. The basic assumption of cognitive restructuring therapy is that cognitive, emotional, physiological and behavioural responses are not the mere effect of events, but it is simply due to the interpretation of the events. In this therapy, the counsellor assists the client to identify the maladaptive thoughts and beliefs that are causing the anxiety. Clients are also taught to make adaptive responses or reactions to test situations in order to reduce test anxiety (Meichenbaum & Butler as cited in Ghamari, Rafeie & Kiani, 2015). Introducing test anxious students to effective study skills complements cognitive restructuring therapy. In study skills counselling, students are exposed to effective ways of studying and taking tests and examinations.

Although cognitive and skilled-focused techniques are very effective in managing test anxiety, it appears that their effectiveness have not been investigated in Ghana. There is, therefore, the need for an empirical study to be conducted using cognitive and skilled-focused interventions on test anxiety so as to bridge the gap in the literature. The few studies conducted in the country on test anxiety are descriptive in nature (e.g. Atindanbila, Abasimi, Nyarko, & Adika, 2014; Bruce, 2015; Ntim, 2016). It is against this background that the researchers decided to examine the combined effects of cognitive restructuring therapy and study skills counselling on test anxiety among senior high school students in the Komenda Edina Eguafo Abrem Municipality in Ghana.

The study sought to find out the difference in the test anxiety mean scores of participants exposed to cognitive restructuring therapy and study skills counselling and the control group and also determine the influence of gender on test anxiety among participants in the experimental group.

Research Hypotheses

The following hypotheses guided the study:

1. H_0: There is no significant difference in the test anxiety mean scores of participants exposed to cognitive restructuring therapy and study skills counselling and the control group.
   $H_{1:}$ There is significant difference in the test anxiety mean scores of participants exposed to cognitive restructuring therapy and study skills counselling and the control group.
2. H_0: There is no significant difference in the test anxiety mean scores of male and female participants exposed to cognitive restructuring therapy and study skills counselling.
   H_1: There is significant difference in the test anxiety mean scores of male and female participants exposed to cognitive restructuring therapy and study skills counselling.

Methodology

Research Design

The quasi-experimental, pre-test, post-test control group design was used by the researchers for the study. The design was made up of two groups, namely, experimental group and control group. The experimental group received cognitive restructuring therapy and study skills counselling while the control group did not benefit from the treatment. The quasi-experimental pre-test, post-test control group design can be represented as:

Experimental group	O1	X	O2
Control group	O3		O4

Figure 1: Design of the study

O1 and O3 represent pre-test and O2 and O4 refer to post-test. X presents the treatment.

Population

The population for this study was all second year senior high School students in the Komenda Edina Eguafo Abrem Municipality of Ghana in the 2017/2018 academic year.

Sample and sampling procedure

Simple random sampling technique was used to select two schools out of the three senior high schools in the Komenda Edina Eguafo Abrem Municipality. The sample size for the study was 40. This number was divided into two groups of 20 participants each (10 males and 10 females). Simple random sampling was also used to select the 40 respondents to participate in the study. Ethical issues were considered and they included confidentiality and voluntary participation.

Research instrument

The West Side Test Anxiety Scale was adapted for the study. The scale was developed by Driscoll (2007). It comprises 10 items and measures anxiety impairments, with most items asking directly about performance impairment or about worrying, which interferes with concentration. The response options are 5=

Extremely True; 4= Highly True; 3=Moderately True; 2= Slightly True; 1=Never True. Scores are obtained by summing up the 10 questions. After that, divide the sum by 10 to obtain the test anxiety score. The interpretation of the scores are 1.0—1.9=Comfortably low test anxiety; 2.0—2.5=Normal or average test anxiety; 2.6—2.9=High normal test anxiety; 3.0—3.4=Moderately high; 3.5—3.9=High test anxiety; 4.0—5.0=Extremely high anxiety. Higher scores indicate higher test anxiety. Students whose test anxiety scores fell within 3.0– 5.0 were considered eligible for the study and were divided into the two groups; experimental and the control groups.

The instrument was given to experts in guidance and counselling at the University of Cape Coast to ascertain its content validity. A pre-test of the instrument was conducted among students in a senior high school that did not form part of the population of this study. The Cronbach's coefficient alpha yielded an index of 0.76.

Treatment procedure

The treatment procedure consisted of three distinct phases as shown below:

Pre-counselling phase

The researchers administered the adapted version of Westside Test Anxiety Scale to the participants in order to collect the baseline data. After that, the participants were grouped into the experimental and control groups.

Counselling phase

The counselling session was held one hour twice in a week for six consecutive weeks. The details are as follows:

Session 1: Establishment of relationship

This session dealt with self-introduction, counsellors' and participants' responsibilities during counselling, goals of counselling and ground rules to guide group interaction.

Session 2: Concept of test anxiety
This session covered the explanation of test anxiety, its causes, symptoms and effects on academic performance.

Session 3: Concept of cognitive restructuring
In this section, cognitive restructuring was explained. The theoretical basis of cognitive restructuring was discussed with a focus on rational emotive behaviour therapy. Issues such as the ABC theory of personality, including maladaptive beliefs or interpretations were discussed.

Session 4: Changing negative thoughts and maladaptive beliefs
Cognitive restructuring was used to modify negative perceptions and maladaptive beliefs about test situations. Participants were encouraged to replace their faulty thoughts and unhealthy beliefs with adaptive thought patterns and beliefs.

Sessions 5-8: Concept of study skills
This section covered the meaning and importance of study skills. The components of study skills such as memory enhancing strategies, reading skills, note taking skills, consultation, time management and test-taking strategies were discussed as suggested by Awabil (2016). The relationship between test anxiety and poor study skills was also discussed. Clients were encouraged to put into practice all strategies that have been discussed.

Session 9: Review of sessions
This session covered the review and evaluation of the preceding sessions. After that the counselling intervention was terminated.

Post counselling phase
Two weeks after the termination of the counselling, the clients were given the adapted version of Westside Test Anxiety Scale to fill in order to ascertain the effects of the intervention on their test anxiety levels.

Data analysis

The data were analysed using independent samples t-test. The hypotheses were tested at 0.05 level of significance.

Results

Research hypothesis One

H_0: There is no significant difference in the test anxiety mean scores of participants exposed to cognitive restructuring and study skills counselling and the control group.

H_1: There is significant difference in the test anxiety mean scores of participants exposed to cognitive restructuring and study skills counselling and the control group.

To find out the statistical difference between the post-test mean scores of participants in the experimental and control groups on test anxiety, the independent samples t-test was conducted. The results are presented in Table 1.

Table 1- *Result of independent samples t-test analysis comparing the post-test scores of participants in the experimental and control groups on test anxiety (n= 40)*

Group	Mean	SD	t-value	df	Sig-value
Control	3.89	.28			
			9.742*	38	.000
Experimental	1.91	.87			

*Significant, $p < 0.05$

Table 1 presents the result of independent samples t-test analysis comparing the post-test mean scores of participants in the experimental and control groups on test anxiety. The result shows that there was significant difference between experimental group and control group with respect to their test anxiety level ($t = 9.742$, $df= 38$, $p = .000$, 2-tailed) at post-test. Therefore, the null hypothesis is rejected. The result means that there was significant effect of cognitive restructuring and study skills counselling on the test anxiety of participants in the experimental group at post-test.

In other words, the cognitive restructuring therapy and study skills counselling group showed significantly greater reduction in test anxiety than the control group.

Research hypothesis two

H_0: There is no significant difference in the test anxiety mean scores of male and female participants exposed to cognitive restructuring and study skills counselling.

H_1: There is significant difference in the test anxiety mean scores of male and female participants exposed to cognitive restructuring and study skills counselling.

One of the objectives of the study was to determine the influence of gender on test anxiety of participants in the experimental group at post-test. To achieve this, the independent samples t-test was deemed appropriate for the analysis. The results are presented in Table 2.

Table 2- *Results of independent samples t-test comparing gender on test anxiety of participants in the experimental groups using the post-test scores (n=20)*

Gender	Mean	SD	t-value	Df	Sig-value
Male	1.83	.31			
			-.897	18	.389
Female	1.95	.26			

Table 2 presents the influence of gender on test anxiety of participants in the experimental group at post-test. In order to ascertain whether significant difference exits in the post-test mean scores on test anxiety of participants in the experimental group on the basis of gender, the independent samples t-test was computed. The result indicates that there was no significant gender difference in the post-test mean scores on test anxiety (t = -.897, df= 18, p = .389, 2-tailed). The null hypothesis is, therefore, retained. The result implies that both genders experienced similar level of test

anxiety in the experimental group at post-test. Therefore, it can be said that the intervention was effective.

Discussion of results

The result indicated that there was significant effect of cognitive restructuring and study skills counselling on the test anxiety of participants in the experimental group at post-test when compared with the control group. This current discovery is consistent with the findings of Ergene (2003) and Ghamari, Rafeie and Kiani (2015) which stated that participants exposed to both cognitive restructuring and study skills counselling had lower test anxiety as compared with the control. Again, the finding supports previous research findings of Amiri et al. (as cited in Ghamari, Rafeie & Kiani, 2015) who compared the effectiveness of cognitive-behavioural therapy techniques, learning effective study skills and the mixed method in reducing test anxiety. Their results showed that all the three experimental groups compared with the control group showed a significant decrease in anxiety scores, but the simultaneous application of the cognitive-behavioural therapy and study skills training compared with its separate application caused a significant decrease in the scores of students' test anxiety. In the current study, the significant reduction of the test anxiety of participants in the experimental group as compared to their counterparts in the control group could be attributed to the cognitive restructuring and the study skills counselling intervention. For example, students were taught how to identify and modify negative thoughts and maladaptive beliefs relating to test situations. They were also taught study skills such as how to manage their time effectively and how to memorize and retrieve information.

The results also showed that there was no significant difference in the post-test mean scores on test anxiety of male and female participants in the experimental group. This finding is in line with the finding of Akinsola and Nwajei (2013) which indicated that there was no significant difference in the test anxiety levels of both males and females at post-test. In contrast, the

current finding does not agree with the results of descriptive studies obtained by Ngwoke, Ossai and Obikwelu (2013), Farooqi, Ghani & Speilberger (2012), Syokwaa, Aloka and Ndunge (2014) and Malhotra (2015) which revealed significant gender differences in test anxiety.

The current finding suggests that both genders experienced almost similar level of test anxiety in the experimental group after the intervention. This implies that both genders benefited equally from the intervention. The failure to find significant gender differences could be attributed to the fact that both male and female participants were equally motivated to have a reduction in their test anxiety.

Conclusions and Recommendations

Based on the findings, the following conclusions and recommendations are made.

It can be concluded that the combined therapy of cognitive restructuring and study skills counselling is an effective intervention for managing test anxiety among senior high school students. Gender is not a significant determinant of test anxiety among senior high school students at post-test. It is, therefore, recommended that in the pursuit of helping to reduce or manage test anxiety among senior high school students, counsellors should combine cognitive restructuring therapy with study skills counselling. It is also recommended that school counsellors should organize seminars and workshops to orient and train teachers on how to effectively use the cognitive restructuring technique and study skills counselling in the classroom so as to improve students' academic performance by minimizing test anxiety levels of students.

References

Ali, M. S., & Moshin, M. N. (2013). Relationship of test anxiety with students' achievement in science. *International Journal of Educational Science and Research, 3*(1), 99-106.

Ali, M. S., Awan, A. S., Batool, S., & Muhammad, N. (2013). Secondary school students' test anxiety and achievement in English. *International Journal of English and Literature, 3*(1), 131-138.

Akinsola, E. F., & Nwajei, A. D. (2013). Test anxiety, depression and academic performance: Assessment and management using relaxation and cognitive restructuring techniques. *Psychology, 4*(6), 18-24.

Atindanbila, S., Abasimi, E., Nyarko, K., & Adika, J. A. (2014). The occurrence of test anxiety in student nurses in selected nursing schools in Ghana. *American Journal of Applied Psychology, 3*(1), 21-26.

Awabil, G. (2016). *Introduction to study skills for students in higher education*. Accra: Adwinsa Publications (Gh) Ltd.

Bruce, D. (2015). Mathematics anxiety among Ghanaian students: A study of students in Kinbu Senior High/Technical School, Accra and Herman-Gmeiner SOS Junior High School, Tema. *Journal of Education and Practice, 7*(15), 75-83.

Cassady, J. C., & Johnson, R. E. (2002). Cognitive test anxiety and academic performance. *Contemporary Educational Psychology, 27*(2), 270-295.

Chapell, M. S., Blanding, Z. B., Takahashi, M., Silverstein, M.E., Newman, B., Gubi, A., & Mccann, N. (2005). Test anxiety and academic performance in undergraduate and graduate students. *Journal of Educational Psychology, 97*(2), 268-274.

Driscoll, R. (2007). *Westside test anxiety scale validation.* Retrieved frohttps://files.eric.ed.gov/fulltext/ED495968.pdf

Ergene, T. (2003). Effective interventions on test anxiety reduction: A meta-analysis. *School Psychology International, 24*(3), 313-328.

Farooqi, Y. N., Ghani, R., & Spielberger, C. D. (2012). Gender differences in test anxiety and academic performance of medical students. *International Journal of Psychology and Behavioral Sciences, 2*(2), 38-43.

Ghamari, K. H., Rafeie, S. H., & Kiani, A. R. (2015). Effectiveness of cognitive restructuring and proper study skills in the reduction of test Anxiety symptoms among students in Khalkhal, Iran. *American Journal of Educational Research, 3*(10), 1230-1236.

Khalid, R., & Hasan, S.S (2009). Test anxiety in high and low achievers. *Pakistan Journal of Psychological Research,* 24(3-4).

Malhotra, T. (2015). Exam anxiety among secondary school students. *Scholarly Research Journal for Interdisciplinary Studies, 3*(17), 3089-3098.

Ngwoke, D. U., Ossai, O. V., Obikwelu, C. L. (2013). Influence of study skills on test anxiety of secondary school students in Nsukka Urban, Enugu State, Nigeria. Journal of Education and Practice, 4(17), 162-165.

Ntim, S. (2016). Do restrictions in working memory capacity account for decrement in cognitive performance on highly test-anxious individuals? A study among selected Ghanaian university students. *Internal Journal of Applied Psychology, 2*(2), 704-710.

Olorunfemi-Olabisi, F. A. (2014). Effects of problem solving technique on test anxiety and academic performance among secondary school students in Ondo State. *Journal of Research and Method in Education, 4*(4), 20-26.

Oludipe, B. (2009). Influence of test anxiety on performance levels on numerical tasks of secondary school physics students. *Academic Leadership Journal, 7*(4).

Ossai, O. V. (2012). *Influence of study skills on test anxiety levels and achievement of senior secondary school students in English language*. Unpublished master's research project, University of Nigeria, Nsukka.

Parvez, M., & Shakir, M. (20014). Academic achievement of adolescents in relation to academic anxiety, gender and choice of academic stream. *Research on Humanities and Social Sciences, 4*(12), 107-115.

Spielberger, C. (1972). Anxiety as an emotional state. In C. D. Spielberger(Ed.),*Anxiety:Current trends in theory and research* (pp. 23-49). New York, NY: Academic Press.

Syokwaa, K. A., Aloka, P. J., & Ndunge, S. N. F. (2014). The relationship between anxiety levels and academic achievement among students in selected secondary schools in Lang'ata District, Kenya. *Journal of Educational and Social Research, 4*(3), 403-415.

Udeani, U. (2012). The relationship between study habits, test anxiety and science achievement. *Journal of Education and Practice, 3*(8), 151-157.