



UNIVERSITI PUTRA MALAYSIA

***PREVALENCE AND PREDICTORS OF SUFFICIENT PHYSICAL
ACTIVITY USING SOCIO-ECOLOGICAL MODEL AMONG
FIRST-YEAR UNDERGRADUATE STUDENTS OF A
UNIVERSITY IN NIGERIA***

ESSIET, INIMFON ANIEMA

FPSK(M) 2016 10



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By

ESSIET, INIMFON ANIEMA

**Thesis Submitted to the School of Graduate Studies, Universiti Putra
Malaysia, in Fulfillment of the Requirements for the Degree of Master of
Science**

September 2016



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DEDICATION

This thesis is dedicated to the memory of my Late Dad, Mr Aniema Tiger Essiet, who saw me embark on this journey but didn't live long enough to see me complete it. Your memory will last in my heart forever. You live on. And to my lovely Mom, Mrs Eno Aniema Essiet, who sacrifices a lot to ensure that I have the best opportunities in life. Thank you mum.



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Science

PREVALENCE AND PREDICTORS OF SUFFICIENT PHYSICAL ACTIVITY USING SOCIO-ECOLOGICAL MODEL AMONG FIRST-YEAR UNDERGRADUATE STUDENTS OF A UNIVERSITY IN NIGERIA

By

ESSIET, INIMFON ANIEMA

September, 2016

Chairman : Anisah Baharom, PhD
Faculty : Medicine and Health Sciences

Introduction: The benefits of adopting regular and consistent physical activity as a lifestyle has been well documented. Research shows that regular participation in physical activity reduces the risk of chronic non-communicable diseases such as Type 2 diabetes mellitus, cardiovascular disease, some types of cancer and obesity. However, several studies have reported that physical activity begins to decrease in young adulthood when people transition from high school into the university. Studies have also reported that Nigerian university students do not engage in sufficient levels of physical activity required to gain the health benefits associated with being physically active. Physical activity is a health behavior that is determined by the interaction of various factors which may act as facilitators or barriers to being physically active. Thus, examining the multilevel determinants of physical activity using the socio-ecological model is an important prerequisite for designing relevant policies and effective health promotion programs aimed at increasing physical activity participation among Nigerian university students.

Objective: This study was conducted to determine the prevalence and predictors of sufficient physical activity using the socio-ecological model among first-year undergraduate students of the University of Uyo, Nigeria.

Methodology: A cross-sectional study was conducted in the University of Uyo in Akwa Ibom State, Nigeria. A total of 386 first-year undergraduate students were selected using a multistage sampling method. Data was collected on physical activity and associated factors among first-year undergraduate students from July to September 2015 using a self-administered questionnaire. The International Physical Activity Questionnaire (IPAQ) was used to assess physical activity levels of respondents. Respondents whose activity level was equal to or above 600MET-minutes/week were regarded as being sufficiently physically active. Descriptive analysis, chi-square tests and multiple logistic regression were conducted. Significant levels were set at p-value of <0.05 and 95% CI.

Results: The response rate for this study was 88.6%. It was observed that 93.6% of the respondents were sufficiently physically active. Multiple logistic regression revealed that respondents belonging to the Ibibio ethnicity were more likely to be sufficiently physically active when compared to others (Adjusted OR = 3.510, 95% CI = 1.382, 8.916). Also, underweight and overweight respondents were less likely to be sufficiently physically active compared to those that were normal (Adjusted OR = 0.198, 95% CI = 0.064, 0.613 and Adjusted OR = 0.240, 95% CI = 0.077, 0.750 respectively). Furthermore, respondents who reported that there were school facilities for indoor recreation and that the school had an enjoyable scenery were more likely to be sufficiently physically active (Adjusted OR = 3.003, 95% CI = 1.179, 7.649 and Adjusted OR = 2.787, 95% CI = 1.074, 7.234 respectively).

Conclusion: The findings of the study revealed that majority of the surveyed first-year undergraduate students of the University of Uyo demonstrated sufficient levels of physical activity over the course of seven days. Socio-ecological factors associated with physical activity that have been identified in this study can serve as additional information to aid in the development of interventions that would sustain high physical activity levels among university students.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**PREVALEN DAN PREDIKTOR AKTIVITI FIZIKAL YANG
MENCUKUPI MENGGUNAKAN MODEL SOSIOEKOLOGIKAL
DALAM KALANGAN PELAJAR PRASISWAZAH TAHUN PERTAMA
DI SEBUAH UNIVERSITI DI NIGERIA**

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Pengenalan: Faedah mengamalkan aktiviti fizikal yang tetap dan konsisten sebagai suatu gaya hidup telah didokumentasikan dengan baik. Penyelidikan menunjukkan bahawa penglibatan dalam aktiviti fizikal secara tetap dapat mengurangkan risiko penyakit-penyakit kronik tidak berjangkit, seperti diabetes melitus jenis 2, penyakit kardiovaskular, beberapa jenis kanser dan obesiti. Walau bagaimanapun, beberapa kajian telah melaporkan bahawa aktiviti fizikal mula menurun dalam peringkat awal dewasa, iaitu tempoh transisi dari sekolah menengah ke peringkat universiti. Kajian juga telah melaporkan bahawa pelajar universiti di Nigeria tidak terlibat dalam aktiviti fizikal yang mencukupi untuk memperoleh faedah kesihatan yang berkaitan dengan kecerdasan fizikal. Aktiviti fizikal merupakan suatu tingkah laku kesihatan yang ditentukan oleh interaksi pelbagai faktor yang boleh memudahkan atau menghalang seseorang untuk kekal aktif secara fizikal. Oleh sebab itu, adalah penting untuk menentukan determinan aktiviti fizikal pada pelbagai peringkat dengan menggunakan model sosioekologikal ia dapat membantu dalam pembentukan polisi yang relevan dan program promosi kesihatan yang efektif untuk meningkatkan penglibatan pelajar universiti dalam aktiviti fizikal, khususnya di Nigeria.

Objektif: Kajian ini telah dijalankan untuk menentukan prevalen dan prediktor aktiviti fizikal yang mencukupi menggunakan model sosioekologikal dalam kalangan pelajar prasiswazah tahun pertama di Universiti Uyo, Nigeria.

Metodologi: Kajian keratan rentas telah dijalankan di Universiti Uyo di Negeri Akwa Ibom, Nigeria. Seramai 386 pelajar prasiswazah tahun pertama telah dipilih menggunakan kaedah persampelan dua peringkat. Data telah dikumpulkan dari bulan Julai hingga bulan September 2015 menggunakan borang soal selidik yang merangkumi perihal aktiviti fizikal dan faktor yang berkaitan. Borang Soal Selidik

Aktiviti Fizikal Antarabangsa (IPAQ) telah digunakan untuk menilai tahap aktiviti fizikal responden. Responden yang tahap aktiviti sama atau lebih daripada 600MET-minit/minggu dikategorikan sebagai aktiviti fizikal yang mencukupi. Analisis deskriptif, ujian khi kuasa dua dan regresi logistik berganda telah dilaksanakan. Tahap signifikan telah ditentukan pada nilai $p < 0.05$ dan CI 95%.

Keputusan: Kadar respon bagi kajian ini ialah 88.6%. Kajian ini mendapati bahawa 93.6% responden adalah cukup aktif secara fizikal. Regresi logistik berganda menunjukkan bahawa responden yang berasal daripada etnik Ibibio adalah lebih cenderung untuk aktif secara fizikal berbanding dengan etnik lain (Adjusted OR = 3.510, 95% CI = 1.382, 8.916). Di samping itu, responden yang kurang berat badan (Adjusted OR = 0.198, 95% CI = 0.064, 0.613) dan berat badan berlebihan (Adjusted OR = 0.240, 95% CI = 0.077, 0.750) adalah kurang cenderung untuk aktif secara fizikal berbanding dengan mereka yang mempunyai berat badan normal. Tambahan pula, responden yang melaporkan bahawa terdapatnya kemudahan bagi rekreasi dalaman (Adjusted OR = 3.003, 95% CI = 1.179, 7.649), dan sekolah yang mempunyai persekitaran yang memberangsangkan (Adjusted OR = 2.787, 95% CI = 1.074, 7.234) mempunyai odds ratio yang lebih tinggi untuk aktiviti fizikal yang mencukupi.

Kesimpulan: Dapatan kajian ini menunjukkan bahawa majoriti pelajar prasiswazah tahun pertama Universiti Uyo yang dikaji memperlihatkan tahap aktiviti fizikal yang mencukupi bagi tempoh tujuh hari. Faktor sosioekologikal yang berkaitan dengan aktiviti fizikal yang telah dikenal pasti dalam kajian ini dapat digunakan sebagai maklumat tambahan bagi membantu perkembangan intervensi yang dapat mengekalkan tahap aktiviti fizikal yang tinggi dalam kalangan pelajar universiti.

ACKNOWLEDGEMENTS

To God Almighty, my ever present help in times of need, my shelter and strength, I am eternally grateful. To my supervisor Dr. Anisah Baharom, who has generously given her time and expertise to better my work and make me a better researcher, your contributions and good-natured support are very much appreciated. To my kind co-supervisors Dr. Hayati Shahar and Prof Benjamin Uzochukwu, you were both very supportive and encouraging and I am grateful. Thank you.

I must acknowledge my mother as well; I am short of words, thank you, thank you and thank you. You are the best mum in the whole world. To my darling siblings, thank you so much for your love, prayers and supports. Words cannot express how grateful I am. To Ibanga and Aniebiet Ekong, thank you for your kindness, love and support. I can never repay you both for what you have done for me. Thank you so much.

I also need to express my gratitude and deep appreciation to Dr Bolarinwa Oladimeji whose friendship, knowledge, and wisdom have supported, enlightened, and entertained me. They have consistently helped me keep perspective on what is important in life and shown me how to deal with reality. Thank you. To Panmial, Monica and Hamzat, I am indeed grateful for your contributions.

I certify that a Thesis Examination Committee has met on 30 September 2016 to conduct the final examination of Inimfon Aniema Essiet on her thesis entitled “Prevalence and predictors of sufficient physical activity using the socio-ecological model among first-year undergraduate students of the University of Uyo, Nigeria” in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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LIST OF ABBREVIATIONS

<	Less than
<	Less than
>	Greater than
≤	Less than or equal to
≥	Greater than or equal to
ACSM	American College of Sports Medicine
AOR	Adjusted odds ratio
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
COR	Crude odds ratio
<i>df</i>	Degree of freedom
EBBS	Exercise Benefits/Barriers Scale
GPAQ	Global Physical Activity Questionnaire
HBSC	Health Behavior in School-aged Children
HEPA	Health-enhancing physical activity
HDL	High-density lipoprotein
HRF	Health-related fitness
IPAQ	International Physical Activity Questionnaire
IQR	Inter quartile range
Kcal	Kilocalories
kg	kilograms
kJ	Kilojoules
LCD	Liquid Crystal Display
LDL	Low-density lipoprotein
LGA	Local government area
LTEQ	Leisure Time Exercise Questionnaire
MET	Metabolic Equivalent of Task
mL	milliliters
MVPA	Moderate- and vigorous-intensity physical activity
NCDs	Non-communicable diseases
OR	Odds ratio

<i>p</i>	Level of significance
PA	Physical activity
PAQ-A	Physical Activity Questionnaire for Adolescents
PAQ-C	Physical Activity Questionnaire for Children
PE	Physical education
RCT	Randomized controlled trial
SD	Standard deviation
SEM	Socio-Ecological Model
SPSS	Statistical Package for Social Science
t	T-test
V _{O₂}	Oxygen consumption
VPA	Vigorous physical activity
WC	Waist circumference
WHO	World Health Organization
χ^2	Chi-square test

CHAPTER 1

INTRODUCTION

1.1 Background

Regular and consistent practice of physical activity at sufficient levels has been known to result in many long term physical health benefits, particularly in the prevention of non-communicable diseases such as cardiovascular diseases, Type 2 diabetes mellitus, some types of cancer, obesity, osteoporosis (Miller, Staten, Rayens, & Noland, 2005); and psychological health benefits which include raised self-esteem, reduced stress, depression and anxiety (World Health Organization 2015a; Molina-García, Castillo, & Pablos, 2009). A systematic review and meta-analysis by Oguma and Shinoda-Tagawa (2004) concluded that the protective effects observed among physically active persons were obvious with as little as 60 minutes of walking in a week. A cohort study by Kujala, Kaprio, Kannus, Sarna, and Koskenvuo (2000) also reported that physical activity performed at vigorous intensity significantly decreased the rate of occurrence of hip fracture among his participants.

On the contrary, lack of sufficient amounts of physical activity has been documented as one of the top 10 risk factors for global mortality (WHO, 2015b). Nearly 3.2 million deaths and 32.1 million disability-adjusted life years are attributable to lack of adequate levels of physical activity (WHO, 2015a; WHO, 2009). A study by Blair et al. (1989) involving healthy men and women (10,224 men and 3120 women) followed up for about eight years measured physical fitness using an exercise treadmill. Results from this study noted that participants with low fitness levels had an increased risk of mortality from any cause when compared to highly fit participants.

Globally in 2010, around 77% of adults (aged 18years and above) were found to have practiced sufficient amounts of physical activity (WHO, 2015c). The prevalence of sufficient amounts of physical activity among adults (aged 18years and above) in developed and developing countries were found to be similar. For instance, in developed countries like Belgium and Czech Republic, the prevalence was 66.8% and 76.2% respectively (WHO, 2015d). Similarly, in developing countries like Argentina and China, the prevalence ranged from 60.8% and 75.9% respectively (WHO, 2015d). In Nigeria, which is a developing country, the prevalence of sufficient amounts of physical activity was 77.7% (WHO, 2015d).

Furthermore, the prevalence of physical activity based on gender was also seen to vary between countries. Studies carried out in different cultures have found that

males are generally more physically active than females (Miller et al., 2005; Steptoe et al., 2002). For instance, in 2010, about 72.3% of males (aged 18 years and above) were found to be sufficiently active in Algeria compared to 58.8% of females who were reportedly sufficiently active (WHO, 2015d). For university students in developed countries, physical activity prevalence was reported to range from 76.9% in Spain to 86.5% in Belgium among males, while for females, the prevalence ranged from 52.7% in Spain to 73.7% in Belgium (Steptoe et al., 2002). These statistics confirm that males tend to be more physically active than females.

Physical activity is a health behavior determined by the interaction of various factors such as intrapersonal, social, and environmental factors that are specific to populations, type of activity performed and the locality where the activity is performed (Solomon, Rees, Ukoumunne, Metcalf, & Hillsdon, 2013). A change of behavior from being physically inactive to being active is hard to achieve, especially in a setting which cannot support this change. Therefore, so that physical activity participation can be promoted, efforts need to be focused on the behavioral choices of each individual as well as the factors that influence those choices. One way of explaining the interrelationship between people, their behavior and their social and physical environment is via the use of socio-ecological models (Fleury & Lee, 2006).

Socio-ecological models (SEM) have been developed to provide an overarching framework for understanding the dynamic inter-relations among multiple social and environmental factors in health behavior in a particular setting or context (Stokols, 1996). One of these socio-ecological models was developed by Stokols (1996). This model identifies the influences on health behavior in four different levels namely: individual, social environment, physical environment and policies (Stokols, 1996). The individual level comprises of personal factors and individual characteristics that decrease or increase the odds of being a physically active individual. The social environment includes the culturally relevant social norms and social support that may act as facilitators to health behavior change (Fleury & Lee, 2006).

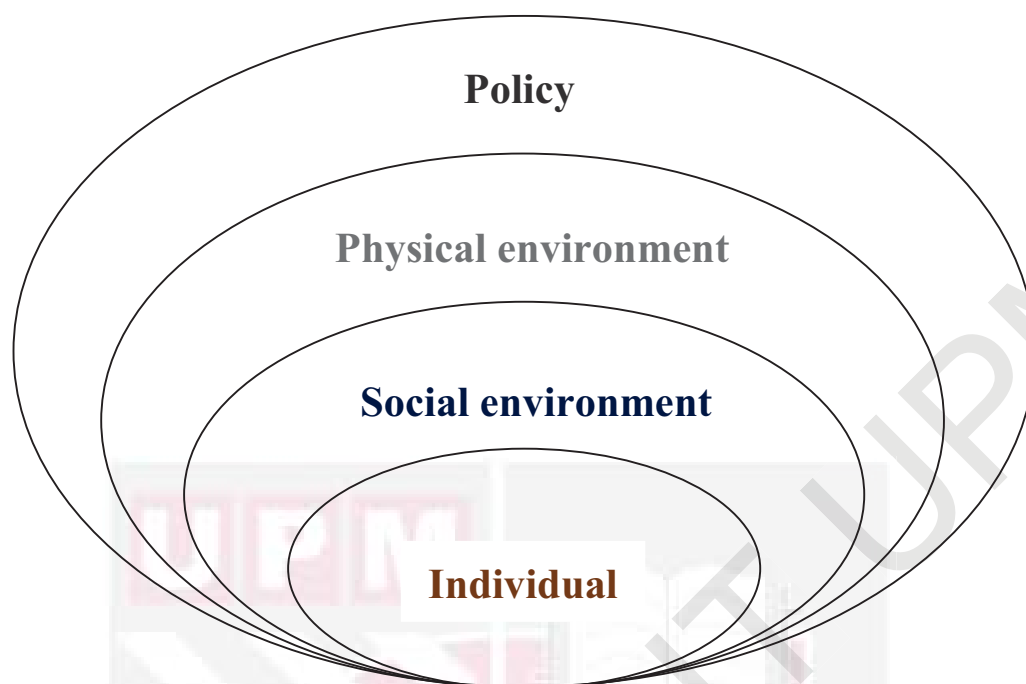


Figure 1.1: A Socio-Ecological Model adapted from Stokols (1996).

The physical environment provides opportunities for physical activity. It comprises of the natural environment and the man-made (built) environment (Fleury & Lee, 2006; Giles-Corti & Donovan, 2002; Stokols, 1996). Lastly, policy refers to regulations, laws, or actions that has the capacity to influence health behavior such as physical activity (Sallis, Bauman, & Pratt, 1998).

In this study, using the social-ecological model helps in recognizing the multi-level factors that influence physical activity behavior systematically, thereby identifying opportunities to promote participation in physical activity within population groups.

1.2 Problem Statement

It has been proven that chronic non-communicable diseases (NCDs) is the leading cause of mortality worldwide (WHO, 2011). In Nigeria, the burden of NCDs is enormous and glaring (Ekpenyong, Udokang, Akpan, & Samson, 2012). It has been reported that NCDs account for about 24% of the total deaths (7% for cardiovascular diseases, 2% for diabetes, 1% for chronic respiratory diseases, 3% for cancers, and 11% for other NCDs) in the country (WHO, 2014). The likelihood of death between the ages of 30 and 70 from the four main NCDs (cardiovascular diseases, cancers, diabetes and chronic respiratory diseases) was given at 20% (WHO, 2014). Researchers have linked NCDs to urbanization, globalization and lifestyle factors

(such as physical inactivity, alcohol consumption and smoking) (Ekpeyong et al., 2012). Regular participation in physical activity decreases the risk of cardiovascular diseases, diabetes, breast and colon cancers and depression (WHO, 2015a; Ekpeyong et al., 2012). As the burden of NCDs increases, the relevance of promoting regular practice of physical activity among youths cannot be overemphasized.

Many cross-sectional and longitudinal studies regarding patterns of physical activity have reported that university students do not practice physical activity in adequate amounts needed to experience the health benefits associated with being physically active (Sabourin & Irwin, 2008; Keating, Guan, Piñero, & Bridges, 2005; Sarkin, Nichols, Sallis, & Calfas, 2000). A systematic review by Irwin (2004) came to the conclusion that more than half of the university students in Canada, China and the United States were not physically active enough to reap all the health benefits associated with physical activity. Studies have also reported that a great proportion of students that transition to the university engage in low physical activity levels, with about one-third of those who were previously active students, becoming inactive during this transition (Goje, Salmiah, Ahmad Azuhairi, & Jusoff, 2014; Cowie & Hamilton, 2014). For instance, a cohort study by Bray and Born (2004) which was aimed at assessing vigorous physical activity while transitioning from high school to university among 145 Canadian university undergraduates found that 66.2% of the respondents participated in vigorous physical activity in the last two months of high school but this declined to 44% in their first two months in the university. Another study by Sinclair, Hamlin and Steel (2005) observed that there were significant declines in vigorous and moderate physical activity practice of first-year New-Zealand students since beginning university. This decline in physical activity could be as a result of competing demands faced by students during the transition to university which may reduce their engagement in regular physical activity. For students, allocation of time and motivations may now focus on their university studies, and as such, they may feel that there is very little time or motivation remaining to focus on physical activity (Cowie & Hamilton, 2014). This makes university students a high risk group for chronic non-communicable diseases.

Previous researchers have reported that physical activity is a health behavior determined by a large number of factors (Fleury & Lee, 2006). Until relatively recently, research on physical activity has been focused mainly on identifying individual determinants and has failed to consider the fact that the social and physical environment may also have an impact on physical activity behavior. This approach has come under criticism since it places excessive emphasis on the individual and does not examine the setting within which the behavior takes place (Giles-Corti & Donovan, 2002). A socio-ecological perspective of physical activity suggests the interdependence between people, their physical activity behavior, their social and physical environment and policies that act as facilitators to physical activity participation.

However, a systematic search of Pubmed, Taylor and Francis, Proquest, Google Scholar, and ScienceDirect, limited to English-language publications, revealed that there is no published article on the factors influencing physical activity participation among Nigerian university students using the socio-ecological model. Also, studies have not been published on physical activity among students of the University of Uyo, Nigeria. A study conducted by Awotidebe et al. (2014) only examined the influence of psychosocial variables on physical activity among undergraduate students of the Obafemi Awolowo University (OAU), Ile-Ife in Nigeria. Furthermore, Eskay (2014) only assessed knowledge, attitude and practice of physical activity among undergraduate students of the University of Nigeria, Nigeria.

Research has shown that public health programs that have been successful, have been based on an understanding of health behaviors (such as physical activity) and adequately addressing the contexts in which they occur such as the social, physical and policy environment (Glanz, Rimer, & Viswanath, 2008). There is a dearth of information regarding the multi-level factors that influence physical activity using the socio-ecological model among university students in Nigeria. The present study was conducted to determine the prevalence and predictors of sufficient levels of physical activity among first-year undergraduate students of the University of Uyo using a socio-ecological perspective.

1.3 Significance of the Study

This study revealed the prevalence of physical activity and the factors associated with being sufficiently physically active using the multiple levels of the socio-ecological model (individual, social environment, physical environment and policy levels). The results of this study can give a more holistic picture of the factors that influence physical activity practice among Nigerian university students.

The results of the present study can also contribute to data on the prevalence of physical activity among Nigerian university students. It will increase the body of knowledge on physical activity and serve as additional information for the development of interventions by researchers and university authorities, targeted at the prevention of non-communicable diseases by promoting physical activity in Nigerian university students. In addition, findings of the study can point towards future research areas and intervention strategies for decreasing physical inactivity among young adults.

1.4 Research Questions

- i. What is the prevalence of sufficient physical activity among first-year undergraduate students of University of Uyo, Nigeria?
- ii. What are the predictors of sufficient physical activity among first-year undergraduate students of the University of Uyo?

1.5 Objectives of the Study

1.5.1 General Objective

This research was conducted to determine the prevalence and predictors of sufficient physical activity using the socio-ecological model among first-year undergraduate students of the University of Uyo, Nigeria.

1.5.2 Specific Objectives

The specific objectives were:

- i. To determine the prevalence of sufficient physical activity among first-year undergraduate students of the University of Uyo, Nigeria.
- ii. To describe the individual (age, gender, ethnicity, marital status, residence, body mass index, self-efficacy, perceived barriers, knowledge and attitude), social environment (perceived family's social support, perceived friends' social support, father's physical activity, mother's physical activity and sibling(s)' physical activity), physical environment (availability of school facilities for indoor recreation, availability of school facilities for outdoor recreation, perceived safety, and enjoyable scenery) and policy factors (perception on physical education classes and perception on provision of time for physical activity) among first-year undergraduate students of the University of Uyo, Nigeria.
- iii. To determine the association between individual factors and physical activity levels among first-year undergraduate students of the University of Uyo, Nigeria.
- iv. To determine the association between social environment factors and physical activity levels among first-year undergraduate students of the University of Uyo, Nigeria.
- v. To determine the association between physical environment factors and physical activity levels among first-year undergraduate students of the University of Uyo, Nigeria.
- vi. To determine the association between policy factors and physical activity levels among first-year undergraduate students of the University of Uyo, Nigeria.

- vii. To determine the predictors of sufficient physical activity among first-year undergraduate students of the University of Uyo, Nigeria.

1.6 Research Hypotheses

The alternative hypotheses were:

H₀ = There is no significant association between individual factors and physical activity levels among first-year undergraduate students of the University of Uyo, Nigeria.

H₀ = There is no significant association between social environment factors and physical activity levels among first-year undergraduate students of the University of Uyo, Nigeria.

H₀ = There is no significant association between physical environment factors and physical activity levels among first-year undergraduate students of the University of Uyo, Nigeria.

H₀ = There is no significant association between policy factors and physical activity levels among first-year undergraduate students of the University of Uyo, Nigeria.

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