THE INFLUENCE OF HEALTH LITERACY ON ACTIVE TRANSPORT AMONG SECONDARY SCHOOL STUDENTS IN A SELECTED LOCAL GOVERNMENT AREA IN BENIN-CITY

BY

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CERTIFICATION

This dissertation by Irabor Imariabe is accepted in its presented form as satisfying the dissertation requirement of the degree of Bachelor of Physiotherapy of the School of Basic Medical Sciences, College of Medical Sciences of the University of Benin.

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DEDICATION

This dissertation is dedicated to God Almighty who made it possible to see this day, to my beloved mother. Thank you for all you do. I love you mummy. I want to specially dedicate this work to everyone who dares to dream, it is possible.

ABSTRACT

Background: Promoting health literacy (HL) at an early age is a key intervention strategy to reduce disease burden and health disparities. Active transport on the other hand involves a form of physical activity for everyday transportation either by walking or cycling. With the benefits of physical activity, leading a physically active life and avoiding long episodes of sedentary behavior, can help prevent non-specific health complaints and improve overall well-being among adolescents. Both HL and active transport are important determinants of health however studies on their relationship are limited.

Aim: This study aimed to influence of health literacy on active transport among secondary school students in Benin City, Edo State.

Method: This study utilized a cross-sectional study design. A total of 354 students were recruited from 11 secondary schools across Egor local government area, Benin City. The association between health literacy and active transport was determined by linear or logistics regression models. A p-value <0.05 was considered statistically significant. All analysis was performed using IBM SPSS Statistics for windows version 24.

Results: 331 (93.5%) of the respondents had inadequate level of health literacy. A total of 153 (43.2%) of the respondents engage in active transport with 86 (24.3%) commuting on foot and 67 (18.9%) on bicycle. There was no significant influence of health literacy on active transport.

Conclusion: This study found that secondary school students in Benin City spend little time on active transportation and possess an inadequate level of health literacy, but has a high frequency of active transportation. Health literacy does not influence time spent using active transport among secondary school students in Benin-City.

Keywords: Health literacy, active transport, secondary school, students

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TABLE OF CONTENTS

LIST OF TABLES

Table **Title** **Page**

CHAPTER ONE

INTRODUCTION

1.1. BACKGROUND OF STUDY

Health literacy according to World Health Organization (WHO, 1998), represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health". Further, health literacy implies the achievement of a level of knowledge, personal skills and confidence to take action to improve personal and community health by changing personal lifestyles and living conditions (Sørensen *et al.,* 2012). Over the last decade, the field of adolescent health literacy has gained momentum globally (Manganello *et al.,* 2007). As a personal asset, it highlights the empowerment of adolescents and their own rights of citizenship in society (Broder *et al.,* 2019). Low health literacy in adolescents is associated with a range of adverse health outcomes including health-compromising behaviours, poor health status and obesity (Fleary *et al.,* 2018). Lower health literacy is most times associated with less participation in health-promoting and disease detection activities, riskier health choices (such as higher smoking rates), more work accidents, diminished management of chronic diseases (such as diabetes, HIV infection and asthma), poor adherence to medication, increased hospitalization and re-hospitalization, increased morbidity and premature death (Kickbush *et al.,* 2013). Excellent health literacy enhances the quality of life due to active judgement and decision concerning health care, disease prevention and health promotion in everyday life (Nutbeam *et al.,* 2008). Little is known about the relationship about health and literacy, active transport is a strong determinant for health and important in health promotion (Sørensen *et al.,* 2012). However, a study by Xu *et al*. (2013) found that an increase in walking and cycling for transportation is related to positive health effect, e.g. better mental health, a lower body weight, a reduction of chronic diseases and a better general

cardiovascular health status (Lu *et al.,* 2013; Pucher *et al.,* 2010). Adolescent health literacy is an important and modifiable determinant of health; promoting health literacy at an early age is a key intervention strategy to reduce disease burden and health disparities (Smith *et al.,* 2017). Equally, there is a lack of knowledge and consensus on the abilities and knowledge that a child or young person should have in order to make sound health decisions (Pinkham *et al.,* 2012). An individual's health literacy is determined by their personal situation, which includes their health status, risks or problems, and affiliation with social group(s) (e.g. health practitioners and patients) and other socioeconomic factors (Rothman *et al.,* 2009).

Active transport, a form of physical activity for everyday transportation either by walking or cycling is an important predictor of health and an essential determinant of health promotion (Hofer-Fischanger *et al.,* 2020; Pucher *et al.,* 2010). Increased walking and cycling for transport have been linked to improved mental health, lower body weight, a reduction in chronic diseases, and a better overall cardiovascular health status (Xu *et al.,* 2013; Lu *et al.,* 2013; Pucher *et al.,* 2010). Those who cycle or walk to work or school are more likely to achieve minimum levels of healthy physical activity than those who commute by other modes (Woodward & Wild, 2020). Active transport is associated with improved mood and feelings of well-being, lower body weight, and better heart health and has been linked to better cognition and mental alertness (Kristen & Sanchez, 2020). Being sufficiently physically active is important for children, although, there are numerous health benefits associated with active transport, active transport can help reduce greenhouse gas emissions and provide economic benefits by lowering healthcare expenses (Mizdrak, *et al.,* 2019; Kriit, *et al.,* 2019). Even though, those with higher health literacy are more physically active than those with lower health literacy (Guntzviller, *et al.,* 2017), it is unclear if they are also more prone to prefer active over passive modes of transport such as travelling in a car or using a bus. There

is currently no study which has examined the relationship between health literacy and active transport among secondary school students in Nigeria.

1.2. STATEMENT OF PROBLEM

Health literacy is an important issue to consider in the provision of health-care to children (Morrison *et al.,* 2019). Similar to the adult population, most parents face health literacy challenges (Morrison *et al.,* 2019). Of particular concern is that 1 in 4 parents have low health literacy, greatly affecting their ability to use health information to make health decisions for their child (Morrison *et al.,* 2019). Consequently, these children's health literacy may be inadequate to make healthy choices (De Buhr & Tannen, 2020). High expectations are placed on parents and children to achieve effective disease management and positive health outcomes in the context of complex health-care systems and disease treatment regimens (Morrison *et al.,* 2019). The effect of low health literacy is wide ranging, including poor nutrition knowledge and behaviors, higher obesity rates, more medication errors, more emergency department use, poor asthma knowledge, behaviors, and outcomes (Morrison *et al.,* 2019). Health-care providers can mitigate the effects of health literacy by seeking to align health-care demands with the health literacy skills of families (Morrison *et al.,* 2019). Effective health literacy–informed interventions provide insights into methods that can be used by providers and health systems to improve health outcomes (Morrison *et al.,* 2019). Health literacy–informed communication strategies should be used with all families in a "universal precautions approach" because all parents likely benefit from clear communication (Morrison *et al.,* 2019).

A physically active life and avoiding long episodes of sedentary behavior, help prevent non-specific health complaints and improve well-being among adolescents (Sudeck *et al.,* 2020). In particular, the protective functions of physical activity are well established in the context

of mental health (Mazur *et al.,* 2019). Physical activity goes far beyond sports. According to WHO recommendations, moderate to intense physical activity is important, including daily activities that require energy expenditure, such as cleaning, walking upstairs, or active transport to school (ATS) (WHO, 2020). A key to changing to a more active lifestyle is to implement more physical activity into daily life, including active travel, which does not require financial costs or making huge changes in one's course of everyday life (Gardner *et al.,* 2011). Over the last two decades, studies have shown that ATS plays a significant role in improving adolescent health in many countries (Faulkner *et al.,* 2009). Existing studies have focused mainly on walking and cycling as two forms of active transport (Carver *et al.,* 2014). Cycling to school enables young people to meet the WHO recommendations for daily physical activity to a greater extent reduces the risk of obesity, improves overall body fitness, and ensures proper blood circulation (Cooper *et al.,* 2019). ATS also strengthens positive effects on mental health, helping students perform better in school. This positive effect on mental well-being is significant, as is the joy that physical activity generates and the contact with nature while walking or cycling. It is assumed that ATS can help one build a sense of independence and self-confidence as well as concern for the environment (Biddle *et al.,* 2019).

1.3. RESEARCH QUESTIONS

1. What is the level of health literacy among secondary school students in Benin City?
2. What are the types of active transport among secondary school students in Benin City?
3. What is the influence of health literacy on active transport among secondary school students in Benin City?

1.4. AIM OF THE STUDY

The aim of the study is to determine the influence of health literacy on active transport among secondary school students in Benin City, Edo State.

1.5.SPECIFIC OBJECTIVES

Specifically, this study seeks to determine the following:

1. To determine the level of health literacy among secondary school students in Benin City.
2. To determine the types of active transport among secondary school students in Benin City.
3. To determine the influence of health literacy on active transport among secondary school students in Benin City.

1.6. HYPOTHESES

1.6.1 MAIN HYPOTHESES

There will be no significant influence of health literacy on active transport.

1.7. SIGNIFICANCE OF THE STUDY

1. This study will create more research on health literacy and active transport.
2. The study will create awareness on health literacy and active transport among secondary school student in Benin City, Edo State.
3. This study will enhance the knowledge secondary school students have regarding health literacy and active transport.
4. This study will enable headships to formulate policies that will be beneficial in secondary schools.

1.8. SCOPE/DELIMITATIONS OF THE STUDY

The study was delimited to selected secondary school students.

The study was delimited to selected secondary schools in Edo State.

1.9.LIMITATIONS OF THE STUDY

1 A limitation of the study was that students were unwilling to cooperate.

2 Some parents did not give consent for their children to participate in this study.

3 Self-report measures may lead to bias responses or over-reporting or underreporting, due to social desirability.

1.10. DEFINITION OF TERMS

Health Literacy: According to the World Health Organization, health literacy implies the achievement of a level of knowledge, personal skills and confidence to take action to improve personal and community standards. (WHO, 2010).

Active transport: Active transport refers to travel between destinations by walking, cycling, or other non-"motorized modes" (NPHP, 2001).

Secondary school: A school that serves as a bridge between elementary and secondary school, typically offering general, technical, vocational, or college-preparatory courses (TheFreeDictionary.com).

Students: A person who attends school, College or University to study for something (Dictionary.com, 2019).

Physical Activity: The World Health Organization defines physical activity as "any bodily movement produced by skeletal muscles that necessitates the expenditure of energy."

Edo State: Edo (The Heartbeat Of Nigeria**)**, is a state in Nigeria. With Benin City as capital,

it is made up of 3 major ethnic groups; namely the Edo's in Benin, Esan, Owan, and Etsako (Edo State Gov, 2022).

CHAPTER TWO

REVIEW OF LITERATURE

2.1 HEALTH LITERACY

Literacy is generally defined "as the ability to read, write and use language in an accomplished and efficient way" (Robinson *et al.,* 1996). According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), literacy is "the ability to identify, understand, interpret, create, communicate, compute and use printed and written materials associated with varying contexts. Literacy involves continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential and to participate fully in their community ad wider society" (UNESCO, 2004).

Health literacy refers to the degree to which individuals have the capacity to obtain process and understand basic health information and services necessary to take appropriate health decisions (Parker *et al.,* 2010). The World Health Organization (WHO) defines it as the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health (WHO, 2020). Heath literacy means more than being able to read pamphlets, it includes the totality of processes involved in appreciating and utilizing health information effectively and is essential if patients are to exercise control over their own health (Kuyinu *et al.,* 2020). It has been classified into three levels; basic or functional health literacy, communicative or interactive health literacy and critical health literacy (Zumbo *et al.,* 2006). Functional health literacy has been described as a fundamental requirement for effective engagement of patients with health-related decision-making (Nutbeam *et al.,* 2000).

Types of Literacy and Literacy Skills

The following are some basic types of literacy and literacy skills (Lynch, 2019):

a. **Media Literacy-** It means the ability to understand massages on television, radio, video games, movies, news and on social media. Furthermore, the National Association for Media literacy Education, defined media literacy as the ability to access, analyze, evaluate, create and act using all forms of communication (Lynch, 2019).
b. **Recreational literacy-** Independent activities that cultivate positive attitudes, interests and literacy habits (Lynch, 2019).
c. **Disciplinary Literacy**- The treatment by experts in various disciplines of students reading, writing and critical thinking abilities specific to the different disciplines (Lynch, 2019).
d. **Civic Literacy-** Knowledge of how to actively participate and effect change in the local community and society (Lynch, 2019).
e. **Multicultural Literacy-** The ability to understand and appreciate the parallels and difference between customs, values and beliefs (Lynch, 2019).
f. **Health Literacy-** This type of literacy allows you to understand the types of health care system such as medication, to consult with doctors and specialists and to get the help needed by support staff (Lynch, 2019).
g. **Early Literacy-** What a child knows about communication, reading and writing before they learn to read and write (Lynch, 2019).
h. **Critical Literacy-** Advanced cognitive skills which, together with social skills, can be applied to critically analyse information (Freebody *et al.,* 1990).

Generally, literacy can also be viewed as having some basic components or skills, each of which represents vital ability needed by the literate to function optimally as an individual and within the given community (Education.gov, 2021).

Health literacy relates to people receive, comprehend, and apply health information to improve their health (AIHW, 2022). People with inadequate health literacy are more likely to have negative health outcomes and engage in unhealthy behaviours. (AIHW, 2022).

The idea of health literacy is dynamic and evolving. While there are many published definitions, there is no consensus on its meaning (Sørensen *et al.,* 2012). Health literacy initially focused on the ability of individuals to read and understand medical information; however, the way information is delivered by health care professionals and organisations is equally important. Therefore, according to ACSQHC (2014), health literacy has 2 main components:

1. Individual health literacy – these are individual skills, such as the ability to find, understand and use health information; for example, to complete health care forms or understand and use the health care system (ACSQHC, 2014).
2. The health literacy environment – these are the health system-based elements, such as policies, processes, and materials, which affect the way the individual engages with the health system (ACSQHC, 2014).

People have health literacy strengths and weaknesses which determines how seriously they engage with health information and services (Beauchamp *et al.,* 2015). Health information and support should be available and accessible to people with low health literacy (Dodson *et al.,* 2014). Health literacy is an outcome of health education and communication activities (Nutbeam, 2000). Low health literacy is especially prevalent among marginalized minority populations. These same populations are also more likely to develop chronic disease and are disproportionately affected by health disparities. A focus on adolescent health literacy may aid in addressing health disparities during a key transitional and developmental stage (Ghadder *et al.,* 2011).

The field of adolescent health literacy has gained momentum globally (Manganello *et al.,* 2007)

As a personal asset, it highlights the empowerment of adolescents and their own rights of citizenship in society (Bröder *et al.,* 2019). Low health literacy in adolescents is associated with a range of adverse health Outcomes including health-compromising behaviours, poor health status and overweight/obesity (Fleary *et al.,* 2018). Adolescent health literacy is an important and modifiable determinant of health; promoting health

Literacy at an early age is a key intervention strategy to reduce disease burden and health disparities (Smith *et al.,* 2017). In Nigeria, only 38% of in-school adolescents possessed adequate health literacy skills and there was a significant relationship between health literacy skills level and internet health information use (Ajiboye *et al.,* 2016). Furthermore, in Nigeria, low level of health literacy was found to be associated with poor medication adherence (Dadipoor Sakineh *et al.,* 2018) A review paper identified causes of low levels of health literacy in Nigeria to include culture and belief system, low educational level, low socio-economic status and ineffective communication (dekoya-Cole *et al.,* 2015). The poor health outcomes and late presentation to the health system by Nigerians in part may be due to inadequate health literacy (Agaba *et al.,* 2014).

2.2 EPIDEMIOLOGY OF HEALTH LITERACY

Most research focused on the ability to read basic health information (Nielsen-Bohlman, *et al.,* 2010). However, all of us can identify a friend or colleague who has excellent reading skills, but who has low health literacy, this person has trouble understanding and acting on health information (Schonlau *et al.,* 2011). As such, describing the epidemiology of health literacy requires an explanation of what has been traditionally measured (US, 2009). Researchers have measured reading ability as a proxy for health literacy (Manganello, 2007; US, 2009). Measuring reading ability emphasizes the role of understanding written health information (Nielsen-Bohlman *et al.*, 2010) and would likely classify our colleague with excellent reading skills as having "high health literacy" (Schonlau *et al.,* 2011). So, although measuring reading ability does not give us the full picture of health literacy, understanding the problems associated with not reading well can help us identify key principles for addressing health literacy (Schonlau *et al.,* 2011).

Patients with low literacy are more likely to misunderstand prescription medication instructions and warning labels (AbuAlreesh & Alburikan, 2019). Children with asthma who have parents with low literacy have more days of school missed, greater use of rescue medications and more hospitalizations all because of low health literacy (DeWalt *et al.,* 2007; Harrington *et al.,* 2015).

Interventions to improve low health literacy are as follows:

1. Improve health literacy skills in the population (Nutbeam *et al.,* 2017).
2. Improve written and multimedia communication (Ishikawa & Kiuchi, 2010).
3. Improve patient-provider communication in health care visits (Patak *et al.,* 2009; King & Hoppe, 2013).
4. Alter systems of care

2.3. LOW HEALTH LITERACY

Low health literacy is common, with at least one-third of adolescents facing challenges of accessing, understanding and using health information in everyday life (Guo *et al.,* 2021). Except for the impact of culture on health literacy, there is consistent evidence showing that adolescent health literacy is associated with personal self-efficacy, social support, and perceptions of school environment in both cultural groups (Guo *et al.,* 2020). In addition, adolescent health literacy is related to health behaviours, patient-provider communication, and health status (Park *et al.,* 2017). Particularly, creating a supportive school environment is critical to develop adolescent health literacy that would eventually contribute to better health outcomes (Khanal *et al.,* 2023).

Low health literacy is very common. It has been connected to poor health behavior and poor health outcome (Dewalt & Hink, 2009). Low health literacy can lead to:

1. Additional hospital admissions and readmissions (Mitchell *et al.,* 2012)
2. Lower participation in preventive measures (Von *et al*., 2007; Adams *et al.,* 2013)
3. Increased healthcare costs (Herndon *et al.,* 2011)
4. Ineffective communication with healthcare professionals (Schillinger *et al.,* 2002)
5. Poor medication adherence and increased adverse drug events (Lindguist *et al.,* 2012)
6. Lower functional status (Wolf *et al.,* 2005)
7. Poorer chronic disease self-management and disease outcomes (Schillinger *et al.,* 2004)

Poor health literacy has been associated with poorer physical and mental health function, and higher emergency department and hospital utilizations (Griffey *et al.,* 2014).

Low health literacy can have serious consequences for individuals as they might not be able to understand important health information, such as medication instruction or the risk associated with certain behavior or treatment (Griffey *et al.,* 2014). This can lead to lack of adherence to treatment plans, denied diagnosis or treatment, and ultimately poorer health outcome (Fleary & Joseph, 2020). To address low health illiteracy, healthcare providers can use plain language and visual aids to communicate health information, access patient understanding of health informants and provide follow up support as needed (Wynia & Osborn, 2010). Health literacy intervention can also be implanted at the community level, such as through health education, programs, outreaches that targets adolescents (WHO, 2016)

Low health literacy amongst adolescents is a great concern, as it can affect their ability to make informed decision about their health and wellbeing (Fleary & Joseph, 2020). According to Manganello (2007), adolescence with low health literacy may have difficulty understanding health information related to topics such as;

1. Sexual Health
2. Substance use
3. Mental Health

These are particularly relevant during the adolescent stage of development. There are several strategies that health care providers and educators can use to address low health literacy amongst adolescents, these include

1. Using plain language and avoiding medical jargons: Health care providers and educators should use simple health language when communicating health information's to adolescents, avoiding technical terms that may be difficult to understand (Fleary & Joseph, 2020).

2. Providing Visual Aids: Visual aids, such as diagrams or illustrations can help to reinforce health information and make it easier for adolescents to understand (Pratt & Searles, 2017).
3. Using interactive teaching methods such as discussion or role-playing activities, can engage adolescents and help them better understand health information (Suka & Yoshida, 2009).

Why is health literacy important?

People with low health literacy are more likely to have worse health outcomes overall (Berkman *et al.,* 2011) and adverse health behaviours, such as:

2. lower engagement with health services, including preventive services such as cancer screening (Kobayashi *et al.,* 2014)
3. higher hospital re-admission rates (Mitchell *et al.,* 2012)
4. poorer understanding of medication instructions (for example, non-adherence, improper usage) (Marvanova *et al.,* 2011; Miller 2016)
5. Lower ability to self-managed care (Geboers *et al.,* 2016).

In contrast, higher levels of health literacy are associated with increased patient involvement in shared decision making, which is important in patient-centred care (De Oliveira *et al.,* 2018; Seo *et al.,* 2016). Improving health literacy is therefore a key element in allowing people to partner with health professionals for better health.

2.4. RELEVANCE OF HEALTH LITERACY

People with low health literacy engage in disease management activities less effectively. Resulting in poorer outcome and increased Burden (Beggs *et al.,* 2003). It is important to make health information available to individuals and communities as this will improve the availability and accessibility to health information (Protheroe *et al.,* 2009). It will also enhance the ability of individuals to support and engage in health literacy (Protheroe *et al.,* 2009). A healthy population is essential for achieving society's objectives. Reducing inequalities and the social gradient improves everyone's health and well-being (Adelaide statement on all health policies, WHO 2010). Good health improves quality of life, increases workforce productivity, increases learning capacity, strengthens families and communities, promotes sustainable habitats and environments, and contributes to security, poverty reduction, and social inclusion (Adelaide statement on all health policies, WHO 2010). According to Adelaide statement on all health policies, WHO (2010), awareness of health literacy amongst individuals promotes:

1. Good health
2. Reduces mortality
3. Increases participation of prevention measures
4. Decreased health cost
5. Decreased prevalence of health risk factors
6. Good medication adherence and increased adverse drug events
7. Better communication with health care professionals.

It is essential to support health literacy among adolescent for the following reasons:

1. Few studies on adolescent literacy and health literacy have found that low health literacy is associated with risky behaviors such as smoking, obesity, and a low level of health promoting behavior (Ghaddar *et al.,* 2011).

2. Adolescents are forming lifelong health habits and behaviors, and adequate health literacy skills may support informed health-seeking lifestyles (Fleary & Joseph, 2020).

3. As more health systems rely on Internet-based services, adolescents are gradually gaining access to online health services (Park & Kwon, 2018).

4. Adolescents are future independent users of the health-care system, and health-literate young adults may contribute to a generation-level reduction of poor health outcomes known to be associated with low health literacy among adults (Fleary & Joseph, 2020).

Here are some of the reasons why health literacy is relevant:

1. Improved health outcomes: Health literacy is directly related to better health outcomes (Coughlin *et al.,* 2020). Individuals with higher level of health literacy are more likely to engage in preventive health behaviours, have better cornice disease management and make informed decisions about their health (WHO, 2016; Coughlin *et al.,* 2020).
2. Patient safety (Kim *et al.,* 2020): Health literacy s critical for patient safety. The understanding of medical prescription for example can lead to adverse drug events that can be harmful or even fatal
3. Health Equity: Health literacy is essential to achieving health equity by ensuring that everyone has access to health information and services needed to make informed decisions about their health (WHO, 2016).

2.5. ACTIVE TRANSPORT

Active transport as a form of physical activity contributes considerably to total physical activity and could therefore have significant positive health effects (Larouche *et al.,* 2014). Active transport, especially walking is feasible for most individuals and several positive health effects are associated with walking (during leisure time and for commuting purposes). Active transport in general specifically walking was inversely associated with cardiovascular risk factors and all-cause mortality in a meta-analysis of prospective cohort studies (Kraus *et al.,* 2019).

Active transport is an important aspect of physical activities, particularly for children and adolescent who spends significant amount of time siting in classrooms and engaging in sedimentary (Kohl & Cook, 2013). Active transport provides an opportunity for students to increase their daily physical activities level, improve their cardio vascular health, and reduce their risk of developing chronic diseases such as, obesity, diabetics and heart disease (Bopp *et al.,* 2013). In addition to health benefits, active transport also has social, environmental, and economic benefits (Bopp *et al.,* 2013). Walking or cycling to school can promotes social interaction between students, reduce traffic congestion and reduce air pollution (WHO, 2022).

Active commuting (walking/bicycling) to school is associated with higher levels of physical activity among children (Robertson-Wilson *et al.,* 2008; Chillón *et al.,* 2010; Pizzaro *et al.,* 2013; Rodríguez-López *et al.,* 2013) and it is a method by which the youth can build physical activity into their daily routines (Babey *et al.,* 2009; Gropp *et al.,* 2012; Owen *et al.,* 2012). Active commuting to school provides opportunities to increase cardiorespiratory fitness (Chillón *et al.,* 2010), prevent obesity (Mendoza *et al.,* 2011), and decrease metabolic disease (Pizzaro *et al.,* 2013). The recent decline in children's active commuting to school (Pizzaro *et al.,* 2013; Lee *et al.,* 2008) has become an important public health issue because positive

associations have been observed between active commuting and overall physical activity levels (Lee *et al.,* 2008). In view of the important role of physical activity in overall health promotion, and in view of the decline in physical activity among children and adolescents (Pizzaro *et al.,* 2013; Lee *et al.,* 2008), it becomes crucial for each society to review all likely opportunities available to promote increased physical activity among their youth. One such opportunity is provided by active commuting to school (Chillón *et al.,* 2010; Pizzaro *et al.,* 2013; Rodríguez-López *et al.,* 2013)

2.6. FACTORS AFFECTING ADOLESCENT ACTIVE TRANSPORT

Personal correlates, social cultural correlates, and environmental correlates all have an impact on active transportation (Simons *et al.,* 2013).

1. **Personal correlates**

A study by Simons *et al* (2013) identified personal correlate as age, autonomy and health.

2. **Age**

A few individuals mentioned that their parents do not think they are old enough to walk or cycle, hence they either drive them or put them on a bus, this maybe because the parents are thinking of the children's safety (Simons *et al.,* 2013).

3. **Autonomy**

A lot of people said that they do not like to be dependent on someone or something when it comes to be transportation, cycling to destination provides adolescents with a great deal of independence because it is reliable. It provides them with a direct route to their destination and they are independent from their parents driving them (Simons *et al.,* 2013).

2.7. EPIDEMIOLOGY OF ACTIVE TRANSPORT

The Epidemiology of active transport refers to the study of distribution and determinant of active transport behavior in a population, as well as the health outcomes associated with active transport. Studies have shown that active transport is associated with a range of health benefits, including reduced risk of chronic diseases such as obesity, diabetes and cardio vascular disease as well as improved mental health and over all wellbeing (Lu *et al.,* 2013; Green *et al.,* 2021). The world is experiencing a crisis of physical inactivity with almost 80% of adolescents not achieving the recommended 60 min of daily moderate to vigorous physical activity for health (Sallis *et al.,* 2016). In this context, transportation, as a daily necessity to move from one place to another, represents a promising domain to promote the accumulation of physical activity in children and adolescents in a convenient and habitual manner (Ikeda *et al.,* 2019). Specifically, active transportation to/from school is an opportunity to integrate physical activity into children's and adolescent's routines (Larouche *et al.,* 2014). Active transportation comprises non-motorized travel modes like walking, cycling or riding a scooter, among others (CDC 2019). The use of these active modes leads not only to health benefits such as greater levels of cardiorespiratory fitness (Lubans *et al.,* 2011) and better cardio metabolic health indicators (Andersen *et al.,* 2011) among children who actively commute, but also to other co-benefits, such as better mental health outcomes (Luiz-Ariza *et al.,* 2015) greater interaction with their environment (Fusco *et al.,* 2012) and reduced transportation-related emissions and pollution (Marshall *et al.,* 2010). Despite these benefits, current evidence suggests that this behaviour is declining in many countries (Larouche *et al.,* 2018). Physical activity provides a wide range of health benefits to children and adolescents and it is clearly documented that higher levels of physical activity are associated with better physical fitness, body composition, bone health, and cardio metabolic risk status in young people (U.S. Department of Health and Human Services, 2008). Substantial evidence suggests that physical activity promotes good mental health as well as improved cognition and school

performance (U.S. Department of Health and Human Services, 2008). Accordingly, public health authorities around the world have adopted physical activity guidelines for children and adolescents, and these recommendations typically call for young people to be active for 60 minutes per day at intensities in the moderate-to vigorous range (WHO, 2010). Adolescent are physically active in many different places and in many ways and forms but globally 80% are insufficiently active, not meeting WHO recommendations (Van Sluijs *et al.,* 2021). Accordingly, the effort to increase the physical activities level in adolescent will have to be through strategies in multiple societal sectors (CDC, 2011). Changing physical activity behavior at the community level with require implementation on policy and program that can reach large number of adolescent within interventions that are known to be effective in increasing physical activities (CDC, 2011). Reduction of childhood obesity rate with require increasing physical activity level of the children (CDC, 2011) Studies generally show that increased fat-free mass and decreased body fat is associated with physical activity (W & Cook, 2013). The healthy eating and physical activity (HEPA) standard related to physical activities, the standard states that (YNCA) after school program should provide children and adolescent with at least 30mins of physical activities per day (YMCA, 2014).

2.8. WAYS OF PROMTING HEALTH LITERACY AMONGS SECONDARY SCHOOL STUDENTS

From a public health perspective, children and young people constitute a core target group for health literacy research and intervention as during childhood and youth, fundamental cognitive, physical and emotional development processes take place and health-related behaviours and skills develop (Borzekowski *et al.,* 2009). As a result, these stages of life are regarded as crucial for healthy development, as well as for personal health and well-being throughout adulthood (Irwin *et al.,* 2007). Moreover, health literacy is understood as a

variable construct that is acquired in a life-long learning process, starting in early childhood (Zarcadoolas *et al.,* 2005). Hence, targeting children and young people with health literacy interventions can help promote health behaviors and ameliorate future health risks. Here are some ways in which health literacy can be promoted among secondary school students:

1. Health Education Programs (Auld *et al.,* 2020): Some schools can develop health education programs that aim at improving student knowledge and understanding of health issues. These program can cover a range of topics including Nutrition, Exercise, Mental Health and Sexual Health (Auld *et al.,* 2020).
2. Health Literacy Materials (CDC, 2010): Such as brochures, postal, and infographics can be used to provide students with ease to understand health information's (CDC, 2010).
3. Technology Based Learning: Such as online courses, mobile apps and educational games can be used to engage students and provide them with interactive learning experience (Literacy, 2011).
4. Parental Involvement (Đurišić & Bunijevac, 2017): Parents can be involved in promoting health literacy among their children by encouraging healthy behaviors at home and supporting health education programs at school (Đurišić & Bunijevac, 2017).

2.9 TABLE OF EMPIRICAL LITERATURE REVIEW

YEAR/ COUNTRY	AUTHORS	AIM OF STUDY	TYPE OF RESEARCH DESIGN	METHOD /OUTCOME	SAMPLING SIZE	FINDINGS	STRENGTH/ LIMITATION	EVIDENCE GAP
Australia and China 2020 (Health literacy)	Elise Davis and Shuaijun-Guo *et al.,*	To compare health literacy between two cultural groups among secondary school students in Beijing and Melbourne.	Cross sectional study	A self-administered questionnaire was designed to collect information on health literacy assessment tool	770 students from 5 secondary school from Beijing and Melbourne	The study investigated and compared secondary school student health literacy in Beijing and Melbourne using different health literacy assessment tools.	**Strength:** Two methodological framework was used to ensure the clarity, transparency and rigor of the study. First **Limitation;** due to convenience sampling, students in Beijing and Melbourne secondary school, were not representative. the sampling size was not equivalent to Beijing and Melbourne secondary school	Future research is needed to replicate the findings with larger and more representative samples among cultural groups.

Nigeria 2014 (Adolescents health)	Adeniyi *et al.,*	To examine active commuting (Active transport e.g walking, bicycling) among secondary school student and the factors that constitute barriers or facilitators.	Cross sectional study	A self-developed questionnaire was used to collect data on the mode of commuting, (active transport) to school and the reason for the adoption of such modes	1100 students. A sample of 100 students were allocated for each school.	The study found that the majority of the secondary school student in the study area were not actively commuting (using active transportation) to school.	**Strength:** This study is of major public health significance because it has a potentially harmful trend **Limitations:** Lack of appropriate sidewalks and cycling skills that discouraged active commuting (active transportation) among students.	There is also the need to exercise caution when interpreting these results. As it is not certain whether the pattern of commuting (active transportation) to school continues outside school hours
China 2021 (Modes of transport to school)	Yuan-Shen *et al.,*	To investigate the mode of transport to school and the association on with the weight status of Chinese student.	Cross sectional study	Self-administered, structured questionnaire, was used to classify student's mode (active mode) weight status.	10,123 students	Although no statistically significant association were found between different modes and over all weight status.	**Strength:** The main strength of this investigations covered all grades in primary and middle school. **Limitation:** The survey did not include information on distance to school or travel time to school.	The findings of this study did not support the notion that the active mode is beneficial for preventing over weight / obesity in students, and more studies are warranted to confirm such studies.

CHAPTER THREE

MATERIALS AND METHODOLOGY

This chapter provides explanation for the study design, eligibility criteria, data collection processes, study materials and data analysis methodology.

3.1. Participant selection

This study was conducted among secondary school students in secondary schools (from SS1 and SS2) in Egor Local Government Area of Edo state, Nigeria.

3.2. Eligibility criteria

This includes the inclusion criteria and exclusion criteria

3.2.2 Inclusion criteria

i. Participants were students of private and public secondary schools in Egor local government area, Benin city, Edo State, Nigeria.

ii. Senior secondary levels in the secondary schools.

3.2.3 Exclusion criteria

i. Students not physically present in class.

ii. Secondary schools located outside Egor local government area, Benin city.

iii. Schools for the physically challenged.

iv. Students in junior secondary schools.

v. Students below the age of 13 years.

3.3. Material

3.3.1 Research Instrument

Proforma: This was used to collect Sociodemographic data (age, gender and level/class, private or public schools).

Mechanical weighing scale: The mechanical weighing scale which was made in Nigeria was used to ascertain the weight in the nearest 0.5kg (kilogram) of the participants.

Liangjin Tape Measure: The Liangjin tape measure made in Mumbai, India was used to measure the height of the participants in the nearest 0.1 metre (m).

Health literacy questionnaire

Health literacy questionnaire (HLQ) measures health literacy based on definition from Sorensen with three domains: healthcare, disease prevention, and health promotion (Pelikan *et al.,* 2017). It is a self-reported tool with responses in Likert-type scale ("very easy", "fairly easy", "fairly difficult", "very difficult"). HL index was computed based on the validated HLS-EU-16 questionnaire (Sorensen *et al.,* 2013). The index score was calculated for those respondents who answered >80% (i.e., > 13 items) of the questionnaire. For comparison with other studies, the following formula was used to calculate the HL score (Wilson *et al.,* 2002).

$$\text{Index} = (\text{mean (per Item)} - 1) * 50/3$$

The index score has a minimum value of 0 and a maximum value of 50. In addition, four categories were formed on the basis of the score as defined by Sorensen et al. (Sorensen *et al.,* 2015) (0-25 inadequate HL; > 25-33 problematic HL; > 33-42 sufficient HL, and > 42-50 excellent HL).

Active transport

Based on previous work (Lu *et al.,* 2013; Carlson *et al.,* 2018), participants were asked "which of the following transport option they have used in the last 12 months?" followed by seven categories: (1) foot; (2) car, (3) public transport; (4) bicycle or freight bicycle; (5) electric bicycle; (6) motorbike; (7)

taxi. Subcategories will be answered with the following option regarding frequency of active transport: daily, 3-4 days per week (daily/often), 1-2 days per week, 1-3 days per month (weekly/1-3 times a month), seldom, never, do not know. In addition, active transport was measured as the minute per week spent on walking from A to B. For walking, participants were asked "on how many days in a usual week do you walk more than 10 minutes from A to B?" and "On how long do you walk on such a day?" Participants reported a number of days per week walking. Total minutes of walking per week was calculated by multiplying the number of hours reported with sixty and adding them to the minutes reported. Consequently, minutes of active walking per week was calculated by multiplying the reported number of days per week with the calculated minutes per day. This number of minutes of walking for active transport per week was used in the analysis.

3.4. Method

3.3.1. SAMPLE SIZE

A total of 163 secondary schools are in Egor local government area, Benin City, Edo state (SUBEB, 2020). A total of 1929 students were recruited from 11 secondary schools across Egor local government area, Benin City.

$n=N / (1+N[e]^2)$ (Slovin's Formula) (Singh *et al.,* 2014)

Where,

n = Sample size

N = Population size

e = Margin of error/Significance level

1 = Unity with

N (Population size) = 1929

And, e (Margin of error/Significance level) = 0.05

So, n =1929 / (1+ [1929*0.05] ^2)

Therefore, sample size is 331

Attrition rate: 33

Total sample size: 364

3.3.2 SAMPLING TECHNIQUE

Stage 1

Out of the 163 secondary schools in Egor local government area, every 10th school was selected, we arrived at 16 school thereafter.

Stage 2

A ballot was made by writing the 16 schools in sheets of paper, folded and shuffled. An independent person randomly picked eleven folded papers from 16 papers, hence eleven secondary schools were selected and students from each class were selected via convenience sampling.

3.3.3 RESEARCH DESIGN

This study is a cross-sectional study design.

3.3.4 Ethical consideration

Ethical approval for this study was sought from the Ethics Research Committee of College of Medical Sciences, University of Benin, Benin City. Letter of introduction to the principals of the secondary schools was obtained from the Department of Physiotherapy, College of Medical Sciences, University of Benin (**CMS/REC/2023/357**). Informed consent was obtained from the principals of

the secondary schools and the parents/guardians of the students using informed consent form. Before seeking informed consent, prospective participants was adequately informed of the aims, methods, any possible conflicts of interest, institutional affiliations of the researcher, the anticipated benefits and potential risks of the study and the discomfort it may entail. Having been fully informed of the aim, methods, benefits and the potential risk, prospective participants were reserved with the right to refuse to participate without reprisal.

3.3.5 Procedure for data collection

The available participants who met the inclusion criteria were used for this study. Once the criteria were met, their informed consent was sort for after the purpose and protocol for the study has been explained thoroughly. The total number of participants required were administered questionnaires to fill. The questionnaires were divided into three sections. Section A comprise the Socio-demographic questionnaire (age, gender, type of school and ethnicity) while anthropometric measurement includes height and weight. Section B consist of health literacy questionnaire while section C was active transport questionnaire.

3.3.6 Procedure of measurements

The anthropometric measurements of each student was measured prior to the filling of the questionnaire. Height of the participants was measured and recorded in meters (m) with the aid of a Liangjin tape measure. The weight of the participants was measured and recorded using a mechanical weighing scale. Student weight was documented in kilogram (kg). Body mass index (BMI) was calculated using both the weight and height measured in kg/m^2**.**

3.3.7 Data Analysis

Continuous variables with a normal distribution was shown as means with their standard deviation (SD). When distribution is not normal, median and interquartile range (IQR) were reported. Categorical variables were displayed as numbers (n) and percentage (%). The influence of health

literacy on active transport were determined using Mann Whitney U, using the health literacy groups (i.e., inadequate as reference vs. problematic) as an independent variable and active transport as a dependent variable. Mann-Whitney U test was performed because active transport was not normally distributed. A p-value <0.05 was considered statistically significant. All analysis was performed using IBM SPSS Statistics for windows version 24.

CHAPTER FOUR

RESULTS

4.1 Preamble

The main aim of this study was to determine the association between health literacy and active transport among secondary school students in Benin City, Edo State. A total of 354 students were recruited for this study.

4.1.1 Sociodemographic characteristics of the respondents

Shown in table 1. 186 (52.5%) of the respondents were male, 185 (52.3%) attended public schools and 189 (53.4%) were in the SSS 2 class. The mean age and BMI of the respondents were 16.75 years (± 2.26) and 19.86 kg/m^2 (± 3.73).

Table 1: Sociodemographic characteristics of the respondents **N = 354**

	Frequency	Percentage (%)
Gender		
Male	186	52.5
Female	168	47.5
Type of school		
Public	169	47.7
Private	185	52.3
Class		
SSS 1	165	46.6
SSS 2	189	53.4
	Range	**Mean ± SD**
Age	13 – 20	16.75 ± 2.26
BMI	11.15 – 34.11	19.86 ±3.73

4.1.2 Health literacy score of the respondents

Shown in table 2. The health literacy score of the respondents ranged between 2.08 to 35.42 with a median score of 16.67 (IQR = 8.33). 331 (93.5%) of the respondents had inadequate level of health literacy.

Table 2: Health literacy score of the respondents **N = 354**

	Don't Know/Refusal (n, %)	Very difficult (n, %)	Fairly difficult (n, %)	Fairly easy (n, %)	Very easy (n, %)
HLQ1	78 (22.0%)	56 (15.8%)	89 (25.1%)	54 (15.3 %)	77 (21.8%)
HLQ2	68 (19.2%)	71 (20.1%)	74 (20.9%)	76 (21.5%)	65 (18.4%)
HLQ3	79 (22.3%)	74 (20.9%)	70 (19.8%)	58 (16.4%)	73 (20.6%)
HLQ4	70 (19.8%)	75 (21.2%)	63 (17.8%)	81 (22.9%)	65 (18.4%)
HLQ5	67 (18.9%)	80 (22.6%)	57 (16.1%)	71 (20.1%)	79 (22.3%)
HLQ6	73 (20.6%)	66 (18.6%)	72 (20.3%)	69 (19.5%)	74 (20.9%)
HLQ7	83 (23.7%)	62 (17.5%)	61 (17.2%)	86 (24.3%)	61 (17.2%)
HLQ8	51 (14.4%)	66 (18.6%)	91 (25.7%)	68 (19.2%)	78 (22.0%)
HLQ9	65 (18.4%)	75 (21.2%)	66 (18.6%)	78 (22.0%)	70 (19.8%)
HLQ10	72 (20.3%)	76 (21.5%)	67 (18.9%)	67 (18.9%)	72 (20.3%)
HLQ11	65 (18.4%)	83 (23.4%)	66 (18.6%)	74 (20.9%)	66 (18.6%)
HLQ12	68 (19.2%)	76 (21.5%)	60 (16.9%)	73 (20.6%)	77 (21.8%)
HLQ13	70 (19.8%)	77 (21.8%)	68 (19.2%)	78 (22.0%)	61 (17.2%)
HLQ14	75 (21.2%)	63 (17.8%)	79 (22.3%)	64 (18.1%)	73 (20.6%)
HLQ15	61 (71.2%)	58 (16.4%)	76 (21.5%)	84 (23.7%)	75 (21.2%)
HLQ16	70 (19.8%)	75 (21.2%)	86 (24.3%)	62 (17.5%)	61 (17.2%)

	Range	**Median (IQR)**
HL Score	2.08 – 35.42	16.67 (8.33)
HL Category	**Frequency**	**Percentage (%)**
Inadequate	331	93.5

Problematic	22	6.2
Sufficient	1	0.3
Excellent	0	0

HLQ = Health Literacy Question, HL = Health literacy

4.1.3 Active transport characteristics of the respondents

Shown in table 3. 86 (24.3%) chose walking on foot as their mode of commuting in the previous 12 months. 35 (9.9%) of the respondents engage in active transport daily. 83 (23.4%) reported walking for more than 10 minutes on a daily basis. 100 (28.2%) of the respondents reported cycling for more than 10 minutes on a daily basis. Minutes of active transport per week ranged from 0 to 1085 minutes with a median score 165.0 (IQR = 213.75).

Table 3: Active transport characteristics of the respondents **N = 354**

	Frequency	Percentage (%)
Mode of transport used in the previous 12 months		
Foot	86	24.3
Car	74	20.9
Public Bus	62	17.5
Bicycle	67	18.9
Skateboard	65	18.4
Frequency of active transport		
Daily (3-4 days per week)	35	9.9
1-2 days per week	41	11.6
1-3 days per month	34	9.6
Weekly (1-3 times a month)	37	10.5
Never	27	7.6
I do not know	44	12.4
Walking days		
I don't know/Refusal	84	23.7
Daily	83	23.4
Weekly (3 times a week)	88	24.9
Never	99	28.0
Cycling days		
I don't know/Refusal	86	24.3
Daily	100	28.2

Weekly (3 times a week)	90	25.4
Never	78.0	22.0
	Range	**Median (IQR)**
Walking Minutes/week	0 - 840	45.0 (105.0)
Cycling Minutes/week	0 – 840	105.0 (180.0)
Active Transport Minutes/week	0 – 1085	165.0 (213.75)

4.1.4 Relationship between health literacy on active transport

Shown in table 4. There was no significant influence of health literacy on the active transport score of the respondents ($\rho = 0.977$).

Table 4: Influence of health literacy on active transport

HL Category	Median (IQR)	Mean Rank	U	ρ
Inadequate	165 (215)	6.77	1050.50	0.977
Problematic	105 (340)	3.50		

4.2 Hypotheses Testing

Hypothesis 1: There will be no significant influence of health literacy on active transport among secondary school students.

Alpha level: 0.05

Test statistic: Mann-Whitney U test

Observed: $p > 0.05$

Since the observed p value was greater than 0.05 Alpha level. The hypothesis was therefore NOT REJECTED

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

Health literacy in adolescents has been reported to significantly impact participation in health-promoting activities (such as active transport) and decision making on health choices which ultimately impact their health outcomes (Kickbush et al., 2013; Fleary et al., 2018). Active transport provides a good avenue for physical activity among adolescents and can help to improve their health status. This study aimed to determine the association between health literacy and active transport among secondary school students in Benin city, Edo state.

The mean health literacy score among the respondents of this study was 16.76 (± 5.84) and majority (93.5%) of the respondents had inadequate level of health literacy. This finding is in contrast to those by Chu-ko *et al,* (2021) who reported a mean health literacy score of 36.15 (± 5.84) among adolescents in central Taiwan, with only 30.17% of the study population having insufficient or problematic health literacy. Hamzah *et al* (2015) in a study among adolescents in Malaysia reported that 56.3% of the study population had moderate health literacy level. The contrast between the findings of this present study and those from previous studies may be attributed to difference in the curriculum of the secondary students and also the environment in which they live.

A total of 153 (43.2%) of the respondents engage in active transport with 86 (24.3%) commuting on foot and 67 (18.9%) on bicycle. These findings are similar to those from a study by Ahmadu *et al* (2012) who reported that a large percentage of the study population walk to school. Majority of households in Nigeria do not own a car, only 20.1% of households in the South-South zone of Nigeria are reported to own a car or truck as at 2020 (Statista, 2023). The low prevalence of car ownership will require that students engage in active transport while commuting to school. The mean

active transport minutes per week reported by the respondents of this study was 223.21 minutes per week (± 213.30). A study by Hofer-Fischanger *et al* (2020) reported an average value of 180.0 minutes per week among citizens in Austria. The active transport score of 223.21 minutes per week reported among the respondents of this present study falls short of the World Health Organization (WHO) recommendation of at least minute 60 minutes per day (which would equate to 420 minutes per week) of moderate-to-vigorous physical activity among adolescents (WHO, 2022). Most students are enrolled in schools that are closer to their homes hence reducing the need for vehicular transport, this may explain the low average active transport minutes per week among the respondents of this present study despite the high prevalence of engagement in active transport. Duncan *et al*, (2015) reported similar findings among adolescents in New Zealand, who had high prevalence of active transport to school but low levels of physical activity among students whose schools were a short distance away from their homes. Students may also take public transportation to school which would require them to walk only a short distance from where they are dropped off to the school.

It was observed from this present study that there was no significant influence of healthy literacy on active transport score of the respondents. There is paucity of studies that have compared the influence of health literacy on active transport among adolescents. However, Hofer-Fischanger *et al* (2020) reported similar findings among citizens in an Austrian rural region. Engagement in active transport by the students in this present study may be attributed to other variables such as socioeconomic status, household ownership and distance of their homes from the school. The inadequate level of health literacy among the respondents could imply that respondents engage in active transport without any knowledge of its importance. Buchmann *et al* (2023) reported that high levels of health literacy in comparison to low levels was associated with 1.65 times increase in engaging in activity rather than planning the activity.

This lack of significant influence of health literacy on active transport may also be attributed to different demographics where the studies were conducted. Other variables such as socioeconomic

status, exposure to health education and level of health literacy of the parents of the students may influence their level of health literacy.

5.2 Conclusion

This study found that secondary school students have inadequate level of health literacy but a high frequency of active transportation, but low active transportation minutes per week among the respondents. There was no significant relationship between health literacy and active transportation.

5.3 Recommendations

Health providers and teachers should aim to broaden the level of knowledge of students and adolescents in general on health topics and also highlight the importance of engaging in physical activity and healthy habits. Efforts should be made to encourage more students to engage in active transportation more while commuting to school and for longer durations.

5.4 Implications for Further Study

Future studies show aim to assess other variables such as the distance of students from their schools, their socioeconomic status as well as the level of healthy literacy of parents and the relationships that these variables may have on the level of health literacy and active transportation among adolescents.

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Appendix 1

INFORMED CONSENT FORM

My name is IMARIABE IRABOR, a 500 level student of physiotherapy department, School of Basic Medical Sciences, College of Medical Sciences, University of Benin, Benin city. I am carrying out my project research titled " THE INFLUENCE OF HEALTH LITERACY ON ACTIVE TRANSPORT AMONG SECONDARY SCHOOL STUDENTS IN A SELECTED LOCAL GOVERNMENT AREAS IN BENIN CITY". I humbly request your participation in this survey as your responses would be most helpful.

The survey will take only about 10-12 minutes to complete. Your participation in this survey is completely voluntary and all of your responses will be kept confidential. You also have right to withdraw from this study at any time. Thank you very much for your time and cooperation.

Consent: Now that this study has been explained to me in details and I understand the nature purpose and benefits of the study, I consent for my ward to be a participant in this study

_____ _____

Signature of the Guardian/Date **Signature of Researcher/Date**

Note: Kindly return this copy after inputting your signature to the researcher or to your school principal and for more information, you can reach me on the contact below:

08072827745. Thank you.

Appendix 2

QUESTIONNAIRE

Section A (Proforma): Socio-Demographic Data

Please fill in the required information correctly:

1 Age _____

2 Gender Male [ ] [Female [ ] _____

3 Weight (kg) _____

4 Height (m) _____

5 Type of School : Public [ ] Private [ ]

6 Class _____

Section B: HEALTH LITERACY QUESTIONNAIRE

INSTRUCTIONS

Please answer by marking the appropriate box. You may be in doubt on how to answer but please do your best. Please answer every question. This questionnaire aims to know one's level of HEALTH LITERACY.

On a scale from very easy to very difficult, how easy will you say it is to

		Very easy	Fairly easy	Fairly difficult	Very difficult	Don't know/refusal
1	Find information on treatment of illnesses that concern you					
2	Find out where to get professional help when you are ill					
3	Understand what your doctor says to you					
4	Understand your doctor or pharmacist's instruction on how to take a prescribed medicine					
5	Judge when you may need to get a second opinion from another doctor					
6	Use information the doctor gives you to make decisions about your illness					
7	Follow instruction from your doctor or pharmacist					
8	Find information on how to manage mental health problems like stress or depression					
9	Understand health warnings about behaviour such as smoking, low physical activity and drinking too much					
10	Understand why you need health screenings					

11	Judge if the information on health risks in the media is reliable					
12	Decide how you can protect yourself from illness based on information in the media					
13	Find out about activities that are good for your mental well-being					
14	Understand advice on health from family members or friends					
15	Understand information in the media on how to get healthier					
16	Judge which everyday behaviour is related to your health					

Section C: ACTIVE TRANSPORT QUESTIONNAIRE

Please answer by putting a cross in the appropriate box – one cross for each question. You may be in doubt on how to answer but please do your best anyway. Please answer every question.

4. Which of the following transport options did you choose for commuting in the last six months?

    4. Foot [ ]
    5. Car [ ]
    6. Public Bus [ ]
    7. Bicycle [ ]
    8. Taxi [ ]

5. What is Frequency of active transport?

    1. Daily (3 – 4 days per week) [ ]
    2. 1 – 2 days per week [ ]
    3. 1 – 3 days per month [ ]
    4. Weekly (1 – 3 times a month) [ ]
    5. Never [ ]
    6. I do not know [ ]

6. On how many days in a usual week do you walk more than 10 minutes from one place to another?

    1. Daily/often [ ]
    2. Weekly/ 1- 3 times [ ]
    3. Never [ ]
    4. I do not know [ ]

4. For how long do you walk on such a day?

    10 minutes- 1 hour [ ]; state specific time __ (hours) _____mins___

1 hour- 24hours [ ] state specific time __ (hours) _____mins___

Never [ ]

I do not know [ ]

5. On how many days in a week do you cycle more than 10 minutes from one place to another?

   i. Daily/ often [ ]

   j. Weekly/ 1-3 times [ ]

   k. Never [ ]

   l. I do not know [ ]

6. For how long do you cycle on such a day?

   3. 10 minutes- 1 hour [ ]; state specific time __ (hours)_____mins___

   4. 1 hour- 24hours [ ] state specific time __ (hours)_____mins___

   5. Never [ ]

   6. I do not know [ ]

THANK YOU.

Table 5: Test of normality for health literacy active transport score

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	**Df**	**P**	**Statistic**	**Df**	**ρ**
ATP mins/wk	0.148	204	<0.001	0.850	204	<0.001
HL Score	0.044	354	0.177	0.995	354	0.286

ETHICAL APPROVAL

RESEARCH ETHICS COMMITTEE

COLLEGE OF MEDICAL SCIENCES
UNIVERSITY OF BENIN, BENIN CITY, NIGERIA.

Chairman: Prof. F. A Imarhiagbe
MBChb Cert Neuroscience, FMCP
MD, Cert Clin Res and ethics.
0803449092

P.M.B 1154, BENIN CITY
Email: researchethics.cms@gmail.com

Our Ref: CMS/REC/01/VOL.2/357 **Date:** 26th July, 2023.

Re: ASSOCIATION BETWEEN HEALTH LITERACY AND ACTIVE TRANSPORT AMONG SECONDARY SCHOOL STUDENTS IN SELECTED LOCAL GOVERNMENT AREAS IN BENIN-CITY

Name of Principal Investigator: **IRABOR IMARIABE**
Department Of Physiotherapy,
School Of Basic Medical Sciences,
College Of Medical Sciences.
University Of Benin
Benin City

REC Approval No: **CMS/REC/2023/357**

This is to inform you that the research described in the submitted proposal, the Informed Consent Forms and other participant information materials have been reviewed and approved by the College Research Ethics Committee, University of Benin.

This approval dates from **26th July, 2023 to 25th July, 2024.** In multi-year research, Endeavour to submit your annual report to the REC early in order to obtain renewal of your approval and avoid disruption of your research.

The National Code of Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the code including ensuring that all adverse events are reported promptly to the REC. No, changes are permitted in the research without prior approval by REC except in circumstances outlined in the code. REC reserves the right to conduct compliance visit to your research site without prior notice.
Thank you.

PROF. F.A IMARHIAGBE
Chairman, REC

Promoting best ethical & scientific standard for research in Nigeria