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ASSESSMENT OF PHYSICAL ACTIVITY KNOWLEDGE, STAGES OF BEHAVIOUR CHANGE, PRACTICES AND NON-COMMUNICABLE DISEASES AMONG ADULT OUT-PATIENT ATTENDANTS OF LEKMA HOSPITAL.

BY

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DECLARATION

I, Hosea Boakye hereby declare that, with the exception of cited literature, this dissertation is the result of my own original research carried out under the supervision of Dr. Albert Atabila, School of Public Health. This research has not been presented elsewhere either in part or in whole for purposes of the award of another degree.

4th July, 2022

Hosea Boakye Date

(Student)

…… 07/07/2022 ……

Dr. Albert Atabila Date

(Academic supervisor)

DEDICATION

I dedicate this dissertation to my wife, Helina Osaah for her prayers and support in diverse ways during my studentship.

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ABSTRACT

Background: Physical inactivity is the fourth leading cause of global mortality and a significant cause of non-communicable diseases (NCDs). There is a reported increase in physical inactivity levels among adults due to urbanization and technological advancements. Conversely, physical activity reduces the risk of developing NCDs and their associated burdens. Engaging in physical activity is influenced by the understanding of prescribed physical activity recommendations, which initiates behavioural change to engage in and maintain the levels of physical activity.

Objectives: To assess physical activity knowledge, stages of behaviour change, activity level, and their association with NCDs among adult attendants of the out-patient department of Ledzokuku Municipal Assembly (LEKMA) Hospital.

Method: The study adopted a mixed method design. A descriptive cross-sectional study was used to obtain quantitative data, while focus group discussion (FGD) was used to obtain qualitative data for this study. A stratified and quota sampling technique was used to recruit the eligible participants into the quantitative study. A self-designed questionnaire, Physical Activity Stages of Change Questionnaire and the Global Physical Activity Questionnaire were used to collect data on sociodemographic characteristics, stages of physical activity behaviour and physical activity level respectively. Two separate FGDs was organised for 9 purposively sampled participants from the quantitative study and 10 community health nurses at LEKMA hospital.

Descriptive analysis was done for socio-demographic data whiles Chi-square and logistic regression were used for inferential analysis at a significance level of $p<0.05$ and 95% confidence interval. Recorded discussions were transcribed verbatim and analysed by content thematic analysis.

Descriptive analysis of frequencies, percentages, mean and standard deviation were carried out for all the sections (sections A-C) of the questionnaire. Chi-square and multiple logistic regression were used for inferential analysis at a significance level of $p<0.05$ and 95% confidence interval.

Results: Out of the 480 respondents, 203 (42.3%) were males and 277 (57.7%) were females. Majority, 287 (59.9), had a normal BMI while 185 (38.8) were either overweight or obese. One hundred and eighty-five (38.5%) were married and a greater portion, 281 (58.5%), had at least one child. Regarding stage of behaviour change for physical activity, using the Transtheoretical Model, the majority 273 (58.9%) of the participants were in the pre-action stage, and 197 (41.1%) were in the action stage. Eighty-two (17.1%) knew and stated correctly the recommended physical activity level for adults to stay healthy. The prevalence of selected NCDs among the respondents was 26.7%. Results of the Chi Square test indicated that there was a significant association between participation in physical activity and gender (X^2 =37.64, p< 0.001), age range (X^2 = 35.93, p<0.001), marital status (X^2 = 14.76, p=0.005) , having a child (X^2 = 9.93, p=0.002), education (X^2 =24.68, p< 0.001), occupation (X^2 = 17.32, p=0.004), sedentary behaviour (X^2 =101.43, p<0.001), behaviour change (X^2 =178.97, p<0.001) and impact of COVID-19 pandemic (X^2 =4.72, p=0.030).

The test also showed that there was significant association between the prevalence of NCDs and gender (X^2 =10.00, p=0.002), age (X^2 =89.48, p<0.001), BMI (X^2 =33.60, p<0.001), marital status (X^2 =67.30, p<0.001), having a child (X^2 =39.68, p<0.001), educational status (X^2 =31.24, p<0.001), occupation (X^2 =36.03, p<0.001), alcohol (X^2 =18.33, p<0.001), family history (X^2 =30.39, p<0.001), sedentary behaviour (X^2 =4.13, p=0.042) and participation in physical activity (X^2 =12.68, p<0.001)

Conclusion: Knowledge of physical activity recommendation was very low among the adults and majority were in the pre-action stage based on the Transtheoretical Model. More than half of the adults were physically inactive according to the WHO requirement. The most prevalent NCDs among the adults was hypertension. Factors that independently influenced participation in physical activity were gender, age, stages of physical activity behaviour change and sedentary behaviour. Also, gender, age, marital status, alcohol consumption and family history are the factors that independently predicted the likelihood of developing NCDs.

Keywords: Physical activity, Stages of physical activity behaviour change, physical activity recommendations, non-communicable diseases, sedentary behaviour.

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LIST OF ABBREVIATIONS

BMI	Body Mass Index
NCDs	Non-Communicable Diseases
CDs	Communicable Diseases
CDC	Centre for Disease Control and Prevention
CHN	Community Health Nurse
LEKMA	Ledzokuku Municipal Assembly
FGD	Focus Group Discussion
LMICs	Low-Middle Income Countries
DBP	Diastolic Blood Pressure
GHS-ERC	Ghana Health Service Ethics Review Committee
GPAQ	Global Physical Activity Questionnaire
METs	Metabolic equivalents
MOH	Ministry of Health
OPD	Out Patient Department
PHN	Public Health Nurse
RA	Research Assistant
SD	Standard Deviation
SDGs	Sustainable Development Goals
SBP	Systolic Blood Pressure
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Non-communicable Diseases: Diseases that cannot be passed on directly from one person to another and occur over a long period of time with slow progression making them chronic in nature

Physical Activity: any bodily movement produced by skeletal muscle that requires energy expenditure'. Physical activity can be achieved as part of work activities, domestic chores, travels, leisure and recreation

Adults: People aged 18years to 6years

Sedentary Activity: Activities such as reclining, seated, or lying position requiring very low energy expenditure

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Non-communicable diseases (NCDs) refer to diseases that cannot be passed on directly from one person to another and occur over a long period of time with slow progression making them chronic in nature (World Health Organization, 2021). Non- communicable diseases, which are broadly grouped as cardiovascular diseases, cancers, chronic respiratory diseases and diabetes are the leading cause of global mortality (World Health Organization, 2014). According to the WHO NCDs progress monitor 2020, every year, approximately 41 million people die from stroke, diabetes, heart attacks and chronic respiratory diseases, which account for more than 70% of global mortality with three quarters of this percentage occurring in low-middle income countries (LMICs) (World Health Organization, 2020a). Nearly over 40% of NCD deaths occur in people below 70 years of age, which is considered premature death (World Health Organization, 2014). Due to the chronic and debilitating nature of NCDs coupled with the rising prevalence rate, NCDs place high human, social and economic burden on individuals, households and countries, with developing countries being the most affected (Kankeu et al., 2013).

Recent literature has focused on the burden of NCDs in LMICs with the aim of providing data that can propel political commitment and policy drive to tackle the condition based on the WHO policy guideline. A study that reviewed 49 literature on financial burden from NCDs in LMICs indicated that, NCDs impose high financial cost on affected household with the cost of medicines being the most significant contributing factor (Kankeu et al., 2013). Moreover, the financial implications of NCD care deters people with NCDs from seeking proper medical care which leads to worsening of their condition and eventually push people below the poverty belt. Specifically in Ghana, a

study by Aikins et al., (2014), indicated that NCDs contribute substantially to the global mortality and disability with hypertension and cardiovascular diseases accounting for a significant proportion. A recent report by the WHO, (2020) indicated that, NCDs accounts for 43% of all deaths in Ghana, posing growing challenge on primary healthcare delivery. Most NCDs result from unhealthy lifestyles such as unhealthy diet, tobacco use, harmful use of alcohol and lack of physical activity (WHO, 2014).

Physical activity in particular, has been identified to contribute immensely to active lifestyles of adults both in health and disease states. According to the WHO (2020b), physical activity is defined as 'any bodily movement produced by skeletal muscle that requires energy expenditure'. Physical activity can be achieved as part of work activities, domestic chores, travels, leisure and recreation (WHO, 2020b). Regular participation in physical activity has been documented to provide a protective factor for prevention and treatment of NCDs such as breast cancer, colon cancer, stroke, diabetes, hypertension and heart disease and also serves as a significant contributing factor in the prevention of risk factors such as overweight and obesity (WHO, 2018). Physical activity has also been associated with improvement in the general wellbeing and quality of life of people with chronic NCDs (Lee et al., 2012). To amass the health benefits of physical activity, the WHO 2020 guidelines on physical activity and sedentary behaviour recommend that an adult engages in at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity, or an equivalent combination of moderate and vigorous-intensity physical activity in a week (Bull et al., 2020) which has been adopted locally in Ghana by the ministry of health (MOH, 2009). Despite the numerous health benefits of physical activity, a substantial number of the world population is inactive. It is estimated that about 27.5% of the global adult population do not meet the WHO global recommendations on physical activity for health (Guthold et al., 2018). A study by Afrifa-

Anane et al., (2020) indicated that 29% of urban and 11.2% of the rural Ghanaian population are physically inactive.

Participation in physical activity is influenced by several factors such as sociodemographic characteristics, knowledge of physical activity recommendation and behavioural change (Abdeta et al., 2019). Behavioural change in physical activity has been described as a strong determinant in the initiation and in order to achieve the recommended level of physical activity for health (Abula et al., 2018). Several behavioural change models have been proposed and the transtheoretical model is the widely accepted model (Brug et al., 2005). The model pre-requisites initial cognitive process leading to a new behaviour formulation and progress through different stages to alter physical activity behaviour (Prochaska & DiClemente, 1983). The authors asserted that an individual progresses through the precontemplation stage, contemplation stage, preparation stage, action stage, and maintenance stage where physical activity becomes a lifestyle. Abula et al (2018) opined that the intention to become physically active, which comprises of the precontemplation stage and contemplation stage, is influenced by the knowledge of physical activity recommendation. It is thus imperative to assess the determinants of physical activity participation level and its association with NCDs.

1.2 Problem statement

According to the WHO, (2020a), every year, approximately 41 million people die from NCDs such as strokes, chronic respiratory diseases, heart attacks, diabetes and cancers. Although NCDs were mostly prevalent in developed countries, epidemiological transition occurring in LMICs, has resulted in a double burden of both Communicable and NCDs. Consequentially, this has led to LMICs contributing to as high as three quarters of the world's death from NCDs (World Health

Organization, 2020a). The situation is not different in Ghana, as the country records 94,400 deaths from NCDs, representing 43% of all deaths (WHO, 2020a). Non-communicable diseases do not only cause an increase in mortality, decreased quality of life and increased pressure on the health care system especially the fragile healthcare system in the LMICs, but also cause a substantial financial burden on many households and countries especially those in developing countries (Allen et al., 2017; Kankeu et al., 2013; Muka et al., 2015). Non-communicable diseases have become more topical and crucial problem in these recent times of the COVID-19 pandemic as people with underlying NCDs have higher risk of severe forms infections and mortality (Lancet, 2020).

It has been documented that physical inactivity is the fourth leading cause of global mortality and the main cause of some NCDs. For instance, physical inactivity causes approximately 30% of ischaemic heart diseases, 27% of diabetes and 21-25% of breast and colon cancers (Lee et al., 2012). The increase in physical inactivity globally is ascribed to urbanisation and industrialisation (Guthold et al., 2018). According to Hallal et al., (2012), the global use of technologies in industries has reduced human involvement in physical activity thereby rendering people inactive. They also indicated that with the introduction of home appliances, smart phones and social media, many people resort to these technologies for recreation and entertainment instead of the formerly physically-involved recreation and entertainment. Available data indicate that 27.5% of the world adult's population and 21.4% of adults in Sub-Saharan Africa are inactive (Guthold et al., 2018). This is envisaged to increase in recent times as safety protocols to curb the spread of the COVID-19 pandemic such as impositions on movements, recreational and sporting activities have further decreased the already dwindling physical activity levels (Hans et al., 2020). According to Castañeda-Babarro et al., (2020), walking time and vigorous physical activity were reduced by

58.2% and 16.8% respectively among adults in Spain during the impositions on movements (lockdown) period. During this same period, sedentary behaviour was increased by 23.8%.

Precisely in Ghana, recent literature has found high prevalence of physical inactivity among Ghanaian adults which they attribute to behavioural factors (Afrifa-Anane et al., (2020). Therefore, assessing the knowledge of physical activity guidelines, the stage of physical activity behaviour change, physical activity level and its association with NCDs will provide vital data for policy makers, public health specialists and clinicians in addressing gaps in literature regarding formulation and implementation appropriate policies. The policies will target the promotion of behavioural changes towards physical activity, which will have an impact on NCDs.

1.3 Conceptual framework

This conceptual framework was designed by the researcher based on literature and it demonstrates the possible determinants of physical activity participation level and its association with NCDs. Abdeta et al., (2019) classified the factors that influence engaging in physical activity such as sociodemographic and other factors. Regarding the sociodemographic factors, the study indicated that gender, age, educational status, occupation and income level influence an individual's physical activity participation level. The other factors according to the study are knowledge of physical activity recommendations, future intentions to engage in physical activity and satisfaction with current level of physical activity. Future intentions to engage in physical activity and satisfaction with current level of physical activity have been well addressed in literature and classified under physical activity behavioural change. A study that investigated whether knowledge of physical activity recommendations increases physical activity participation level based on the transtheoretical model found that, knowledge of physical activity recommendations increases the cognitive strategy of behavioural change (i.e., the intention to take part in regular physical activity)

and must be augmented with the component of behavioural strategy such as social support and rewarding or reminding one's self to initiate and maintain physical activity participation (Abula et al., 2018). Other studies also indicated that knowledge of physical activity recommendations influenced the level of physical activity participation (Abdeta et al., 2019; Hunter et al., 2014). Considering the physical activity level, we classified individuals as active and inactive based on the WHO recommendations using the Metabolic Equivalents (METs)-minutes per week. Current studies have found a strong association between physical activity level and NCDs (Bull et al., 2020; Fredriksson et al., 2018). A recent systematic review and meta-analysis that included 3,439,874 participants from 36 studies found a strong causal relationship between physical inactive and NCDs (Wahid et al., 2016). The authors indicated that an increase in 11.25 METs h/week for an individual who is inactive is associated with the reduction of the risk of NCD mortality by 23–26%. Although other risk factors such as age, gender, tobacco use, harmful use of alcohol, obesity/overweight, and increased cholesterol levels have been associated with NCDs, an adjustment in all these factors still resulted in a casual relation between physical activity level and NCDs.

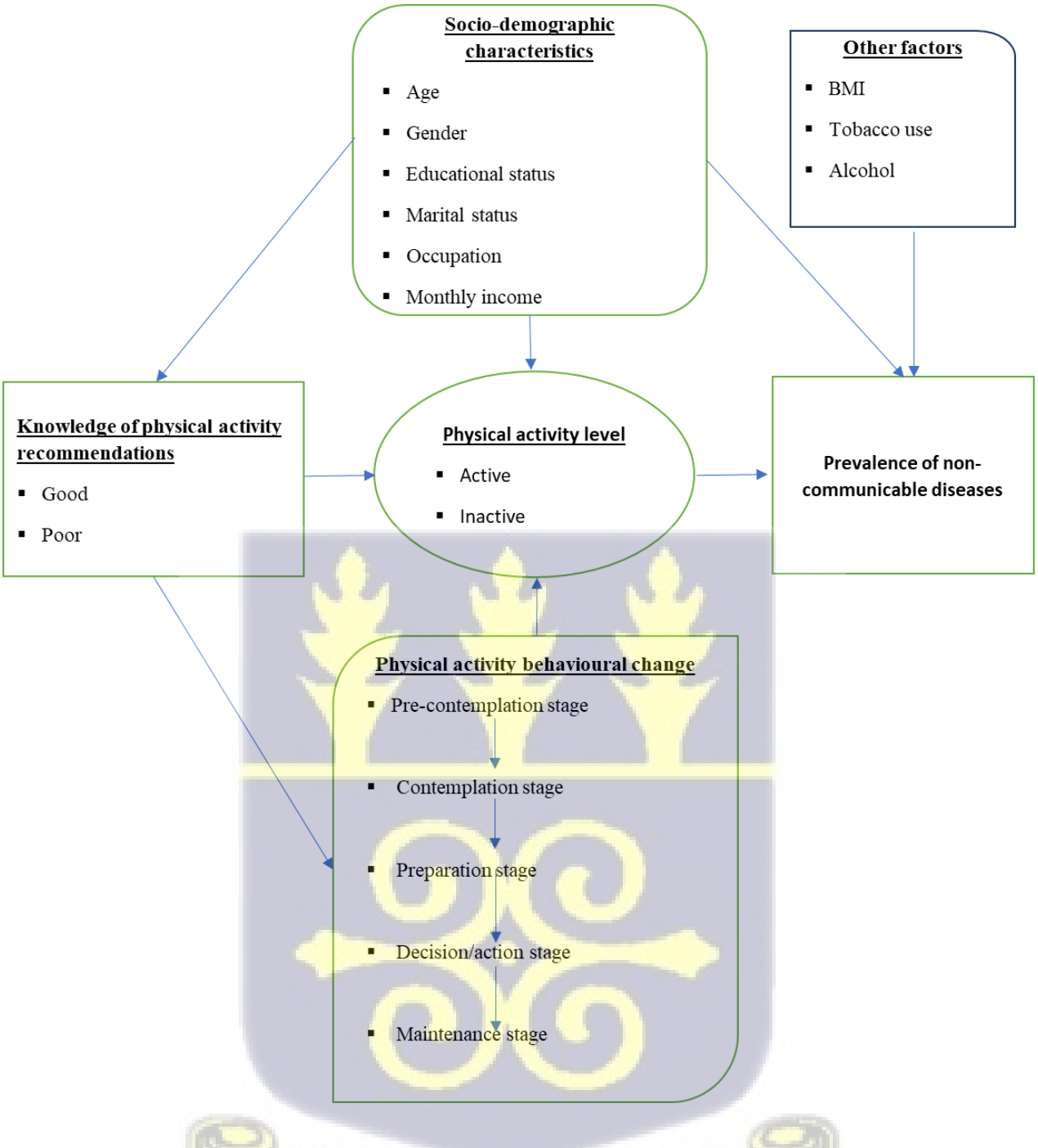

Figure 1. 1: Conceptual framework of the determinants of physical activity participation level and its association with NCDs

1.4 Justification

There is increasing burden of NCDs globally of which LMICs including Ghana are the worse affected. Of all the global mortalities resulting from NCDs, more than three quarters occur in LMICs (World Health Organization, 2020a). In Ghana, the burden of NCDs cannot be overemphasised as recent studies have revealed the financial burden and pressure on the already fragile health care service (de-Graft Aikins et al., 2012). Physical activity which is known to reduce the occurrence and burden of NCDs, has been found to be reducing among the Ghanaian population due to urbanisation and technology (Afrifa-Anane et al., 2020; de-Graft Aikins et al., 2012). Current study indicated that the prevalence of physical inactivity seems to be generally high among Ghanaians residing in Ghana and Ghanaian immigrants. According to Afrifa-Anane et al., (2020) the prevalence of physical inactivity among Ghanaian adults residing in Ghana (urban), Amsterdam, Berlin and London are 29.0%, 14.6%, 24.1% and 36.6% respectively. This they ascribed to poor behavioural factors and suggested policies which are culturally friendly that can promote a positive behaviour change and improve physical activity.

The effect of the ongoing COVID-19 pandemic which has caused a restructuring of institutional schedule such as online learning and working from home has greatly impacted on the already declining physical activity levels among adults(Castañeda-Babarro et al., 2020). Several studies about the prevalence and burden of Physical activity and NCDs have been conducted separately in Ghana (Afrifa-Anane et al., 2020; Aikins et al., 2014; Balis et al., 2019). A more recent paper that assessed the prevalence of physical inactivity among Ghanaians living in Ghana and in Europe found a generally high physical inactivity levels among these groups (Afrifa-Anane et al., 2020). The increase in physical inactivity among Ghanaians regardless of their geographical location according to the authors could probably be explained by behavioural factors. Knowledge of

physical activity guidelines has been found to initiate physical activity behaviour change, and it is therefore expedient to assess the knowledge of physical activity guidelines, physical activity Stage of behaviour change, physical activity participation level and its association to NCDs. This view adds credence to the current study.

1.5 Research questions

1. What is the knowledge of physical activity recommendation among adult attendants of the OPD of a public Hospital?
2. What are the present stages of physical activity behaviour change among adult attendants of the OPD of a public hospital?
3. What is the prevalence of selected NCDs in a public hospital?
4. What are the physical activity levels of adult attendants of the OPD of a public hospital?
5. What are the determinants of physical activity levels ad prevalence of NCDs?

1.6 Objectives

1.6.1 General Objective

To establish the prevalence of selected non-communicable diseases in a public hospital and assess knowledge of physical activity guidelines influence on behaviour change and engagement in physical activity.

1.6.2 Specific Objectives

1. To determine the knowledge of physical activity recommendation among adult attendants of the OPD of a public Hospital.
2. To establish the present stages of physical activity behaviour change among adult attendants of the OPD of a public hospital.
3. To establish the prevalence of some selected NCDs in a public hospital.
4. To establish the physical activity levels of adult attendants of the OPD of a public hospital.
5. To establish the determinants of physical activity levels ad prevalence of NCDs.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Epidemiology of NCDs

The world has gone through epidemiological transitions. Until some few decades ago, communicable diseases (CDs) where of major public health concern. However, due to improved medical advances especially in the developed world, the incidence of CDs has seen a decline with an upsurge in NCDS. Developing countries seems to be experience double burden of diseases. Whiles the prevalence of CDs is still high, the incidence of NCDs is on the ascendency.

In 1990, communicable, nutritional, and neonatal conditions accounted for 47% of global burden of disease (GBD) with NCDs responsible for 43% of disease burden and the remaining 10% attributable to injuries (Murray et al., 2012). By 2010, the global NCD burden had increased to 54%, with communicable, neonatal, nutritional, and maternal conditions reducing to 35% of the burden (Murray et al., 2012).

According to the WHO NCDs progress monitor 2020 report, currently, every year approximately 41million people die from stroke, diabetes, heart attacks and chronic respiratory diseases which account for more than 70% of global mortality of which three quarters occurs in Low-Middle income countries (LMICs) (World Health Organization, 2020a). Out of this, over 40% occurs in people below the age of 70 years which is considered premature death (World Health Organization, 2014).

Ghana in particular is also experiencing a rapid increase in incidence of NCDs. A study by Bosu (2013) revealed that newly diagnosed high blood pressure cases at outpatients increased from about 60,000 in the year 1990 to around 700,000 in the year 2010. These statistics excluded those from the teaching hospitals in both Kumasi and Accra. Similarly, 150,000 newly diagnosed cases and 70,000 old cases each year. A systematic review conducted among Ghanaian adults, which included 11 studies indicated that the prevalence of hypertension ranges from 19.3% to 54.6% (Opoku et al., 2020). The authors also found the prevalence of diabetes ranging from 4% to 9% among Ghanaian adults. %. A current study that assessed the prevalence and correlates of stroke among 4279 Ghanaians ranging from 50-114 years indicated the prevalence of stroke to be 2.6% (Sanuade et al 2019)

2.2 Important Risk Factors of NCDs

Non-Communicable Diseases are often as a results of risk factors that can be at least partially modified through health and social interventions (WHO, 2015). These risk factors have been categorised as; Behavioral risk factors- tobacco use, unhealthy diet and physical inactivity, and metabolic risk factors- raised blood pressure, raised blood glucose, overweight, obesity and raised cholesterol. In 2010, the Global Burden of Disease Study estimated that, 12.5 million deaths were as a result of dietary risk factors and physical inactivity, over 6 million deaths were as a result of tobacco smoking (including second hand smoke), and over 2.5 million deaths were as a result of alcohol use. Out of all these risk factors, there are five of them which have been found to be the leading risk factors.

2.2.1 High blood pressure

It is diagnosed when a person's systolic blood pressure (SBP) reads = 140 mmHg and diastolic blood pressure (DBP) reads = 80 mmHg (National blood pressure and vascular diseases advisory committee, 2010). According to WHO, it accounts for 13% of all deaths from risk factors of NCDs. It is publicly known as hypertension. Raised blood pressure has been estimated to cause 7.5 million deaths which represent a percentage of 12.8 of all deaths in the world (Rao, Danthala & Lankapalli, 2013). Certain complications include heart failure, peripheral vascular disease, renal impairment, retinal haemorrhage and visual impairment (WHO, 2011). A survey conducted by WHO in 2010 revealed a percentage of 36.4 (both males and females) as people with high blood pressure (HBP), of which 37.6% were males and 35.2%, females (WHO, 2010).

2.2.2 High blood glucose

WHO conducted a survey which was based on a category of the people aged 25 or older having fasting plasma glucose value ≥ 700 mmol/L (126 mg/dl) or on medication for raised blood glucose. In the survey, 8.8% of the Ghanaian population had a raised blood glucose level with 8.6% being males and 9.0% being females.

2.2.3 Physical inactivity

This is defined as an insufficient physical activity level to meet present physical activity recommendations (WHO, 2020).

Physical inactivity is the fourth leading risk factor for global mortality (WHO, 2010). It is responsible for 6% of deaths globally, representing 3.2 million per year of which 2.6 million occurs in the low- and middle-income countries (WHO, 2011). People who are physically inactive have a 20-30% increased risk of mortality of all causes (WHO, 2010).

Globally, 31% of adults aged 15 years and older were physically inactive (28%, men and 34% women) with the highest prevalence occurring amongst the Americans and the Eastern Mediterranean Region (WHO, 2011). Physical inactivity is highest in the high-income countries but increasing levels are now seen in the low- and middle- income countries, especially women. It was found that high income countries had more than a double of the prevalence in low-income countries. Statistics show that, 41% of men and 48% of women in high-income countries were physically inactive whiles 18% of men and 21% of women in low-income countries were physically inactive (WHO, 2011).

This difference is as a result of increased technology in these high-income countries. Work has now been made easier because of the advancement in technology.

Furthermore, a WHO survey (2010) in Ghana revealed that 16.1% of the population was physically inactive (13%, males and 19.3% females).

2.2.4 Tobacco use

Annual deaths from tobacco are projected to be 7.5 million (17% of all deaths) by 2020 (Mathers and Loncar, 2006) and 8 million (10% of all deaths) by 2030 if no serious action is taken (WHO, 2010). Tobacco use has been found to be increasing among the youth in Africa. According to the Global Youth Surveys conducted by WHO and the Centre for Disease Control and Prevention

(CDC), in Zambia, a quarter of boys and girls (aged 13–15 years) already use tobacco (WHO/CDC, 2011). In South Africa, 24% of boys and 19% of girls (aged 13–-15 years) are users of tobacco, with 17% of non-smokers indicating their willingness to smoke in the coming years (WHO/CDC, 2011).

Ghana in 2003, started a process to develop natural legislation to reduce demand for, supply of tobacco and to encourage tobacco smokers to quit the habit, considering its negative effect on an individual, the people around and the nation. After this policy, a study was conducted by Tagoe and Duke (2011) on the Healthy lifestyle behaviors among Ghanaian adults in the phase of healthy policy change compared the World health survey, 2003 (WHO) and the Ghana Demographic Health survey, 2008 and reported that the percentage of females who smoked (1.3%) in 2003 had reduced to 0.5% in 2008, that of males had also reduced from 12.4% in 2003 to 9% in 2008. This reduction can only be attributed to the national tobacco policy (MPOWER) which was developed to "monitor prevention programs on tobacco use, protect people from tobacco smoke, offer help to quit tobacco, warn about the dangers of tobacco, enforce bans on tobacco advertising, promotion and sponsorship and raise taxes on tobacco" (WHO, 2008) in 2003.

2.2.5 Obesity

At least 2.8 million people die each year as a result of being overweight/ obese and its prevalence is highest in upper-middle-income countries even though very some low-middle income countries record high levels (WHO, 2011). A study conducted by Khan *et al* (2013) revealed that a survey in Washington DC amongst youth (13-15) in Latin America and the Caribbean revealed that, 19.9% of youth in Argentina, 21.6% of youth in Brazil and 26.7% of youth in Chile were

overweight or obese, having a BMI of 25kg/m2 or higher. Another study conducted in Kerala, India by Thankappan *et al* (2010) to identify NCD risk factors revealed that, in a survey of 7449 individuals (51% being women), 23.9% of the men were overweight whiles 37.5% of the women were overweight.

In 2010, the World Health Organization conducted another survey among a Ghanaian population and found 28.9% of the total population to be overweight (males, 23.1%; females 34.9%).

2.2.6 Physical Activity

According to the US Department of Health and Human Services (1996), Physical activity is defined as 'bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure'. Physical activity is also defined as, all physical motion produced by skeletal muscles, resulting in a substantial increase of energy consumption beyond the normal level (Bouchard, Shepard and Stephens, 2003). It has been indicated that males are generally more active than females, especially during leisure periods (Monteiro *et al*, 2003; Azevodo *et al*, 2007).

2.4 WHO Guidelines for Physical Activity

The WHO (2020) published an article on the recommended physical activity levels according to age groups (children between 5 and 17, adults between 18 and 64, and adults 65 years and above). For children under five years, Chief Medical Officers from the Department of health, UK; outlined recommendations in the 2019 report UK Chief Medical Officers' Physical Activity Guidelines. The guidelines for all age groups are as follows;

Recommendations for physical activity in children under 5 years (2019)

1. Infants (less than 1 year) should be physically active several times every day in a variety of ways, including interactive floor-based activity, e.g., crawling. For infants not yet mobile, this includes at least 30 minutes of tummy time spread throughout the day while awake (and other movements such as reaching and grasping, pushing and pulling themselves independently, or rolling over)
2. Toddlers (1-2 years) should spend at least 180 minutes (3 hours) per day in a variety of physical activities at any intensity, including active and outdoor play, spread throughout the day
3. Pre-schoolers (3-4 years) should spend at least 180 minutes (3 hours) per day in a variety of physical activities spread throughout the day, including active and outdoor play. The 180 minutes should include at least 60 minutes of moderate-to-vigorous intensity physical activity.

All children under 5 years should minimize the amount of time spent being sedentary (being restrained or sitting) for extended periods (except time spent sleeping).

The who recommendations for physical activity in children and adolescents (aged 5–17 years), including those living with disability (2020)

In children and adolescents, physical activity confers benefits for the following health outcomes: physical fitness (cardiorespiratory and muscular fitness), cardio metabolic health (blood pressure, dyslipidemia, glucose and insulin resistance), bone health, cognitive outcomes (academic performance, executive function), mental health (reduced symptoms of depression) and reduced adiposity.

It is recommended that:

1. Children and adolescents should do at least an average of 60 min/day of moderate-to-vigorous intensity, mostly aerobic, physical activity, across the week
2. Vigorous-intensity aerobic activities, as well as those that strengthen muscle and bone should be incorporated at least 3 days a week.

The who recommendations for physical activity for adults (aged 18–64 years) including those with chronic conditions and those living with disability (2020)

In adults, physical activity confers benefits for the following health outcomes: all-cause mortality, cardiovascular disease mortality, incident hypertension, incident type 2 diabetes, incident site-specific cancers, mental health (reduced symptoms of anxiety and depression), cognitive health and sleep; measures of adiposity may also improve.

It is recommended that:

1. All adults should undertake regular physical activity;
2. Adults should do at least 150–300 min of moderate-intensity aerobic physical activity, or at least 75–150 min of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate-intensity and vigorous-intensity activity throughout the week for substantial health benefits;
3. Adults should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional health benefits.

4. Adults may increase moderate-intensity aerobic physical activity to >300 min, or do >150 min of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate-intensity and vigorous-intensity activity throughout the week for additional health benefits (when not contraindicated for those with chronic conditions).

The who recommendations for physical activity in older adults (aged 65 years and older) including those with chronic conditions and those living with disability (2020)

In older adults, physical activity also helps prevent falls and falls-related injuries and declines in bone health and functional ability. It is recommended that:

1. All recommendations for adults apply for this age group as well
2. In addition, as part of their weekly physical activity, older adults should do varied multi-component physical activity that emphasises functional balance and strength training at moderate or greater intensity on 3 or more days a week, to enhance functional capacity and to prevent falls.

The who recommendations for physical activity in pregnant and postpartum women (2020)

In women, physical activity during pregnancy and the postpartum period confers benefits for the following maternal and fetal health outcomes: reduced risk of pre-eclampsia, gestational hypertension, gestational diabetes, excessive gestational weight gain, delivery complications and postpartum depression and no increase in risk of stillbirth, newborn complications or adverse effects on birth weight.

It is recommended that all pregnant and postpartum women without contraindication should:

1. undertake regular physical activity throughout pregnancy and postpartum;
2. Do at least 150 min of moderate-intensity aerobic physical activity throughout the week for substantial health benefits;
3. Incorporate a variety of aerobic and muscle-strengthening activities. Adding gentle stretching may also be beneficial.

2.5 Importance of physical activity for addressing the burden of NCDs

The rise in NCDs, usually manifests during mid to late adulthood and these major NCDs are caused by 4 common factors which include tobacco use, physical inactivity, unhealthy diets and harmful use of alcohol which could lead to overweight and obesity, high blood pressure and high cholesterol (Baldurin et al, 2013; Department of health, 2013; Wagner et al,2012).

Physical inactivity is the 4th leading risk factor for global mortality and also is the most significant cause of disability and reduced quality of life (WHO, 2010). Physical inactivity contributes to almost 21% to 25% of breast and colon cancer, 27% diabetes and 30% ischemic heart disease burden (WHO, 2013;2020). The rising levels of physical inactivity in many countries can contribute to major implications for the occurrence of NCDs (WHO, 2010).

Cardiovascular Disease

The World Confederation for Physical Therapists (WCPT) defined cardiovascular disease as a disease affecting the heart and circulatory system. This consist of stroke, heart disease and increased blood pressure (Hypertension). Brisk walking at a speed of 4.8–6.4 kph frequently could prevent about 30% of deaths from cardiovascular diseases each year(Tully et al, 2005). In a study

involving healthy middle-aged men and women followed up for 8 years, the lowest quintiles of physical activity as measured on an exercise treadmill were associated with an increased risk of death from any cause compared with the top quintiles for fitness (Darren et al, 2006).

An energy expenditure of about 1600 kcal per week has been found to be effective in halting the progression of coronary artery disease and an energy expenditure of about 2200 kcal per week has been shown to be associated to plaque reduction in patients with heart disease; low intensity exercise training has also been associated with an increase in health status among patients with cardiovascular diseases (Darren et al, 2006).

Diabetes Mellitus

WCPT (2013) explained diabetes mellitus in a briefing paper as " a condition where the amount of glucose in the blood is too high, eventually causing tissue damage". There are 2 types of diabetes mellitus namely, Type 1 and Type 2 Diabetes. Type 1 diabetes occurs as a result of the inability of the body to produce insulin whiles Type 2 diabetes occurs when the body does not produce enough insulin or becomes resistant to insulin.

Several studies have demonstrated a consistent beneficial effect of regular physical activity training on carbohydrate metabolism and insulin sensitivity which can be maintained for at least 5 years. These studies use physical activity regimens at an intensity of 50% to 80% VO2 max, 3 to 4 times per week for 30 minutes per session. Increment in HbA were generally 10 to 20% of baseline and were mostly marked in patients with mild type 2 diabetes.

Cancer

WCPT defines cancer as “an umbrella term used to describe more than 100 different diseases with a common characteristic of uncontrolled malignant cell growth”.

In 2011, WHO recommended that a week of moderate intensity aerobic physical activity for 150 minutes can reduce breast and colon cancer risk. Some experts from the American College of Sports Medicine have concluded that exercise training is safe during and after cancer treatment. The exercise leads to an improvement in physical functioning, quality of life and cancer related fatigue in several cancer survival groups (Schmittz et al, 2010).

2.6 Knowledge on importance of physical activity and influence on engagement in physical activity

Physical activity has both beneficial and preventive effects. Certain conditions it has effects on are musculoskeletal ailments, mild to moderate depression, cardiovascular diseases, type two diabetes, obesity and several of the most common forms of cancer. It also has effects on pain levels (Thune and Smeland, 2002).

In 2010, a study conducted by the School of Public Health in Mongolia to investigate the knowledge, attitudes and practices on NCDs and injuries among teachers in schools in Mongolia indicated that; 68.5% of teachers in the urban areas had knowledge on physical activity and 45.9% of the teachers in the rural areas had knowledge on physical activity. In all, 56.6% of the teachers who participated in the study had knowledge on physical activity.

Another study conducted by Knox et al in 2013 to determine the prevalence of knowledge of the UK physical activity guidelines indicated that 18% of the people who participated in the study knew the physical activity guidelines. However, men with lower education, employment status and older adults were less likely to know the physical activity guidelines.

Based on these statistics, it can be said that the knowledge of physical activity is generally low, hence the reason for low physical activity levels.

The knowledge of physical activity can have both negative and positive impact on an individual depending on the persons engagement in physical activity.

According to Knox et al in 2013, it is possible that the lack of knowledge regarding intensity requirements may result in adults engaging in more physical activity of low intensity but not sufficient to meet the required guidelines. This reveals the possibility of a person being less physically active due to lack of knowledge in the required physical activity for him/her. Indicating that, people might think they are physically active but might not be carrying out the physical activity required for his/her age.

There is limited information regarding knowledge of physical activity and how it plays a role in the physical activity levels of people in Ghana. This study therefore seeks to identify the knowledge of people on physical activity and how it influences NCDs.

2.7 Health Behaviour

Health behaviour are "personal attributes such as beliefs, perceptions, expectations, motives, values, and other cognitive elements; personality characteristics, including affective and emotional

states and traits; and overt behavior patterns, actions, and habits that relate to health maintenance, to health restoration, and to health improvement" (*Parkerson, 1993*). Vicente et al., (2019) further defined health behaviour in three different categories as follows. 1. Preventive health behavior is any activity undertaken by an individual who believes to be healthy, for the purpose of preventing or detecting illness in an asymptomatic state. 2. Illness behavior is any activity undertaken by an individual who perceives himself to be ill, to define the state of health, and to discover a suitable remedy. 3. Sick-role behavior on the other hand is any activity undertaken by an individual who considers himself to be ill, for the purpose of getting well. It includes receiving treatment from medical providers, generally involves a whole range of dependent behaviors, and leads to some degree of exemption from one's usual responsibilities.

There are several healthy behaviours but the 3 most documented ones with tremendous health benefits are physical activity, healthy diet and not smoking (Vicente et al., 2019). Practicing one or more of these behaviours leads to some degree of health benefits, however, the health benefits are more pronounced when all these three behaviours are practiced (Vicente et al., 2019). Inculcating these healthy behaviours into an individual or community will demand health promotion and education programs and interventions using a theory or a model (Glanz & Bishop, 2010). Until recently, public health professionals and clinicians relied on their experiences in initiating positive behaviour change. However, current systematic reviews and meta-analysis have indicated that health behaviour interventions carved with theories yield a better result than interventions that has no theory basis(Albada et al., 2009; McEachan et al., 2011).

Practicing healthy behaviour have been marred by urbanisation, globalisation and industralisation (Vicente et al., 2019). This is even worse in current times as huge sum of monies is invested in the promotion of unhealthy lifestyles such as tobacco use, sugary and alcoholic beverages through

attractive advertisement often using sports icons and other celebrities who have a lot of influence (Vicente et al., 2019). These unhealthy behaviours lead to increase in NCDs which has resulted in many countries below the poverty line (Muka et al., 2015). Therefore, global, national and community policies must encourage individuals to make informed positive decisions that will influence and enable the individuals to practice healthy behaviours. Informed decision making is vital in healthy behaviour and medical uncertainties as it leads to improved patient satisfaction and health outcomes (Rimer et al., 2004). Making informed decision is the bedrock of any health behaviour theory and takes into accounts the setting and audiences. Thus, for any health behaviour change to be effective, strategies should be designed with an understanding of the recipients, their health, cultural context, social characteristics, beliefs, attitudes, values, skills and past behaviour (Vicente et al., 2019). Due to the complex nature in understanding and improving health behaviour, many studies have been conducted to test the most effective health behaviour change (Vicente et al., 2019). There is a plethora of health behaviour theories but the most widely studied to cause health behaviour change are the health belief model, social cognitive theory and the transtheoretical theory.

2.8 Transtheoretical Model (Stages of behaviour change)

The transtheoretical model which was first described by James Prochaska and Carlo DiClemente is an integrative model of behaviour change formulated from different psychological theories (Prochaska & DiClemente, 1983). This model was first used to study smokers who wanted to change their smoking behaviour. The authors observed that behaviour change goes through ten processes of change which is often referred to constructs. To ensure behaviour change, an individual goes through six stages of change as behaviour change has been described as a processes

and not event achieved over night (Prochaska & Velicer, 1997). The six stages as described by Prochaska & DiClemente, (1983) are:

Precontemplation stage: this is the initial stage in which an individual has no intention to take action concerning a behaviour in the next six months. At this stage, the individual is uninformed about the dangers of the behaviour or have failed many times with the attempt to change.

Contemplation stage: the second stage in which an individual has the intention to change from a behaviour in the next six months. At this stage the individual is aware of the pros and cons of the behaviour. The imbalances between the costs and benefits of changing causes an individual to stage longer in this stage.

Preparation stage: This is the stage in which an individual has the intention to take immediate action in changing a behaviour usually in the next one month. The individual has planned to consult a counselor or health promotion class or rely on self-change approach.

Action stage: At this stage, within the past six months, an individual has made an overt modification in their lifestyle. For instance, if it is weight lost programme, the individual has reduced the amount of calorie intake within 6 months.

Maintenance stage: At this stage an individual has made overt modifications in behaviour for more than six months. Relapse is not common as compared to the action stage

Termination stage: This is the last stage in which an individual has practiced his/her new behaviour for a longtime and nothing seems to change the person to the old ways

This model has been used in many fields such as cessation of alcohol intake, prevention of HIV/AIDS, weight loss programmes and physical activity programmes.

Specifically with physical activity programmes, a recent study (Abula et al., 2018) indicated that, an individual goes through the stages of change from being inactive to become physically active. The first 3 stages according to the authors are influenced by knowledge of physical activity recommendation while the last three stages are empowered by motivation which is able to proper an individual from being inactive to being physically active. A Ghanaian study (Balis et al., 2019) that explored the perception of older adults about physical activity identified some motivation factors such as group activities which is able to drive physical activity among the older adults.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study design

This study employed a descriptive cross-sectional design, which utilised both quantitative and qualitative methods of collecting and analysing data. For the quantitative aspect of the study, a structured-questionnaire was used to collect data on participants' socio-demographic characteristics, participants' knowledge on physical activity recommendation, physical activity level, stages of physical activity behaviour change and the prevalence of NCDs. Two different focus group discussions were conducted for the qualitative aspect of the study. The first focus group discussion was used to elaborate and complement the quantitative data and to unearth other focal areas that might not be included in the questionnaire. The second focus group discussion conducted among community health nurse (CHN) and public health nurses (PHN) was used to collect data on health professionals' perspective on the topic. The mixed method was used because according to Wasti et al (2022), mixed-methods research design provides a better and deeper understanding, by providing a complete picture that can enhance description and understanding of the phenomena. However, it takes a longer time to complete as it involves multiple stages of data collection and analysis making it costly (Wasti et al 2022).

3.2 Study site

The study was conducted at the out-patient department (OPD) of LEKMA Hospital located at Teshie in the Greater Accra Region. The hospital is currently the main referral centre for Ledzokuku, Krowor and La Dade Kotopon Municipalities and some parts of Tema Metropolitan Assembly. The LEKMA Hospital is a 140-bed capacity facility with general and specialised

services which include OPD, Surgery, internal medicine, paediatrics including neonatal intensive care unit, reproductive and child health services (and other public health services), accident and emergency services, specialist clinics, chronic disease clinics, laboratory and radiological services, physiotherapy, community psychiatry/clinical psychology, infectious disease/isolation ward, eye, ENT, Dental and complementary and Alternative medicine.

3.3 Study Population and Sampling

Adults who attended the OPD of LEKMA hospital were recruited for the quantitative aspect of the study. A stratified sampling technique was used to recruit the eligible participants into the study. The participants were divided into 3 strata using age intervals (i.e., 18–34, 35–49, and 50-64). Participants were further sampled from the 3 different strata based on the 2021 data at the health information unit of the hospital which was in the ratio 4.5:3.5:2 respectively. In the final stage of the recruitment, a simple random sampling technique was used, where eligible participants were made to pick a sheet with the inscription YES or NO from a container. The container on any day of the data collection contains equal number of YES and NO sheets. All those who picked 'Yes' were recruited to participate in the study. For the qualitative aspect of this study, two different FGDs were organised. The first FGD purposively sampled 9 participants who participated in the quantitative aspect of the study such that there was a fair representation of age, gender, socioeconomic status and different level of physical activity. The second FGD purposively sampled 10 CHN and PHN to ensure fair representation of age, gender, qualification, work experience and job description. They were included in the study to ascertain their knowledge level about physical activity guidelines and how they educate their client on physical activity since health promotion, education and disease prevention is part of their job description.

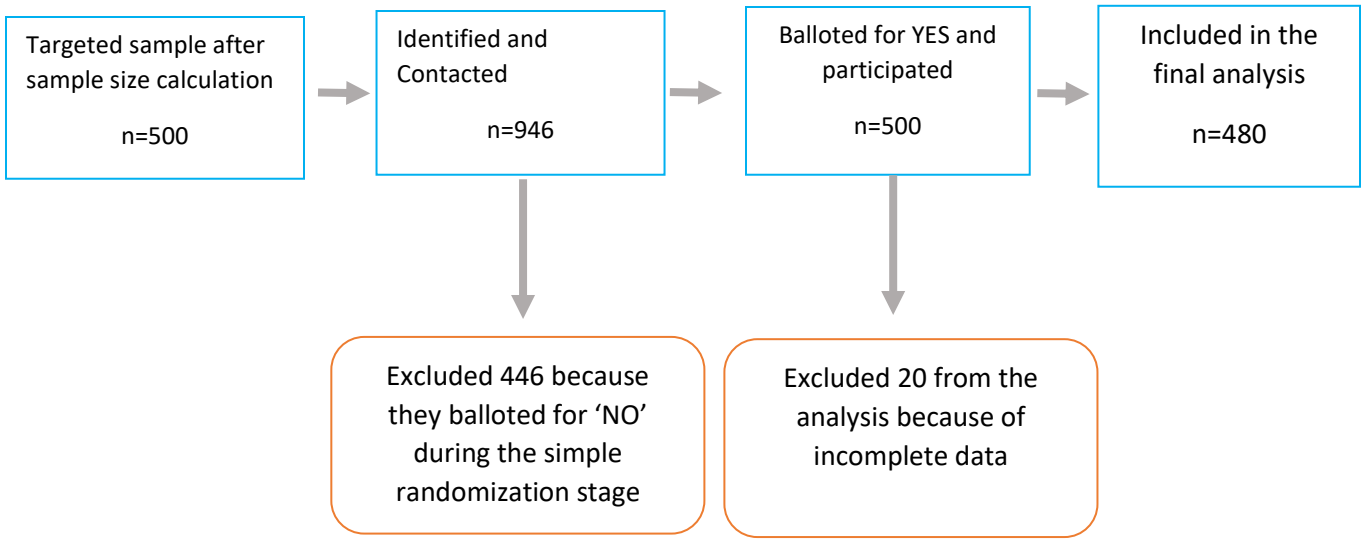

Figure 3. 1: A flow diagram showing the number of participants for the study.

3.4 Inclusion and Exclusion criteria

The study included all persons from 18 to 64 years old who attend the OPD of LEKMA Hospital and gave their consent to freely participate.

The study excluded the following

1. Persons who are wheelchair bound and cannot participate in the recommended physical activity level
2. Persons with cognitive or communication impairments
3. Persons who are undergoing an exercise programme prescribed by a health professional for therapeutic benefits.
4. Pregnant women

3.5 Study Variables

3.51 Independent Variables

i. Socio-demographic characteristics: gender, age, marital status, having a child, educational level, employment status, income level, BMI, district of residence and tribe
ii. Previous history of alcohol intake and smoking
iii. Knowledge of recommended physical activity
iv. Physical activity stages of change
v. Sedentary behaviour
vi. Impact of COVID-19 on physical activity
vii. Participation in physical activity (for the purposes of this study and based on the theoretical framework, participation in physical activity was used as a dependent variable to explore the factors that influence participation in physical activity and it was used as an independent variable to explore the factors that influenced the prevalence of NCDs)

3.5.2 Dependent Variables

i. Prevalence of NCDs
ii. Participation in physical activity

3.6 Sampling

3.6.1 Quantitative- Sample size calculation

Sample size was determined using the Taro Yamane formula:

$$n=N/1+N(e^2)$$

Where, n is the sample size, N is the population under study, e is the margin of error which is estimated to be 0.05.

Data obtained from the medical statistics department of the LEKMA hospital indicated that for three months, the average number of OPD attendants within the age range under study was 6253.

i.e. April=6320, May=5312, June=7127

Therefore, $n=6253/1+6253(0.05^2)$

$$n=376$$

The minimum number of participants for the study was 376

3.5.2 Qualitative

For the first focus group discussion, 9 participants were purposively sampled from the quantitative study such that 3 participants each were from the different age categories (18–34, 35–49, 50–64) and there was fair representation of gender, marital status, socioeconomic status and different levels of physical activity. The second FGD purposively sampled 10 CHN and PHN to ensure fair representation of age, gender, qualification and work experience.

The decision to use 9 and 10 participants for the two FGDs was based on literature. Although literature has varied views regarding the number of people required for an FGD, researchers indicate that most FGDs consist of 6 to 12 people, depending on the objective of the research (Wong, 2008).

3.6 Instrument for data collection

Data for this study were collected using a structured questionnaire. The questionnaire was made up of three sections i.e. Section A, B and C. Section A composed of both open and closed-ended questions that collected data on socio-demographic characteristics of participants, prevalence and risk factors of some selected NCDs and knowledge of recommended physical activity level for adults to stay healthy. The socio-demographic data included age, gender, marital status, educational level, occupation and monthly income while a single question, thus 'Have you been previously diagnosed of any of the following conditions' was used to determine the prevalence of the NCDs. For the purpose of this study the selected NCDs were hypertension, diabetes, dyslipidemia, heart attacks, stroke, cancers and Chronic Obstructive Pulmonary Disease. Regarding their knowledge level, participants were asked whether they knew of any recommended physical activity activity levels for adults to stay healthy. Those who chose 'Yes' were asked to state it in terms of minutes per week.

Section B is the Physical Activity Stages of Behavour Change questionnaire (*RM 1 – FM : Physical Activity Stages of Change — Questionnaire* *, 2003), which is a standardised questionnaire used to measure stages of physical activity behaviour. The questionnaire has four questions with Yes and No answers which was interpreted as pre-contemplation, contemplation, preparation, decision/action and maintenance. The questions are as follows: "I am currently physically active", "I intend to become more physically active in the next six months", "I currently engage in regular physical activity" and "I have been regularly physically active for the past six months".

The last section which is Section C was made up of the WHO Global Physical Activity Questionnaire (GPAQ) (WHO, 2012). This questionnaire has 16 questions on physical activity

participation in three domains viz activity at work, travel to and from places and recreational activities with the last question on sedentary behaviour. The questions are labelled P1–P16 and a participant will not necessarily have to answer all the questions. If a participant answers 'NO' for P1 the interviewer skipped to P4. If P4 is also answered in the negative, the interviewer skipped to P7. If a participant selects 'NO' for P7, the interviewer skipped to P10. Similarly, if P10 is answered in the negative, the interviewer skipped to P13. Aside these questions, all other questions are answered by the participants. The WHO generic show cards (Activities, n.d.) were used in conjunction with the GPAQ to give a pictorial view of vigorous and moderate activity at work, transport activity, vigorous and moderate activity during leisure time, as well as sitting. This enabled the respondents to know exactly what activity at work, transport, leisure and sitting are meant in the questionnaire.

The self-designed section of the questionnaire (section A) was peer-reviewed by two academic staff: one each from the School of Public Health and School of Biomedical and Allied health Sciences of the University of Ghana. Upon incorporating the recommendations by the peer-reviewers, a pilot study that recruited 15 participants from the Ga West Municipal Hospital was conducted to ascertain the feasibility of the proposed study, and the time taken to complete the questionnaire. From the pilot study, it was realised that COVID-19 pandemic may influence physical activity activity participation; therefore, two extra questions were added to the questions in section C of the questionnaire, which determined whether the COVID-19 pandemic has impacted the physical activity levels of the participants and if a participant answered 'Yes,' they were asked if the impact caused a decrease or increase in the physical activity level.

Another observation was the income level, which was originally open-ended, was changed to closed-ended before the main study was rolled out. This was because participants were reluctant to state the exact amount they earn but they were convenient to choose from a range.

3.7 Procedure for data collection

Approval to perform this study was sought from the Ghana Health Service Ethics Review Committee (GHS-ECR 026/08/21). Written permission was also obtained from the Management of LEKMA Hospital to execute the study. Three research assistants (RAs); two with a degree in rehabilitation and one with degree in Biochemistry who can speak English and two other Ghanaian Languages (Ga, Twi and Ewe) were recruited for both the quantitative and qualitative aspect of the study. A two-day training workshop was organised for the RAs. The training comprised of infection prevention control with emphasis on COVID-19 safety protocols which was facilitated by the head of public health unit of LEKMA Hospital and training on the usage of the questionnaire by the researcher. The RAs were made to practice among themselves in the presence of the researcher to correct any misinterpretation of any question. The researcher-administered questionnaire along with an informed consent form were administered to the sampled participants by the RAs. Participants were given alcohol-based hand sanitisers to rub their hands before signing or thumb-printing the informed consent form. The RAs ensured strict adherence to the COVID-19 safety protocols outlined by the WHO and enforced at the LEKMA Hospital.

The two FGDs were held separately in the conference room of LEKMA Hospital to ensure the required COVID-19 social distancing protocol. The discussion was led by the researcher with two RAs as the note takers. Focus group discussion guidelines comprising of open-ended questions which gave participants the opportunity to describe their experiences in their own words were

used. Every participant was given a unique number before the discussions began (e.g. F1–F9). The 45 minutes to one-hour discussion was audio recorded using a smart phone voice recorder and a portable Homder recording device. The recordings were transferred unto a laptop and secured with a password by the researcher for later transcription.

3.8 Data management

Appropriate quality control measures such as concealment of participant names and other identifiable participants' information were implemented to ensure anonymity. Regular meetings were held between the researcher and RAs to discuss emerging challenges encountered in the course of the study to ameliorate them. Both the quantitative and qualitative data obtained from the study were cleaned and appropriate measures were implemented for dealing with missing or incomplete data. At all points in this study, questionnaires were kept secured in a password protected folder. Where it is applicable, data were encrypted in folders both locally and online.

3.9 Data processing and analysis

All the data collected were entered directly into Microsoft Excel version 2016, cleaned, coded and imported into StataIC 16.1(StataIC 16.1) for analysis. Age which was collected as a continuous variable was converted into categorical variable (18–34 years, 35–49years, 50–64years). The height and weight were used to calculate the BMI and classified as underweight (>18.5), normal weight (18.5–>25), overweight (25–>30) and obese (≤30). Place of residence was converted to district of residence while the tribe was categorised as Ga-Adangbe, Akan, Ewe and Mole-Dagbani. For the Physical Activity Stages of Change Questionnaire (section B), scoring and categorisation was done using (*RM 1 – FM : Physical Activity Stages of Change — Questionnaire*

*, 2003). For the scoring, if question 1 = 0 and question 2 = 0, then the respondent is at stage, which is categorised as the Pre-contemplation stage. If question 1 = 0 and question 2 = 1, then the respondent is at stage 2 which is categorised as the Contemplation stage. If question 1 = 1 and question 3 = 0, then the respondent is at stage 3 which is categorised as the Preparation stage. If question 1 = 1, question 3 = 1, and question 4 = 0, then the respondent is at stage 4 which is categorised as the Decision/Action stage. If question 1 = 1, question 3 = 1, and question 4 = 1, then the respondent is at stage 5 which is categorised as the Maintenance stage. For the GPAQ (Section C), data cleaning, scoring and analysis was done using WHO, (2012). Metabolic equivalents (METs) was used to analyse the data. Metabolic Equivalents for the individual activities was calculated and the overall METs was obtained by adding all the individual METs. It is estimated that, compared to sitting quietly, a person's caloric consumption is four times as high when being moderately active, and eight times as high when being vigorously active. Therefore, when calculating a participant's overall energy expenditure using GPAQ data, 4 METs get assigned to the time spent in moderate activities, and 8 METs to the time spent in vigorous activities. For an individual to be considered physically active, the accumulated MET should be 600 METs minutes per-week or more. For the sedentary behaviour (P16), the number of times spent in a typical day was recorded in minutes and later categorised, those who spend up to 5-hours in sedentary activities and those who spend more than 5-hours sedentary activities.

After cleaning and categorising the data, descriptive analysis of all the sections (sections A-C) of the questionnaire was carried out. Frequencies, percentages, mean and standard deviation (SD) were calculated and the results were presented as distribution tables, pie chart and bar graph.

Regarding inferential analyses, chi-square analysis was initially conducted to test for the association between participation in physical activity and sociodemographic characteristics,

knowledge of recommended physical activity, stages of behaviour change, sedentary behaviour and impact of the COVID-19 pandemic on physical activity. All the significant variables from the Chi-Square analysis were further analysed using logistic regression analysis to determine the strength of association. Another Chi-square analysis was conducted to test the association between prevalence of NCDs and sociodemographic characteristics, participation in physical activity, sedentary behaviour, previous history of alcohol intake and smoking. The strength of association between the significant independent variables and prevalence of NCDs was further tested using logistic regression analysis. A Significant level was set at $p< 0.05$ with a 95% confidence interval.

3.10 Ethical considerations

Approval regarding the protocol for this study was sought and obtained from the Ghana Health Service Ethical Review Committee on Research involving Human Subjects. A written permission was sought from the Management and Head of the OPD of LEKMA Hospital. Informed written consent was provided for the sampled participants prior to their participation in the study. Confidentiality of participants' information was ensured and safe-guarded, and anonymity was protected during the collection and, storage of the research material. Only those who were willing were recruited for the study to ensure that participation was fully voluntary. Participants chose not to answer any question they found uncomfortable or private. Per the COVID-19 safety protocols of the LEKMA Hospital, everyone who enters the premises performs hand washing and wears a face mask. However, there were boxes of facemask and hand sanitisers provided by the RAs to participants who did not have any of the two.

The FGD was held at the conference room of the hospital, which helped to ensure the required two-meter distancing. Participants were assured that by participating in study, there was no associated foreseeable risk and no cost involved.

Participants in the quantitative study were given 3 surgical face masks to appreciate them for their time, and those who participated in the FGDs were given transportation and refreshment (Participants did not have prior knowledge of this during their recruitment. They only got to know after the discussion) after the discussion. The participants were not informed of these benefits before recruitment into the study. All information collected in this study were assigned code numbers; no name was recorded, and the data collected cannot be linked to anyone in anyway. The data was only accessible to the researcher.

CHAPTER FOUR

4.0 RESULTS

Five hundred eligible respondents participated in the study. After cleaning the data, 20 of them were not included due to missing or inaccurate data especially in section C of the questionnaire (GPAQ). Therefore, 480 respondents were used in the final analysis representing 96% of the total respondents.

4.1 Socio-demographic characteristics of the participants

Out of the 480 respondents, 203 (42.3%) were males and 277 (57.7%) were females. Their age ranged from 18 to 64 years with a mean age of 37.7±16.5 years. With regards to the age range, 222 (46.4%) were 18–34 years, while 176 (36.7%) were 35–49 years and 81 (16.9%) were 50–64 years. Majority, 287 (59.9), had a normal BMI while 185 (38.8) were either overweight or obese. One hundred and eighty-five (38.5%) were married and a greater portion, 281 (58.5%), had at least one child. Majority, 311 (64.8%), had attained either primary, middle or secondary education while 139 (29%) had attained either technical/vocational or tertiary education with 30 (6.3%) having no formal education. Majority, 218 (45.4%), were self-employed, followed by 100 (20.8%) who worked at private-formal sector with only 12 (2.5%) on retirement. Two hundred and seventy (56.3%) stay within the Ledzokuku Municipal Assembly in the Greater Accra region while four (0.8%) stay within the Awutu Senya East Municipal Assembly in the Central Region of Ghana. A greater portion, 198 (41.3%), were GA-Adangbe, 162 (33.8%) were Akans, 102 (21.3) were Ewes and 18 (3.8%) were Mole-Dagbani. Majority, 249 (51.9%), earn from GHc 101 to GHc 999 in a month while only 2(0.4%) earn GHc 3000 or more in a month as presented in Table 4.1.

Table 4. 1: Demographic characteristics of the participants

	Frequency n=480	Percent (%)
Gender		
Male	203	42.3
Female	277	57.7
Age/years		
18-34	222	46.4
35-49	176	36.7
50-64	81	16.9
BMI/Kg/m^2		
underweight	7	1.5
Normal	287	59.9
Overweight	129	26.9
obese	56	11.9
Marital status		
Married	185	38.5
Single	214	44.6
Divorced	17	3.5
Widowed	20	4.2
Cohabitation	44	9.2

Do you have a child		
Yes	281	58.5
No	199	41.5
Education		
No formal education	30	6.3
Primary	38	7.9
Middle	120	25.0
Secondary	153	31.9
Technical/vocational	56	11.7
Tertiary	83	17.3
Occupation		
Unemployed	62	12.9
Public sector	37	7.7
Private sector	100	20.8
Self-employed	218	45.4
Retired	12	2.5
Student	51	10.6
District of residence		
Ledzokuku	270	56.3

Krowor	99	20.6
La Dade Kotopon	30	6.3
Tema Metro	24	5.0
Ashiaman	12	1.5
La Nkwantanang Madina	10	2.1
Ablekuma west	8	1.7
Accra Metro	12	2.5
Awutu Senya East	4	0.8
GA West	7	1.46
Ningo Prampram	4	0.8
Tribe		
Ga-Adangbe	198	41.3
Akan	162	33.8
Ewe	102	21.3
Mole-dagbani	18	3.8
Monthly income [GHc]		
≤100	67	3.9
100-999	249	51.9
1000-1999	141	29.4
2000-2999	21	4.3
≥3000	2	0.4

4.2 Stages of physical activity behaviour change

With the current stages of physical activity behaviour change of the participants, 148(30.8%) were in the pre-contemplation stage, 13 (2.7%) were in the contemplation stage, 122 (25.4%) were in the preparation stage, 104 (21.7%) were in the decision/action stage and 93 (19.4%) were in the maintenance stage as shown in Fig 4.1. That is, majority (273 [58.9%]) were in the pre-action stage, and 197 (41.1%) were in the action stage.

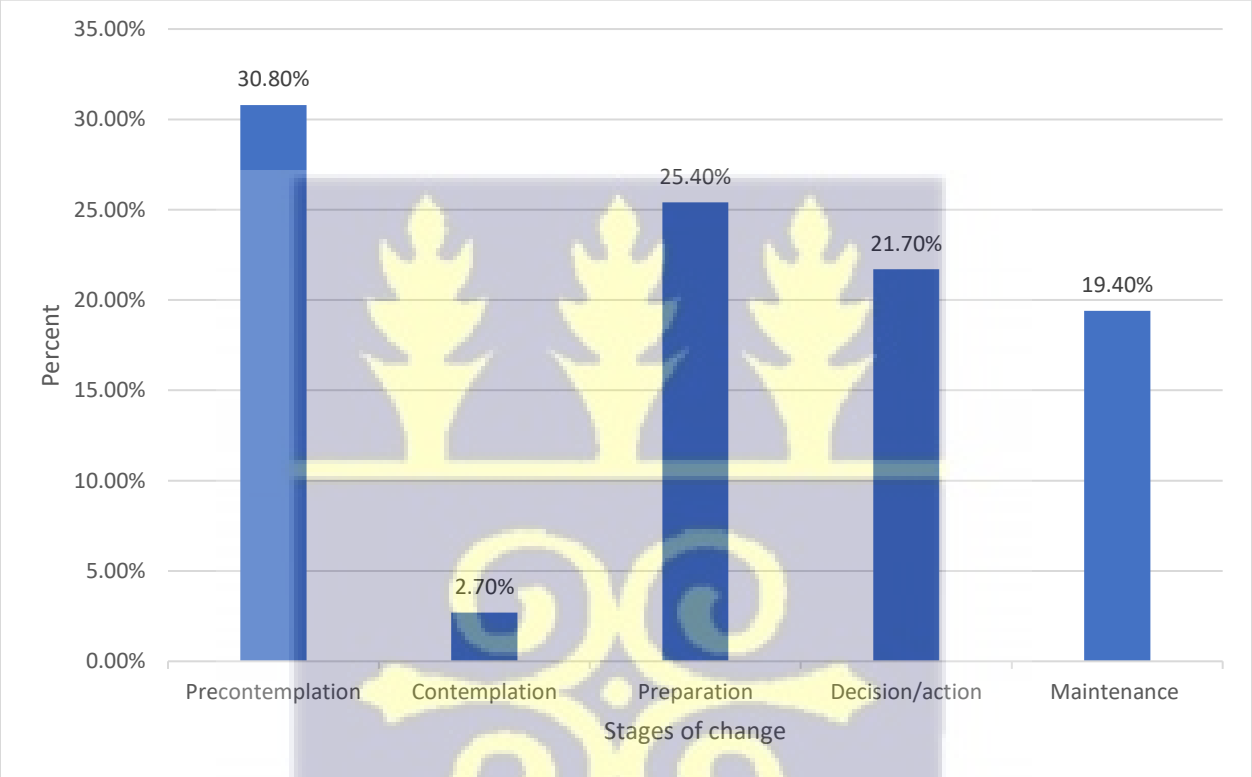

Figure 4. 1: Stages of physical activity behaviour change

4.3 Knowledge and Participation in physical activity

Eighty-two (17.1%) knew and stated correctly the recommended physical activity level for adults to stay healthy while 398 (82.9%) had no knowledge about the recommended physical activity level for an adult to remain healthy as shown in fig 4.2. Two hundred and twenty-two (46.3%) met

the WHO required level of physical activity as shown in fig 4.3. A greater portion (425 [88.5%]) engage no vigorous activity at work. More males (19.2%) do vigorous activity at work compared to females (5.8%) who do rigorous activity at work. Majority 255 (53.1%) do neither vigorous or moderate activity at work. Majority 393 (81.9%) do no vigorous recreation and 96.4% of the females do no vigorous recreation while 63.4% of the males did not vigorous recreation. Majority 288(60%) did not engage in either vigorous or moderate recreation. Ninety-two (19.2%) did not engage in physical activity involving travelling and more females (81.6%) were engaged in physical activity involving traveling compared to males (79.8%) as shown in table 2. On the average, each respondent spent 420.8±5.2 minutes engaging in sedentary activity in a day. Majority 400(83.3%) spent more than 300 mins in sedentary activity consisting of 254 (63.5%) females and 146 (36.5%) males.

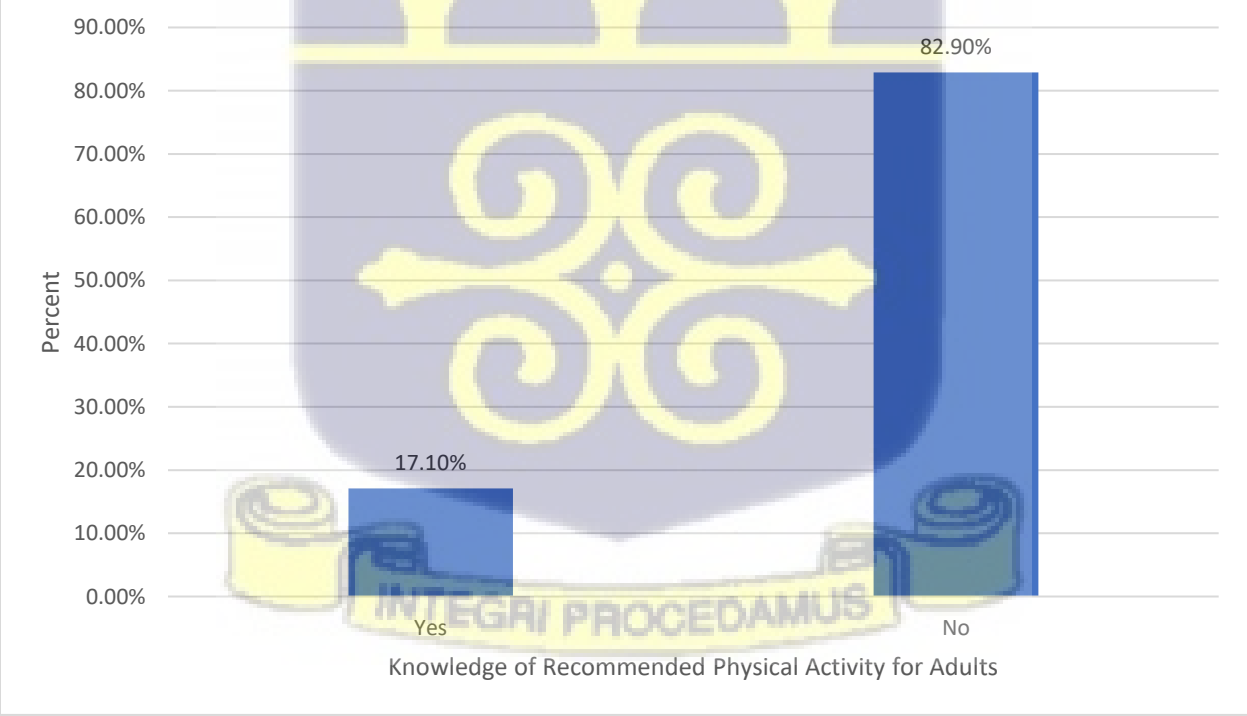

Figure 4. 2: Knowledge of Recommended Physical Activity for Adults

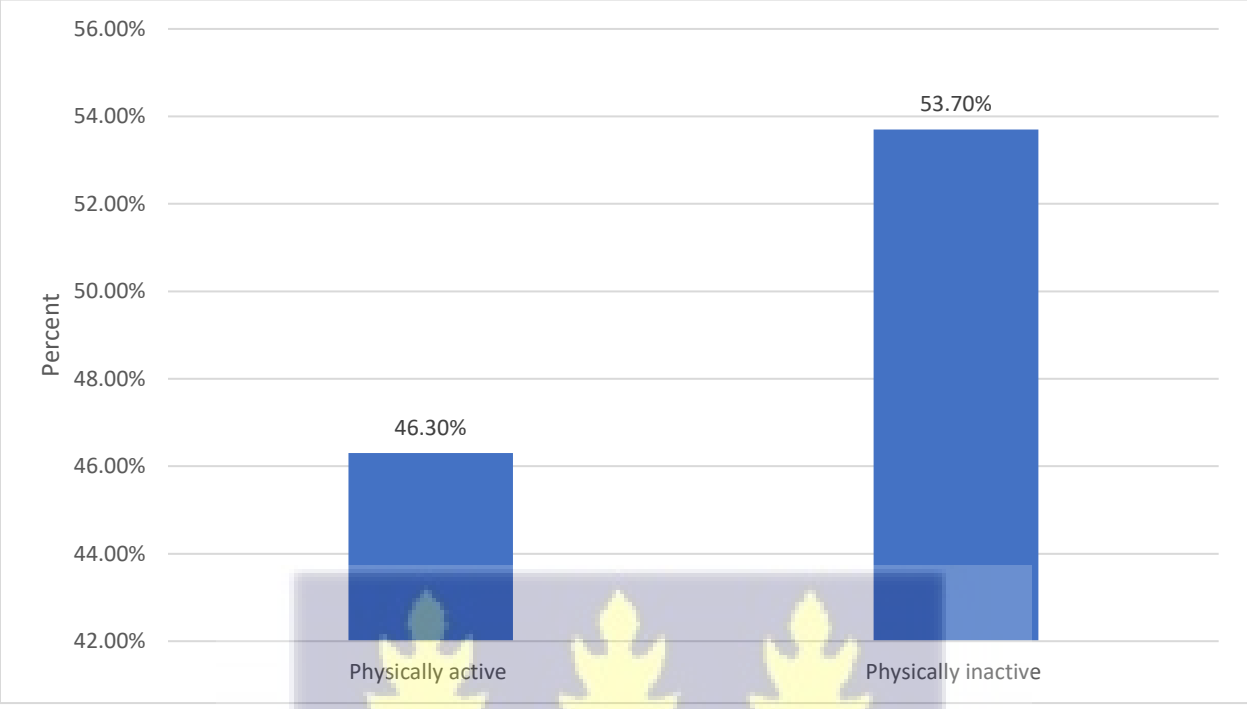

Figure 4. 3: WHO requirements

Table 4. 2: The categories of the of between males and females

Category of physical activity	Frequency (n)		Percentage (%)	
	Male (n)	Female (n)	Male (%)	Female (%)
Vigorous Activity at work				
Yes	39	16	19.0	6.0
No	164	261	81.0	94.0
Total Activity at work				

Yes	112	113	55.2	40.8
No	91	164	44.8	59.2
Vigorous Recreation				
Yes	76	10	37.6	3.6
No	126	267	62.4	96.4
Total Recreation				
Yes	115	77	57.0	28.0
No	88	200	43.0	72.0
Travel				
Yes	162	226	79.8	81.6
No	41	51	20.2	18.4

Exploring the knowledge level of the CHN and PHN (health professionals) during the FGD, only 2 out of the 10 sampled participants could correctly state the recommended physical activity level for adults to stay healthy. The following were their responses

"For moderate physical activity such as brisk walking and swimming, an adult needs to do at least 150 minutes in a week and for vigorous physical activity such as playing football, an adults need to do at least 75 minutes per week to stay healthy" (25-year-old CHN).

"For adults to keep healthy they need at least 150 minutes of moderate intensity physical activity or 75 minutes of vigorous intensity physical activity in a week" (40-year-old Senior Public Health nursing officer).

The rest did not know or could not correctly state the recommended levels in terms of minutes per week. The following were their responses

"I am not aware of any recommended physical activity level for adults to stay healthy" (23-year-old CHN, 25-year-old CHN).

"What I know is that daily dancing and walking briskly for 3 times in a week help adults to keep healthy" (39-year-old principal CHN).

"I am not too sure of any recommended physical activity level that is required of adults to stay healthy. However, I know that walking every day is a good physical activity to gain health benefits" (31-year-old principal CHN).

"I know that walking every day is a good physical activity for adults to stay healthy. To know that you have done enough, you have to do it for your heart to beat faster, but I don't know the recommended minutes in a week" (27-year-old senior CHN).

"I know that jogging at least twice in a week is good for adult health, but I am not aware of how many minutes they should in a week" (32-year-old Public Nursing Officer)

"I also know that jogging and walking for at least twice in a week is very beneficial for health" (24-year-old CHN)

"I know that walking for 3 times in a week is beneficial for adult to keep healthy" (28-year-old CHN)

Exploring whether the health professionals educate their clients on physical activity and how they do it, all of them said "Yes" and could mention one form of physical activity. However, they do not educate their clients on how much physical activity is recommended to stay healthy. The following were their responses

"I tell my clients that in the morning when they have not eaten, they should walk for a while before they go about their normal physical activity" (23-year-old CHN).

"Before I educate my client on physical activity, I first ask of their work. For example, if someone is a trade or hawker, I will not recommend brisk walking because that is the person's normal routine or activity. In such a person I will recommend dancing. If the person cannot do the dancing but still prefers walking, I will educate the person to increase the speed and the number of times he/she walks" (39-year-old principal CHN).

"For my adult client who are 60 years and above who do not work and are mostly at home, I advise them not to be sitting all day, they should get up intermittently and walk…" (31-year-old principal CHN).

"First I educate my clients on the important of physical activity and depending on their age, I educate them to take a walk at their compounds and when they feel they are tired, they can stop and go on with their daily activities" (27-year-old senior CHN).

"I tell my clients that physical activity gets the body healthy and prevents some diseases. some of the physical activity I recommend for them are walking, jogging and running depending on the preference of the client" (25-year-old CHN).

"I educate my clients to walk up early, and go for walk or jogging in order to stay healthy" (24-year-old CHN).

"I educate my clients not to do vigorous or extraneous physical activity depending on their age but they should do physical activity in their tolerable levels" (25-year-old CHN).

"Before I educate a client on physical activity, I first consider the person's work, age and how physically active he/she is. This helps me to design a suitable exercise that will motivate my client. For example, with the aged, immediately you talk about physical activity, they will tell you I cannot do it. So, I recommend mild intensity and regular exercises. Thus, I tell them to walk around their house. They can do it with their spouses just to serve as a motivating factor. For the youth like us, I recommend a more vigorous physical activity for them. For example, those who does office work which requires a lot of

sitting and are always engage with work, I advise them to walk around during their break time. For those who work involves walking like us, that is field work, we are always walking so I just encourage such people to do it more" (40-year-old Senior Public Health nursing officer).

One person recommends sleep, which is not a physical activity, to his clients

"I learnt that sleeping is an exercise and some of the aged have decreased sleeping time so advise them to sleep more…" (24-year-old CHN).

As the health professionals indicated that they educate their clients, it was important to find out where the non-professionals get their education on physical activity from and how they are taught to engage in it. The exploration led to 3 sources, i.e. media, school/work and Hospital. The education they had was focused on the benefits on physical activity and some examples of physical activities to engage in

Media

"Yes, I heard it on television, obunu tv every morning. And it is good to exercise so that every part of your body will function well" (42-year-old male electrician).

"I have heard about people talking about physical activity. It is being discussed on the radio on several occasions. What they usually say is that exercise is good for our health as it builds our body. They also said that, when you exercise a lot, you won't get sick frequently since your immune system will be strong" (38-year-old male driver).

School/work

"I heard it in SHS during our physical education session, and it all focused on our movement" (22-year-old male student).

"I am a fire officer, so it is part of our daily routine. It helps us in our daily activities" (59-year-old male fire officer).

I did PE as a subject in SHS, and I was taught a lot. It was said that exercise keeps the body healthy (36-year-old female administrative assistant).

I also heard it in school. And we were taught that when we exercise, it improves blood circulation and prevent blood clot. Also, we were told that swimming is the best exercise because it is the whole body that is taking part in the swimming (32-year-old-female banker).

Hospital/health professionals

"... I have also heard it on radio, through health screening programs and other places. As human as we are, we need to exercise the whole part of the body so as to make us healthy. So, all about our health, exercise is good for our health" (62-year-old male retired teacher).

"I heard it on radio, television and also when I go to hospitals, they talk about it a lot. They all said that physical activity is good for the body. When we are growing our strength level also declines, but when we exercise it boost our immune system making us strong again to do work" (50-year-old female trader).

Exploring on what can be done by the health professionals to improve upon physical activity among the public, 3 themes emerged from the discussion

Education on the benefits of physical activity

"Before we can promote physical activity among the public, we need to first educate them about the importance of physical activity. That is, we need to let them understand that regular physical activity will help prevent diseases and promote their health. Once they understand the benefits of physical activity, it will be easier for them to do the physical activity we will prescribe for them" (23-year-old CHN).

"For the public to engage in physical activity, we need to explain the reason for each of the activities we tell them to do. So that they will have the knowledge and do it willingly and not out of ignorance which might not last" (39-year-old principal CHN).

Community/Group Activities

"I think we can promote physical activity among the public by organizing health promotional and communal activities like health walk. People will be more encouraged to do it when it is in a group than doing it individually" (31-year-old principal CHN)

"I think another way to promote physical activity among the public is to form groups in the community where the main focus will be promoting physical activity. In this way, the members of the group serve as motivating factor to others" (32-year-old public health nursing officer).

"I share the same view with my colleague by forming groups to promote physical activity. For instance, when I am exercising alone, within 10 minutes, I get tired and give up. But when I am in a group, I can do like one hour without getting tired so I think the groups will help in promoting physical activity among the public" (24-year-old CHN)

Interest of the people/Fun component

"The interest of the people should be paramount in promoting physical activity among the public. For instance, if someone is interested in dancing, their physical activity should include dancing. In this way the person will see the activity as a fun and not necessarily physical activity but at the end of the day, the person will have fun and the benefits of physical activity as well" (27-year-old senior CHN).

"The physical activity should be fun to encourage people to do. Most of the times you will see people jogging and having ear piece maybe listening to music. The music takes their attention off the pains they may be feeling and encourage them to complete their set target. So, I think to promote physical activity among the public there should be the fun component which will encourage them to do the activity" (25-year-old CHN)

"I also think that the first and foremost thing is to educate the person about the importance or the benefits of the physical activity. Once the person has understood, then we look at the interest of the person as someone gave example as dancing. This will encourage the person to be doing it on regular basis. I also think the formation of the group is important... (40-year-old Senior Public Health nursing officer)

Similar themes emerged during the FGD among the non-health professionals

Education on physical activity

"*As for me, I would say that if more enlightenment is thrown on physical activity, it will help us know what it entails, and we will be involved more" (22-year-old male student).*

"... *Also, the organized groups with the help of health professionals can organize a talk to properly educate the people on the need to be fit physically. Just like how I asked a health officer for information, a talk can be organized to disseminate useful information" (59-year-old male fire officer).*

Community/Group Activities

"If the community can also organize keep fits, it will enable us train more. Also, I am getting old so I can't train as I used to do, so if the community/ organized groups like churches can organize keep fit/jogging, it would help us a lot" (42-year-old male electrician).

"... The organized groups can organize keep fit program which can motivate those that can't exercise on their own. When we continue to this, it enables us become active at home and then later, we are able do the exercise at home by ourselves" (36-year-old female administrative assistant).

"... Also, our community/group/ church that we find ourselves in can organize physical activities that will help us. When you are doing it on own, you feel kind of lazy but in the midst of people, you are encouraged to do well" (38-year-old male driver).

Unearthing how the public can engage in physical activity in pandemics where there is restriction of movements, the health professionals identified the following as remedies

Engaging in indoor games/activities that can be done in the house

"For the aged, I will recommend dancing to their favorite music and the youth can climb staircase up and down in their homes for like 30minutes to 40 minutes" (39-year-old principal CHN).

"I think they can involve themselves in indoor games like "ludo", "oware", skipping which is also a form of physical activity" (31-year-old principal CHN).

Some activities can be done in their homes without going outside. For instance, if it is walking, they can do it on their compounds (25-year-old CHN).

Using the Media

"There are some television programs sessions like aerobics that people can watch and do as well" (27-year-old senior CHN).

"During the lockdown I sometimes do some of the aerobic exercises on TV with my husband. So, I think in a situation like that people can watch on TV and do with them" (40-year-old Senior Public Health nursing officer)

Use gym equipment

"If people can afford machines like static bicycle and tread-mill I will advocate for that" (32-year-old public health Nurse)

The themes that emerged during the FGD for the non-health professionals were in line with that of the health professionals.

Indoor games/household chores

"In my opinion, individually, skipping and involving the family to skip can be a good physical activity during these times. Also, after eating time, you can play "ludo" or "oware" and other indoor games"(59-year-old male fire officer).

"I also suggest that the family… can be involved in the indoor games to make it fun and lively. For example, we can be playing ludo, skipping rope and various indoor games to make it interesting and fun. The fun will take away boredom and the fear of the disease which will help with psychologically" (36-year-old administrative assistant).

"What I think is that should there be a strict lockdown, those that are single can engage in press ups, squatting, skipping, and other little exercises that can be done on your own, to be fit and healthy and those staying with their family can do them in a group"(38-year-old male driver)

Use of media/social media

"…What I can say is that our social media platforms can be used as a medium to share exercises so that we won't get bored in the room. Now people are well-versed in those media platforms, we should use the social media platforms to promote physical activity" (42 -year-old male electrician).

"What I can suggest is that health professionals can make use of our social media platforms to educate the public on various ways of exercising. So, a platform can be created, and the health officer can do a short video of him/herself training and then later forward it to the platform with a reminder to remind the people on the platform to exercise" (36-year-old female administrative assistant).

"The social media can help. When we were in the house and not going anywhere, my church, did a video on exercises and its importance and it was shared on the various social media platforms for people to do and get fit" (50-year-old female trader).

Education on physical activity

"One of the things that can be done is throwing more light on physical activity. When the importance of physical activity has been highlighted, it will help us engage ourselves in it" (22-year-old male student).

"The little I can say is that the community/ church/ groups can educate and show us the benefits of exercise because some people don't know its benefits. Others can make fun of you that you don't know what to do with your time that is why you are exercising. This clearly shows that a lot of people do not know the importance of physical activity, so we need to be educated" (32-year-old female unemployed)

4.4 Prevalence of NCDs and Risk Factors

The prevalence of selected NCDs among the respondents was 26.7% (Table 4.3). Out of the 128 (26.7%) who reported to have been diagnosed with the selected NCDs, 99 (77.3%) report one NCD, 25 (19.5%) reported two, while 2 (1.6%) each reported three and four NCDs. Majority 280 (58.3%) reported of family history of NCDs. Out of this, 142 (50.7%) reported one, 98(35%) reported two, 22 (7.9%) reported three, 11 (3.9%) reported four and 7 (2.5%) reported five. The prevalence of the selected NCDs are hypertension, 109 (22.7%); diabetes, 19 (4.0%); dyslipidemia, 15(3.1%); stroke 10 (2.1%); heart diseases, 7 (1.5%); and COPDs, 2 (0.4%) with no one reporting of previously diagnosed of cancers as shown in Table 3.

Two hundred and sixty (54.2%) had ever taken alcohol in their life time, of which 157 (60.4%) were occasional drinkers, 11 (4.2%) were regular drinkers, 3 (1.2%) were chronic alcoholics, 2(0.8%) stopped less than 6 months and 87 (33.5%) have stopped for less than 6 months. Only a few 45 (9.4%) had ever smoked before. Of those who had ever smoked before, 10 (22.2%) were occasional smokers, one (2.2%) each were regular and chronic smokers and 33 (73.3%) had stopped smoking for more than 6 months.

Table 4. 3: Prevalence of NCDs and some associated risk factors

	Frequency n=480	**Percent (%)**
NCDs	128	26.7
Hypertension	109	22.7
Diabetes	19	4.0
Dyslipidemia	15	3.1
Heart Diseases	7	1.5

Stroke	10	2.1
Cancers	0	0.0
COPD	2	0.4
Family history of NCDs		
Yes	280	58.3
No	200	41.7
Alcohol consumption		
Yes	260	54.2
No	220	45.8
Smoking		
Yes	45	9.4
No	435	90.6

4.5 Test of association between participation in physical activity and some selected independent variables

Results of the Chi-Square test (see Table 4.4) indicated that there was a significant association between participation in physical activity and gender (X^2 =37.64, p< 0.001), age range (X^2 = 35.93, p<0.001), marital status (X^2 = 14.76, p=0.005) , having a child (X^2 = 9.93, p=0.002), education (X^2 =24.68, p< 0.001), occupation (X^2 = 17.32, p=0.004), sedentary behaviour (X^2 =101.43, p<0.001), behaviour change (X^2 =178.97, p<0.001) and impact of COVID-19 pandemic (X^2 =4.72, p=0.030).

There was no significant association between the participation in physical activity and tribe, district of residence, BMI and monthly income as presented in Table 4.4

Table 4. 4: Association between participation in physical activity and some selected variables

	participation in physical activity		**Chi-square**	**p-value**
	Physically active	**Physically inactive**		
Gender				
Male	127	76	37.64	**0.000***
Female	95	182		
Age/years				
18-34	127	95		
35-49	79	97	35.93	**0.000***
50-64	15	66		
BMI/Kg/m^2				
underweight	2	5		
Normal	133	154	1.49	0.686
Overweight	63	66		
obese	24	32		

Marital status				
Married	78	107		
Single	115	99		
Divorced	6	11	14.76	**0.005***
Widowed	3	17		
Cohabitation	20	24		
Do you have a child				
Yes	113	168	9.93	**0.002***
No	109	90		
Education				
No formal education	14	16		
Primary	15	23		
Middle	40	80	24.68	**0.000***
Secondary	68	85		
Technical/vocational	29	27		
Tertiary	56	27		
Occupation				
Unemployed	23	39		
Public sector	17	20		

Private sector	50	50	17.32	**0.004***
Self-employed	101	117		
Retired	0	12		
Student	31	20		
District of residence				
Ledzokuku	133	137		
Krowor	43	56		
LA Dade Kotopon	13	17		
Tema metro	8	16		
Ashiaman	5	17		
LA Nkwantanang-Madina	4	6	10.63	0.387
Ablekuma west	2	6		
Accra metro	6	6		
Awutu senya east	1	3		
GA west municipality	6	1		
Ningo prampram	1	3		
Tribe				
Ga-Adangbe	87	111		
Akan	76	86	3.473	0.324
Ewe	47	55		

Mole-dagbani	12	6		
Monthly income [GHc]				
≤100	26	41		
100-999	115	134		
1000-1999	67	74	4.91	0.296
2000-2999	12	9		
≥3000	2	0		
Knowledge of Recommended physical activity				
Yes	61	21	31.50	**0.000***
No	161	237		
Stages of Change				
Pre-contemplation	16	32		
contemplation	4	9		
Preparation	43	79	178.97	**0.000***
Decision/Action	78	26		
Maintenance	81	12		
Sedentary activity (Hours)				

≤5	78	2	101.43	**0.000***
≥5	144	256		
Impact of COVID-19				
Yes	33	22	4.72	**0.030***
No	189	236		

4.6 Factors influencing physical activity

All the significant variables from the Chi square analysis were selected for multiple logistic regression analysis to estimate the adjusted odds ratio (AOR). The results indicate that females are 48% less likely to engage in physical activity compared to their male counterparts. (AOR=0.48, CI=0.28-0.79, P=0.005). Adults from 50-64 years are 21% less likely to participate in physical activity compared to those from 18-34 years (AOR= 0.21, CI=0.07-0.63, P=0.005). Using the pre-contemplation stage as reference, the odds of an adult participating in physical activity increases as one progresses from the pre-contemplation stage through the contemplation stage (AOR=4.53, CI=1.02-20.17, P=0.047), Preparation stage (AOR=3.56, CI=1.77-7.18, P<0.001), action stage (AOR=13.69, CI=6.40-29.24, P<0.001) and to the maintenance stage (AOR=25.26, CI=9.56-67.03, P<0.001). Adults who spend more than 5 hours in sedentary behaviour are 5% less likely to participate in physical activity than those who spend less than 5 hours in sedentary behaviour (AOR=0.05, CI=0.01-0.22, P<0.001).

Marital status, education status, having a child, occupation, knowledge of physical activity guideline and impact of COVID-19 pandemic did not independently predict participating in physical activity as shown in table 5.

Table 4. 5: Multiple logistic regression of factors influencing physical activity

	Adjusted OR	95% CI	p-value
Gender			
Male	Ref.		
Female	0.48	0.28-0.79	**0.005***
Age/years			
18-34	Ref.		
35-49	0.67	0.36-1.22	0.189
50-64	0.21	0.07-0.63	**0.005***
Marital status			
Married	Ref.		
Single	0.76	0.38-1.51	0.434
Divorced	0.81	0.17-3.94	0.798
Widowed	0.53	0.09-3.180000	0.489
Cohabitation	0.53	0.20-1.43	0.212
Do you have a child			
Yes	Ref.		
No	.84	0.44-1.61	0.600
Education			

No formal education	Ref.		
Primary	1.09	0.28-4.29	0.902
Middle	0.83	0.28-2.51	0.746
Secondary	0.88	0.30-2.62	0.825
Technical/vocational	0.76	0.22-2.61	0.667
Tertiary	0.96	0.26-3.57	0.946
Occupation			
Unemployed	Ref		
Formal Public sector	0.78	0.23-2.64	0.690
Formal Private sector	0.83	0.33-2.10	0.700
Self-employed	1.13	0.48-2.65	0.773
Retired	1	-	-
Student/Apprenticeship	1.49	0.50-4.50	0.476
Knowledge of physical activity recommendation			
Yes	Ref		
No	0.95	0.40-2.21	0.904
Stages of change			
Pre-Contemplation	Ref		
Contemplation	4.53	1.02-20.17	**0.047***

Preparation	3.56	1.77-7.18	**0.000***
Action	13.69	6.40-29.24	**0.000***
Maintenance	25.26	9.52-67.03	**0.000***
Sedentary behaviour (hours)			
≤5	ref		
≥5	0.05	0.01-0.22	**0.000***
Impact of COVID-19			
Yes	Ref		
No	0.81	0.31-2.11	0.660

4.7 Test of association between prevalence of NCDs and some selected variables

Chi square analysis revealed that there was significant association between the prevalence of NCDs and gender (X^2 =10.00, p=0.002), age (X^2 =89.48, p<0.000), BMI (X^2 =33.60, p=0.000), marital status (X^2 =67.30, p<0.001), having a child (X^2 =39.68, p<0.000), educational status (X^2 =31.24, p<0.001), occupation (X^2 =36.03, p<0.001), alcohol (X^2 =18.33, p<0.001), family history (X^2 =30.39, p<0.001), sedentary behaviour (X^2 =4.13, p=0.042) and participation in physical activity (X^2 =12.68, p<0.001),

The results indicated no significant association between prevalence of NCDs and tribe, monthly income, smoking and district of residence as presented in Table 4.6.

Table 4. 6: Association between prevalence of NCDs and some selected variables

	Have you been diagnosed of NCDs			
	Yes	**No**	**Chi-square**	**p-value**
Gender				
Male	39	64	10.00	**0.002***
Female	89	188		
Age/years				
18-34	23	199		
35-49	53	123	89.48	**0.000***
50-64	52	29		
BMI/Kg/m^2				
underweight	10	4		
Normal	228	53	33.60	**0.000***
Overweight	89	40		
obese	25	31		
Marital status				
Married	71	114		

Single	25	189		
Divorced	12	5	67.30	**0.000***
Widowed	12	8		
Cohabitation	8	36		
Do you have a child				
Yes	105	176	39.68	**0.000***
No	23	176		
Education				
No formal education	12	18		
Primary	13	25		
Middle	51	69	31.24	**0.000***
Secondary	28	125		
Technical/vocational	11	45		
Tertiary	13	70		
Occupation				
Unemployed	20	42		
Public sector	11	26		
Private sector	22	78	9.11	**0.000***
Self-employed	63	155		
Retired	10	2		

Student	2	49		
Tribe				
Ga-Adangbe	58	140		
Akan	39	123	3.64	0.302
Ewe	29	73		
Mole-dagbani	2	16		
Monthly income [GHc]				
≤100	14	53		
100-999	71	178		
1000-1999	37	104	2.36	0.671
2000-2999	6	15		
≥3000	0	2		
Consumed alcohol before				
Yes	90	170	18.33	**0.000***
No	38	182		
Smoked before				
Yes	13	32	0.13	0.723

No	115	320		
Family history of NCDs				
Yes	101	179	30.39	**0.000***
No	27	173		
Participation in physical activity				
Yes	42	180	12.68	**0.000***
No	86	172		
Sitting				
Yes	14	66	4.13	**0.042***
No	114	286		

4.7 Factors influencing the prevalence of NCDs

All the statistically significant variables from the Chi-square analysis were selected for multiple logistic regression analysis to estimate the Adjusted Odds Ratio (AOR). The results (see Table 4.7) indicated that the odds of females getting NCDs was 2.50 times that of males (AOR=2.50, CI=1.36-4.60, P=0.003). People aged 35 to 49 years were 2.50 times more likely to suffer NCDs than those aged 18 to 34 years (AOR= 2.50, CI=1.36-4.60, P=0.003) and those aged between 50-64 years were 5.50 times more likely to suffer from NCDs compared to those aged 18 to 34years

(AOR=5.50, CI=2.17-13.80, P<0.001). Single people were 41.2% less likely of suffering from NCDs than married people (AOR=0.41, CI=0.20-0.86, P=0.019). The odds of those who had never taken alcohol suffering from NCDs was 0.22% times that of those who had ever taken alcohol (AOR=0.22, CI=0.12-0.40, P<0.001). People without family history of NCDs were 26.8% less likely to suffer from NCDs than those with family history of NCDs.

Participating in physical activity, sedentary lifestyle, BMI, Occupation, educational status and having a child did not independently predict the development of NCDs as shown in Table 4.7.

Table 4. 7: Multiple logistic regression of factors influencing NCDs.

	Adjusted OR	95% CI	p-value
Gender			
Male	Ref		
Female	2.50	1.36-4.60	**0.003***
Age/years			
18-34	Ref		
35-49	2.50	1.29-8.40	**0.006***
50-64	5.48	2.17-13.81	**0.000***
Marital status			
Married	Ref		
Single	0.41	0.20-.86	**0.019***

Divorced	1.68	0.45-6.22	0.440
Widowed	0.62	0.18-2.17	0.458
Cohabitation	0.63	0.24-1.66	0.351
Do you have a child			
Yes	Ref		
No	1.02	0.50-2.09	0.956
Education			
No formal education	Ref		
Primary	0.97	0.27-3.46	0.967
Middle	1.11	0.39-3.15	0.845
Secondary	0.44	0.15-1.28	0.130
Technical/vocational	0.39	0.11-1.43	0.156
Tertiary	0.48	0.13-1.78	0.273
Occupation			
Unemployed	Ref.		
Public sector	0.90	0.27-3.02	0.859
Formal Private sector	1.13	0.42-3.03	0.802
Self-employed	0.94	0.39-2.25	0.891
Retired	6.40	0.86-46.74	0.069
Student	0.59	0.01-3.50	0.562

BMI			
Underweight	Ref		
Normal weight	0.39	0.09-1.62	0.196
Overweight	0.59	0.14-2.57	0.487
Obese	2.62	0.58-11.87	0.212
Consumed alcohol before			
Yes	Ref.		
No	0.22	0.12-0.40	**0.000***
Family history			
Yes	Ref.		
No	0.27	0.15-0.48	**0.000***
Participation in physical activity			
Yes	Ref.		
No	1.25	0.66-2.34	0.497
Sedentary Behaviour			
≤5hours	Ref		
>5hours	1.20	0.48-2.99	0.703

CHAPTER FIVE

5.0 DISCUSSIONS

5.1 Main findings of the study

This study sought to assess the knowledge of physical activity recommendation, stages of behaviour change, participation in physical activity, and the prevalence of NCDs among adult attendants of the out-patient department of LEKMA Hospital. The study also sought to determine the factors associated with physical activity participation and that of NCDs. Findings of the study revealed that, the knowledge of physical activity recommendation was very low (17.1%) among the adults and majority (58.9%) were in the pre-action stage based on the transtheoretical model. More than half of the adults (53.7%) were physically inactive according to the WHO requirement. The prevalence of NCDs was 26.7% with hypertension being the most prevalent among the adults. Factors that independently influenced participation in physical activity were gender, age, stages of physical activity behaviour change and sedentary behaviour. In addition, gender, age, marital status, alcohol consumption and family history were independent predictors of developing NCDs.

5.2 Knowledge and participation in physical activity

The study recorded a very low (17.1%) knowledge of physical activity recommendation among the adults. Previous studies have reported varied knowledge levels among different populations worldwide. While some of the studies recorded higher percentages than that recorded in this study, others recorded lower percentages. For instance, a study conducted among elderly adults aged 55 years and above sin Minnesota state indicated that 36% of the 434 participants had good knowledge of physical activity recommendation (Cheung et al., 2020). Knox et al. (2013) recorded in their study, which included 1,797 UK adults aged above 17 years, that 18% of the participants

accurately stated the recommended physical activity level for adults to stay healthy. Another study that included 10,117 participants from the US found that 25.6% correctly stated the recommended physical activity levels (Moore et al., 2010). Similarly, a study conducted in Ethiopia among 590 adults reported 27% having good knowledge of physical activity recommendation (Abdeta et al., 2019). The above stated studies recorded a higher knowledge level than that reported in this study.

On the contrary, a study conducted in Northern Ireland that included 4,653 with a mean age of 45 years indicated that only 8.4% of the participants had good knowledge of recommended PA(Hunter et al., 2014). Additionally, Abula et al. (2018) also reported that 4.4% of 9,826 college students in China, could accurately report the physical activity recommendation. The disparities in the knowledge levels recorded could be attributed to the differences in information dissemination, lack of locally adopted and published physical activity recommendation and differences in participants' sociodemographic characteristics such as gender, age, educational level, place of residence and income level (Abdeta et al., 2019; Abula et al., 2018; Cheung et al., 2020; Hunter et al., 2014; Knox et al., 2013).

Physical inactivity is considered as a global pandemic due to its significant contribution towards the incidence and prevalence of NCDs, and improvement in general wellbeing. There is an established causal relationship between physical inactivity and the development of hypertension, cardiovascular diseases, diabetes, colon and breast cancer as well as increase in BMI, and it accelerates the onset of dementia (Guthold et al., 2018). As a result of the numerous detrimental health outcomes of physical inactivity, the WHO, its member states and all stake holders have agreed to reduce the prevalence of physical inactivity by 10% by 2025 (WHO, 2018). It is therefore not surprising that several studies across the globe have affirmed the decline in physical activity and increase in physical inactivity among adults. A study conducted among Ethiopian adults with

a mean age of 32.0±12.2 years indicated that, 46% of the adults were physically inactive (Abdeta et al., 2019). Similarly, a Nigerian study that included 934 adults recorded a physical inactivity prevalence of 31.4% (Oyeyemi et al., 2013). To corroborate the global assertion of decline in physical activity and increase in physical inactivity, a bench mark study that included 358 studies from 168 countries with a population of 1.9 million estimated that, 27.5% of the world's adult population are physically inactive(Guthold et al., 2018). Specifically in Ghana, Afrifa-Anane et al., (2020) indicated that 29.0% and 11.2% of Ghanaian adults residing in the urban and rural areas respectively, are physically inactive. The recorded physical inactivity in the above cited studies and that of the global average are lower than that reported in this study. Findings of this study indicated that more than half (53.7%) of the participants were physically inactive. The disparity in the percentages of adults who are physically inactive between this current study and the previous ones could be largely due to the impact of the ongoing COVID-19 pandemic. Measures to curb the spread of the virus such as restriction of movements (lockdown), travel and changes in work schedule (working from home) favours physical inactivity. A study that assessed the impact of COVID-19 safety measures on physical activity among 3800 adults in Spain indicated that, vigorous physical activity and walking time decreased by 16.8% and 58.2% while sedentary time increased by 23.8% (Castañeda-Babarro et al., 2020). It is therefore imperative to ascertain the physical activity levels in this pandemic era to determine the true state of physical activity among adults to enable the implementation of pragmatic interventions to achieve the 10% reduction in PA inactivity by 2025 as stipulated by WHO and its member states.

Regarding the participation in physical activity of the three domains by gender, the results indicated that the percentage of males who participate in vigorous and moderate recreation and activities at work is higher than that of their female counterparts. However, more females

participated in activities involving travelling than that observed among their male counterparts. It is noteworthy that even though more adults engage in physical activity involving traveling and recreation than physical activity at work, the mean MET of physical activity at work was higher than that of recreation and travel. This implies that, the physical activity involving traveling the adults engage in are insufficient to meet the required levels. A possible explanation for this could be that although most health professionals advise their client to participate in physical activity activities that involves travel and recreation, they fail to educate them on the recommended levels that is clinically significant. As Ghana transitions from the pre-industrial state to an industrial state, where most vigorous and moderate activities at work will be performed mechanically, it behooves on exercise specialists, health professionals, public health practitioners and policy makers to implement policies and pragmatic physical activity behaviour change that will focus on physical activity involving travelling and recreation. These policies and programs to improve PA among adults should include education on physical activity recommendation and its benefits, motivation and fun components that includes communal activities as indicated by health professionals and the general public during the FGDs. In situations where restriction of movements become necessary, the use of traditional and social media, indoor games and physical activity that can be done within the confines of one's home and with family as a motivation should be encouraged to promote physical activity.

5.3 Factors associated with participation in physical activity among adults

Findings from this study indicated that there was a strong association between participation in physical activity and gender, age, marital status, having a child, education, occupation, sedentary behaviour, behaviour change and impact of COVID-19 pandemic. When these variables were

subjected to multiple regression analysis, gender, age, stages of physical activity behaviour change and sedentary behaviour were independent predictors of participation in physical activity.

To achieve a significant strive in the promotion of physical activity among adults globally, determinants of physical activity are being studied to target the appropriate interventions. Gender has been identified as a strong independent determinant of physical activity. This study indicated that females are 48% less likely to engage in physical activity than their male counterparts. Several studies in sub-Saharan Africa have reported a similar finding where males were more physically active than females (Abdeta et al., 2019; Oyeyemi et al., 2013). A more detailed study that included 358 studies across countries, sub-regions and continents indicated that globally 31.7% of females are physically inactive compared to 23.4% of males (Guthold et al., 2018). Particularly in sub-Saharan Africa including Ghana, the study found out that 17.9% of males were physically inactive while 24.8% of the females were physically inactive. The differences in the physical activity level between males and females according to Guthold et al., (2018) can be ascribed to their participation in the different domains and intensity of activities. While males are involved in vigorous activities at work and vigorous recreation, females tend to engage in lower-intensity activities.

Regarding age being an independent determinant of physical activity, this study found that adults aged 50–64 years are 21% less likely to engage in physical activity than those from 18–34 years. A previous Ghanaian study affirms this finding by indicating that physical activity decreases with increasing age(Afrifa-Anane et al., 2020). The authors attributed this to the aging phenomenon that is accompanied by decline in health as one increases in age; hence, younger adults find it easier to engage in physical activity than that observed with older adults. Similarly, an Indonesian study indicated that aging leads to decline in PA by 40%–80% due to loss of mass bulk and strength (Suryadinata et al., 2020). On the contrary, according to Abdeta et al. (2019), age was significantly

associated with physical activity in the Chi-square analysis; however, there was no significant association in the multivariate analysis.

One interesting finding of this study is that, stages of physical activity behaviour change independently influenced participation in physical activity. As one progresses from the pre-contemplation stage, contemplation stage, preparation, and action stage to the maintenance stage, the odds of participating in physical activity increases. It is worth noting that as one moves from the preparation stage to the action stage, the odds of engaging in physical activity increases by 4 times that of the preparation stage. The plausible explanation is that, at the preparation stage, the individual has gained knowledge about physical activity and starts preparations to engage in the activity but will not have started the action (Prochaska & DiClemente, 1983). Whereas at the action stage the individual will have engaged in physical activity for a period less than 6 months. At the maintenance stage, the odds of participating in physical activity is double that of the action stage. This is because at the maintenance stage, the individual will have engaged in physical activity for more than 6 months and therefore relapse is highly impossible, unlike the action stage where relapse can occur. Based on the above findings, physical activity programs should be targeted at behaviour change. According to Prochaska & Velicer (1997) behaviour change goes through the initial cognitive process and later behavioural process. Abula et al. (2018) found in their study that, cognitive process is initiated by the knowledge of physical activity recommendation, which affects the pre-action stages, while motivation influences the behavioural process that translates into the action stage. This explains why there was a significant association between physical activity and knowledge of physical activity recommendation in this study but this knowledge did not independently influence participation. The qualitative aspect of the study corroborates this finding as both the health professionals and the general public opined that education about physical activity

activity and motivation such as group/community activities could promote physical activity in adults.

Findings from the study also indicated that there was a significant association between physical activity and the impact of COVID-19. However, the multiple regression analysis did not establish any significant association. This is contrary to a Spanish study (Castañeda-Babarro et al., 2020) which established a decrease in the level of physical activity among adults especially during the lockdown period. The disparity could be due to the difference in the impact of the COVID-19 pandemic on the two countries.

5.4 Prevalence and factors that influence NCDs

The prevalence of NCDs recorded in this study was 26.7% with hypertension (22.7%) being the most prevalent, followed by diabetes (4.0%), dyslipidemia (3.1%), stroke (2.1%), heart diseases (1.5%), COPD (0.4%) and cancers (0.0%).

The prevalence of NCDs have been increasing at an alarming rate especially in Sub-Saharan Africa. This particular development is worrying due to its accompanied mortality rate, disability rate, loss of productivity and associated economic burden (Dalal et al., 2011). As a result, there is undue pressure on the already fragile healthcare system and the deteriorating economy of sub-Saharan African countries including Ghana. This poses a threat in the attainment of the WHO sustainable development goals (SDGs) especially poverty and good health (SDG 1&3) (Bosu, 2013). Therefore, all efforts are being made to curtail the rising incidence of NCDs. To implement any pragmatic interventions, epidemiological studies that assess the disease burden and its associated risk factors are paramount.

Several cross-sectional and systematic reviews conducted in Ghana have reported an increase in the prevalence of hypertension in the last three decades. Bosu, (2013) reported that between 1990 and 2010, newly diagnosed OPD hypertension cases in Ghana, excluding teaching hospitals increased from 60,000 to 700,000, accounting for approximately 1,166% increase. A systematic review conducted among Ghanaian adults, which included 11 studies indicated that the prevalence of hypertension ranges from 19.3% to 54.6% (Opoku et al., 2020). Therefore, the current prevalence falls within the range.

Similarly, diabetes is reported to be increasing, and currently, 150,000 new cases are diagnosed in the OPD yearly across the country (Bosu, 2013). The reported prevalence ranges from 4% to 9% among Ghanaian adults. This is in-line with the 4.0% recorded in this study.

Several studies have associated several factors to the development of NCDs. These factors include age, gender, income levels, educational status, alcohol use, smoking, air quality, access to quality healthcare, diet and physical activity (Bosu, 2013; Dalal et al., 2011; Tenkorang & Kuuire, 2015; Williams et al., 2018). Baird & Cooper, (2015) grouped these factors into genetic, environmental, behavioural, psychosocial, preconception and pregnancy.

This study reveals a significant association between NCDs and gender, age, BMI, marital status, having a child, educational status, occupation, alcohol, family history, sedentary behaviour and physical activity. However, a further multiple regression analysis established a significant association between NCDs and gender, age, marital status, alcohol consumption and family history. There have been divergent reports on which gender are at a higher risk of developing NCDs. These discrepancies have been attributed to the different risk factors associated with NCDs. For instance, more males smoke and consume alcohol than that observed among their female counterparts while more females are physically inactive than the physical inactive of their male

counterparts (Liu et al., 2017). In addition, females are exposed to post-menopausal hormonal changes and pregnancy-related NCDs (Baird & Cooper, 2015). A Chinese study, which included 8,401 men and 8,928 women, indicated that women were at a higher risk of developing hypertension, diabetes and heart diseases than that observed with their male counterparts while men were higher risk of developing stroke and chronic heart diseases than that observed with women (Liu et al., 2017). Other previous studies have reported otherwise. Specifically in Ghana Opoku et al. (2020) observed that males are at a higher risk of hypertension in the early stages of life, but females tend to have a higher risk during the post-menopausal age. This current study indicated that the odds of females developing NCDs is 2.5 times higher that of males. Physical inactivity, postmenopausal hormonal changes, obesity and low socioeconomic status can be possible reasons for this finding (Idris et al., 2021; Liu et al., 2017).

Age has been described as one of the strongest independent risk factors for NCDs. The study indicated that, with adults aged 18–34 years as a reference, the odds of developing NCDs diseases is 2.5 times higher in adults aged 35–49 years and 5.5 times higher in adults aged 50–64years. Thus, after every 15 years of the adult age, the odds of developing NCDs doubles. This study agrees with previous studies (Gyasi et al., 2020; Syed et al., 2019) that iterated that as an individual increases in age, the risk of developing NCDs also increases.

Another interesting finding in this study was that single adults were 41% less likely than married couples to develop an NCD. Furthermore, adults with no family history of NCDs were27% less likely to develop NCDs than those with family a history. In addition, the odds of developing NCDs in adults who have never consumed alcohol before is 0.22 times that of adults who have ever consumed alcohol. These findings are in line with previous studies (Aikins et al., 2014; Baird & Cooper, 2015).

Of much interest in this study is the association between NCDs and physical activity. The study found a strong association between NCDs and physical activity. However, when tested in the multiple regression analysis, no significant association was established. The result is quite surprising as previous studies have established a causal relationship between physical activity and NCDs. For instance, a recent systematic review and meta-analysis that included 3,439,874 participants from 36 studies found a strong causal relationship between physical activity and NCDs (Wahid et al., 2016). The authors indicated that an increase in 11.25 METs h/week for an individual who is inactive is associated with the reduction of the risk of NCD mortality by 23%–26% after adjusting for all factors. A plausible explanation is that the COVID-19 pandemic has generally affected physical activity among adults. Moreover, the sample size in this study and the mean age could have accounted for this difference.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

Knowledge of physical activity recommendation was very low among the adults and majority were in the pre-action stage based on the transtheoretical model. More than half of the adults were physically inactive according to the WHO requirement. The most prevalent NCDs among adults was hypertension.

Males were more likely than females to participate in physical activity. Young adults had higher odds of participating in physical activity than older adults. As one progressed through the stages of behaviour change, the odds of participating in physical activity increased. Adults who spent more than 5 hours participating in sedentary activities were less likely to engage in physical activity than that observed with those who spend less than 5 hours in physical activity. Other factors such as the impact of COVID-19 pandemic, knowledge of recommended physical activity, occupation, education, having a child and marital status were significantly associated with participation in physical activity.

Furthermore, females, older adults, single adults, adults with a family history of NCD and adults who had consumed alcohol before had higher risks of developing NCDs than that observed with males, younger adults, married adults, adults with history of NCDs and those who had never consumed alcohol before, respectively. Other factors such as physical activity, sedentary behaviour, BMI, occupation, education, and having a child were significantly associated with NCDs.

6.2 Recommendation

I. For clinical practice

Health professionals and public health practitioners in the Ledzokuku-krowor Municipal Assembly and Greater Accra region at large should include education on the recommended physical activity levels and the benefits of engaging in it in their clinical practice

II. For research

Further studies involving health professionals should be conducted to ascertain the knowledge level and attitude of health professionals towards physical activity

Experimental studies should be conducted to know which type of physical activity will be accepted and can be incorporated in the activity of daily living of adults.

III. For Policy

Supervisory bodies of health educational institutions should make provision for physical activity in their curriculum to improve students' knowledge of and attitudes towards physical activity, which will help in their later practice.

Cooperate institutions and other institutions whose work involve sedentary activities should make provisions that will encourage physical activity among their workers

Communities and organised groups such as churches and mosques should form keep fit clubs that will embark on regular physical activity.

National Commission on Civic Education should help promote education on participating in physical activity

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APPENDICES

APPENDIX A: Participant information sheet.

Title of Study: Physical Activity and Non-Communicable Diseases: Assessment of knowledge, Behaviour changes and participation Among Adult Attendants of the Out Patient Department of LEKMA Hospital.

Introduction: My name is Hosea Boakye, a senior physiotherapist at LEKMA Hospital, Teshie-Accra. I am currently pursuing a Master of Public Health degree at the School of Public Health, University of Ghana. My contact details are found below.

Background and Purpose of research: This is an academic study aimed at investigating the physical activity level and its association with the prevalence of NCDs among adults. The objectives of the study are to determine the knowledge of PA, PA behaviour change, level of PA and the prevalence of NCDs among adult Attendants of the OPD of LEKMA Hospital. This is attainable by using standardized questionnaire to measure the PA behaviour change and the level of PA. Knowledge of physical activity, prevalence of some selected NCDs and sociodemographic characteristics of the participant will be collated using a self-designed questionnaire based on literature. This study will provide a meaningful insight for health professionals and public health specialists in their quest to reduce the prevalence of NCDs using PA as one of the major determinants.

Nature of research: This is a mixed method study involving a cross-sectional study among adult Attendants of the OPD of LEKMA Hospital using a questionnaire. There will also be two different focus group discussions with 10 participants from the cross sectional study and 10 community health and public health specialists at LEKMA Hospital.

Potential Risks: There are no known risks or harm associated with participating in this study, since there are no sensitive questions in the questionnaire.

Benefits: The result of the study will provide clinicians and public health practitioners with indepth information about knowledge level, behaviour change and level of PA activity and its association with NCDs so as to plan interventions to improve PA activity level and to prevent or minimise the prevalence of NCDs. The information will also be beneficial to policy makers in planning interventions that will improve PA paticipation and eventually reduce the burden of NCDs.

Costs: There will be no additional cost in participating in this study except the transportation cost of the participants in the focus group discussions which will be paid by the researchers.

Compensation: There will be no compensation for participating in the study, except the participants in the focus group discussions who will be refreshed during the discussions.

Confidentiality: All information collected in this study will be given code numbers. No name will be recorded. Data collected cannot be linked to any participant in anyway. No name or identifier will be used in any publication or reports from this study.

Voluntary participation/withdrawal: Taking part in this study should be out of your own free will. You are not under any obligation to. If you choose not to participate in this study, it will not alter your current and future treatment in this facility. You may choose to withdraw from the

research at any time without having to explain yourself. You may also choose not to answer any question you find uncomfortable or private.

Outcome and Feedback: The outcome of this research will be made available to the Graduate School, University of Ghana, the research unit of LEKMA Hospital, the Ghana Health Service Ethical Review Committee and other stakeholders.

Who to Contact for Further Clarification/Questions:

Researcher– Hosea Boakye

Tel: 0244466360

Email: hoseaboakye@yaho.com

ERC Administrator – Nana Abena Apatu

Tel: 0503539896

Email: ethics.reseach@ghsmail.org

APPENDIX B: Consent form.

STUDY TITLE: ASSESSMENT OF PHYSICAL ACTIVITY KNOWLEDGE, STAGE OF BEHAVIOUR CHANGE, PRACTICES AND NON-COMMUNICABLE DISEASES AMONG ADULT OUT-PATIENT ATTENDANTS OF LEKMA HOSPITAL.

PARTICIPANTS' STATEMENT

I acknowledge that I have read or have had the purpose and contents of the Participants' Information Sheet read and all questions satisfactorily explained to me in a language I understand (English, Twi, Ga). I fully understand the contents and any potential implications as well as my right to change my mind (i.e. withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name of Participant……..

Participants' Signature ……..OR Thumb Print……

Date:……

INTERPRETERS' STATEMENT

I interpreted the purpose and contents of the Participants' Information Sheet to the afore named participant to the best of my ability in the (English, Twi, Ga) language to his proper understanding.

All questions, appropriate clarifications sort by the participant and answers were also duly interpreted to his/her satisfaction.

Name of Interpreter……

Signature of Interpreter…….. OR Thumb Print …….....

Date:……

For further information kindly contact:

Nana Abena Apatu
Tel: 0503539896

Email: ethics.reseach@ghsmail.org

STATEMENT OF WITNESS

I was present when the purpose and contents of the Participant Information Sheet was read and explained satisfactorily to the participant in the language he/she understood (English, Twi, Ga)

I confirm that he/she was given the opportunity to ask questions/seek clarifications and same were duly answered to his/her satisfaction before voluntarily agreeing to be part of the research.

Name:……

Signature…….... OR Thumb Print …….....

Date:……

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's name…….

Signature …….

Date…….

APPENDIX C: Global Physical Activity Questionnaire.

SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF GHANA

DEPARTMENT OF BIOLOGICAL, ENVIRONMENTAL AND OCCUPATIONAL HEALTH

This questionnaire is designed to assess the knowledge of physical activity (PA), PA behaviour change, PA levels, and selected Non-Communicable Diseases (NCDs)

Your candid answers are important to us and we therefore want you to be honest and truthful in answering the questions. If you decide to participate in the study, your answers will be kept confidential and will not be shared with anyone who is not part of the study team.

SECTION A- Sociodemographic characteristics

1. Gender : Male ( ) Female ( )
2. Age (completed years): _____
3. Marital status: Married ( ) single ( ) Divorced ( ) Widowed ( ) Cohabitation ( )
4. Do you have a child? Yes ( ) No ( )
5. If yes, how many ……..
6. Education Status: No education ( ), Primary ( ), Middle ( ), Secondary ( ), Technical/Vocational ( ), University degree ( )
7. Occupation: Unemployed ( ), Formal Public sector ( ), Formal Private sector ( ), Self-employed ( ), Retired ( ), Student/apprenticeship ( )
8. Height: _____ cm
9. Weight: _____ Kg

10. Where do you stay _____

11. Which tribe are you_____

12. Monthly income: ≤100 ( ) 101-999 ( ) 1,000-1,999 ( ) 2,000-2,999 ( ) >/= 3,000

13. Have you ever taking alcohol before? Yes ( ) No ( )

14. If Yes, how often? Occasionally ( ), regularly ( ), chronic alcoholic ( ), Stopped 6months< ( ) 6months> ( )

15. Have you ever smoked before? Yes ( ) No ( )

16. If Yes, how often? Occasionally ( ), regularly ( ), chronic smoker ( ), Stopped 6months< ( ) 6months> ( )

17. Have you been previously diagnosed of any of the following? Yes ( ) No ( )

18. If yes (**Tick all apply**)

Hypertension ( ), Diabetes ( ), Dyslipidemia ( ), Heart Diseases ( ), Stroke ( ),

Cancers ( ), Chronic Obstructive Pulmonary Disease (COPD) ( )

19. Do you know of any family member who has any of the conditions in 18?

Yes ( ) No ( )

20. If yes (**Tick all apply**)

Hypertension ( ), Diabetes ( ), Dyslipidemia ( ), Heart Diseases ( ), Stroke ( ),

Cancers ( ), Chronic Obstructive Pulmonary Disease (COPD) ( )

21. Do you know of any recommended physical activity level for adults to stay healthy?

Yes ( ) No ( )

22. If yes, what is the recommended PA level in terms of minutes per week?

_____

SECTION B- Physical Activity Stages of Change—Questionnaire

For each of the following questions, please circle Yes or No. Be sure to follow the instructions carefully.

Physical activity or exercise includes activities such as walking briskly, jogging, bicycling, swimming, or any other activity in which the exertion is at least as intense as these activities.

1. I am currently physically active. Yes ( ) No ( )
2. I intend to become more physically active in the next six months. Yes ( ) No ( )

   For activity to be regular, it must add up to a total of 30 minutes or more per day and be done at least five days per week. For example, you could take one 30-minute walk or take three 10-minute walks for a total of 30 minutes.

3. I currently engage in regular physical activity. Yes ( ) No ( )
4. I have been regularly physically active for the past six months. Yes ( ) No ( )

SECTION C: Global Physical Activity Questionnaire (GPAQ)

Physical Activity			
Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person. Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment. In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.			
Questions		**Response**	**Code**
Activity at work			
1	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like *[carrying or lifting heavy loads, digging or construction work*] for at least 10 minutes continuously?	Yes 1 No 2 *If No, go to P 4*	P1
2	In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	Number of days ⌊__⌋	P2

3	How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hours : minutes ⌊_⌊_⌋ : ⌊_⌊_⌋ hrs mins	P3 (a-b)
4	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking *[or carrying light loads*] for at least 10 minutes continuously?	Yes 1 No 2 *If No, go to P 7*	P4
5	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days ⌊_⌋	P5
6	How much time do you spend doing moderate-intensity activities at work on a typical day?	Hours : minutes ⌊_⌊_⌋ : ⌊_⌊_⌋ hrs mins	P6 (a-b)

Travel to and from places

The next questions exclude the physical activities at work that you have already mentioned.

Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship.

7		Yes 1	

	Do you walk or use a bicycle (*pedal cycle*) for at least 10 minutes continuously to get to and from places?	No 2 *If No, go to P 10*	P7
8	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	Number of days ⌊__⌋	P8
9	How much time do you spend walking or bicycling for travel on a typical day?	⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ Hours : minutes hrs mins	P9 (a-b)

Recreational activities

The next questions exclude the work and transport activities that you have already mentioned.

Now I would like to ask you about sports, fitness and recreational activities (leisure).

10	Do you do any vigorous-intensity sports, fitness or recreational (*leisure*) activities that cause large increases in breathing or heart rate like [*running or football,]* for at least 10 minutes continuously?	Yes 1 No 2 *If No, go to P 13*	P10
11	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (*leisure*) activities?	Number of days ⌊__⌋	P11

12	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours : minutes └─┴─┘ : └─┴─┘ hrs mins	P12 (a-b)

WORK PLAN FOR THE STUDY

ACTIVITY	TIME-FRAME
Proposal presentation	March, 2021
Writing of Proposal	April-June, 2021
Submission of Proposal ethical clearance	August, 2021
Training of research assistants and Pilot study	September, 2021
Data Collection	October-November, 2021
Data Analysis and write up	December, 2021
Submission	December, 2021

BUDGET FOR THE STUDY

Budget Category	**Unit Cost (GH₵)**	**Quantity**	**Total Cost (GH₵)**
Ethical Review	50		50
Transportation (Focus group)	40.00	20	800.00
Communication Cost	100.00	-	100.00
Research assistance allowance	250.00	3	750.00
Refreshment (focus group)	15	26	390.00
Training and pre- testing	200.00	1	200.00
Stationary and printing (Questionnaires)	500.00	-	500.00
Miscellaneous	200.00	-	200.00
Grand Total (GH₵)			**2890**