

UNIVERSITY FOR DEVELOPMENT STUDIES

**EATING PATTERN, PHYSICAL ACTIVITY AND NUTRITIONAL STATUS OF
POLICE PERSONNEL IN THE TAMALE METROPOLIS**

BY

GIFTY SELORM BANSAH

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POLICE PERSONNEL IN THE TAMALE METROPOLIS**

BY

GIFTY SELORM BANSAH (B. E. Vocational studies)

(UDS/MPHN/0004/17)

**DISSERTATION SUBMITTED TO THE DEPARTMENT OF NUTRITIONAL
SCIENCES, SCHOOL OF ALLIED HEALTH SCIENCES, UNIVERSITY FOR
DEVELOPMENT STUDIES IN PARTIAL FULFILMENT OF THE
REQUIREMENT FOR THE AWARD OF MASTER PHILOSOPHY DEGREE IN
PUBLIC HEALTH NUTRITION**

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JUNE, 2019

DECLARATION

I hereby declare that this thesis is the result of my original work and that no part of it has been presented for another degree in this University or elsewhere.

Gifty Selorm Bansah





(Student name)

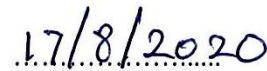
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Date

I hereby declare that the preparation and presentation of this thesis was supervised by me in accordance with the guidelines on supervision of the thesis laid down by the University for Development Studies.

Adadow Yidana (PhD)





(Name of supervisor)

Signature

Date



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I also want to thank my family members for their support and prayers.

May God bless all of you abundantly.



DEDICATION

To my family members, friends and loved ones.

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ABSTRACT

Police work is mentally demanding and stressful, which takes a heavy toll on the health of police personnel. This study was conducted to assess the eating pattern, physical activity and nutritional status of police personnel in the Tamale Metropolis. The study employed a cross-sectional study design. The study sampled 384 Police personnel in the Tamale metropolis using a simple random sampling technique. A self-administered questionnaire was used to collect background data, eating pattern and physical activity data. Anthropometric indices were measured using standard procedures. Data were analyzed using Statistical Package for Social Sciences (SPSS) version 21.0. Chi-square and Fisher's exact tests were used to test associations. Logistic modeling was used to test the strength of the associations. $P < 0.05$ was used to denote significance. Findings of the study revealed that majority of the police ate two main meals (83.3%), skip breakfast (74%), consumed alcohol (83.3%), ate foods belonging to the meat (86%), soft drinks (71%), fish (61%), grain (61%) and eggs (50%) groups and their diet were more moderately diverse (48.7%). The survey findings also suggest that most of the police personnel had moderate-intensity physical activity. Almost 66% of the police personnel had normal BMI while 20% and 6% were overweight and obese respectively. The results showed that, compared to police personnel who took breakfast often, those who took breakfast not always and none had significantly higher chances of being overweight/obese [AOR=2.00, 95% CI (1.35-2.94); AOR=1.80, 95% CI (1.21-2.68) respectively] after adjusting for covariates. Hard and very hard intensity physical activity had a protective effect on overweight and obesity: police personnel who were engaged in hard and very hard intensity physical activity still had lower chances of being overweight/obese [AOR=0.49, 95% CI (0.34-0.70); AOR=0.71, 95% CI (0.54-0.94) respectively] compared to their counterparts after adjusting for confounders. The study recommended that health education and screening exercise should be organized periodically for the Police personnel by the police leadership in the Tamale Metropolis, and police in Tamale should be encouraged to engage in regular physical activity.



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LIST OF ACRONYMS

ANOVA	Analysis of variance (ANOVA)
AOR	Adjusted Odds Ratio
ATP	Adult Treatment Panel
BF	Body Fat
BMI	Body Mass Index
CI	Confidence Interval
CVD	Cardiovascular Disease
GHS	Ghana Health Service
GSS	Ghana Statistical Service
MET	Metabolic equivalent
MOH	Ministry of Health
OR	Odds ratio
SES	Socio-economic Status
SSA	Sub-Saharan Africa
TV	Television
WC	Waist Circumference
WHO	World Health Organization
HDL	High Density Lipoproteins
LDL	Low Density Lipoproteins



CHAPTER ONE

INTRODUCTION

1.1. Background

Policing is an integral part and function of governments globally and are charged with the responsibility to maintain peace and security (Izzatun *et al.*, 2018; Jammanakatti and Eagappan, 2017) by making themselves available all the time to quickly respond to, and deal with challenging physical situations (Guffey, Larson & Lasley, 2012; Anderson, Plecas & Segger, 1994). To adequately execute their mandate, police personnel carry additional weights on their pistol belts such as a handgun, baton, mace, handcuffs, and Taser. This, therefore, requires the police to remain fit and healthy by engaging in moderate to vigorous physical activity at leisure time, which has been associated with health benefits among police personnel (Rennie, McCarthy, Yazdgerdi, Marmot, & Brunner, 2003). It is an important factor for the success of policing (Hoque & Babu, 2016).

Like occupations that manage crisis and emergencies circumstances, the physical demand of policing are higher than those occupations of an increasingly loosened up nature. From the uneventful watch to the physical reactions and activities required in basic occurrences, police officers must be truly equipped for playing out every such obligation effectively (Anderson *et al.*, 1994). In the eye of the public, police personnel are a symbol of the entire force. A fit officer sends the right message to members of the community and criminals for that matter. Be that as it may, overweight and obesity are on the flood among these staff (Earn, 2012) because of sporadic work hours, absence of schedules, exhaustion and erratic



occasions which hinder their endeavors to set up a solid eating routine and exercise propensities (Ramey et al., 2008). Overweight police officers accuse their condition of poor dietary propensities because of unpredictable dinner timing and absence of sorted out exercise program (Demling and DeSanti, 2000).

Additionally, police work like many other occupations that provide 24-hour service run shifts including night shift which is relatively longer than other shifts, meanwhile working longer hours has been linked to comorbidities such as obesity and metabolic syndrome (Gu et al., 2012). Indeed even though shift work is vital to meet numerous of the round-the-clock necessities of a utilitarian and progressively worldwide 24-h society, it isn't without fetched. Aside its effects on performance and fatigue, the role of shiftwork on health risks have been well documented (Kecklund & Axelsson, 2016; Kervezee, Kosmadopoulos & Boivin, 2020; Mason, Qian, Adler & Scheer, 2020). Indeed, shift work is linked to increased chances of obesity (Sun et al., 2018), hypertension (Manohar et al., 2017), diabetes (Gan et al., 205), and cardiovascular disease (Torquati et al., 2018). An extensive body of scientific evidence suggests that stress, poor diets and work environments that blend sedentary hours with sudden physical exertion make police officers more significantly vulnerable (Hastings, 2008).

Shift work among police personnel has also shown significant association with the prevalence of hard intensity physical activity among men and very hard intensity physical activity among women, with afternoon workers reporting the highest prevalence (Ma et al., 2011). The effect of shift work on irregular, poor dietary patterns in the police have also been reported (Starošítk, 2019).





Compared to people who work as it were amid the day, move laborers by and large have increased hazard of a run of wellbeing conditions counting weight, cardiovascular malady, peptic ulcers, gastrointestinal issues, a disappointment to control blood sugar levels, and metabolic disorder. At slightest a few of these complaints may be connected to the quality of the eat less and unpredictable timing of eating, be that as it may, other variables that influence digestion system are likely to play a portion, counting psychosocial stretch, rest obligation, physical dormancy, and deficiently time for rest and revitalization (Lowden, Moreno, Holmbäck, Lennernäs, & Tucker, 2015). The police are of no difference to this, they go through a lot of stress due to their shift work, transferable jobs and inadequate sleep. This often leads to inappropriate dietary practices (Rathi & Singh, 2018). In furtherance, it has been documented elsewhere that the shift work of police officers negatively affects their habitual physical activity, eating habits, stress level and amount of excess energy dispensed (Starošík, 2019) and for that matter their nutritional status. Besides, policemen are now and then posted outdoor of their locality on responsibility for lots of reasons. In this kind of situation, the food available to them may be inadequate and does no longer meet their nutritional wishes for some time. Insufficient, irrelevant nutrient intake for an extended length will cause illness due to nutrient deficiencies. This might also cause intense non-communicable diseases (Jammanakatti & Eagappan, 2017).

Hence early detection of modifiable risk elements is most important. Research has mentioned the outcomes of beside the point of physical interest amongst police employees together with metabolic syndrome, obese and obesity (Lim Yoo, 2007; Rathi & Singh, 2018). Policing is a very significant biophysical social mechanism in which insufficient diet can

affect individual performance and intellectual capacity; this may be of particular relevance to the quality of life in developing countries such as Ghana, where its people face a multitude of adverse nutritional, socio-economic, and cultural conditions (Hoque & Babu, 2016).1.2. Problem statement

Ofori-Asenso et al. (2016) recorded a high and growing prevalence of overweight (25.4%) and obesity (17.1 %) in the general adult population with a higher prevalence in urban areas than in rural areas in Ghana. At the regional level, overweight or obese was around 43.4 %, 36.9 %, 32.4 %, and 55.2 % of people in Ashanti, Central, Northern, and Greater Accra. The potential consequences for current and future public health, chronic disease burden, health care spending and broader economy may be immense for a world already dealing with many infectious and parasitic diseases. The situation among police personnel in Ghana is indifferent. Overweight among police officers in Ghana is on the rise, with more than a quarter being hypertensive and about two-thirds suffer dyslipidemia, high risk of cardiovascular disease (Essien, Lutterodt & Annan, 2019). Meanwhile, 22 per cent of police officer deaths are caused by heart disease (Hastings, 2008). To recognize contributors to the global burden of non-communicable diseases (NCDs) such as diabetes, cancer, and cardiovascular diseases that are hitting hardest in low- and middle- income countries such as Ghana, individual responsibility in the form of physical inactivity cannot be overlooked, among others. However, little is known about the dietary habits, physical activity, and nutritional condition of Ghana police officers, particularly Tamale Metropolis. Hence, this study investigated the pattern of eating, physical activity and nutritional status of police personnel in the Tamale Metropolis.



1.3. Research Questions

1. What is the eating pattern of police personnel in the Tamale Metropolis?
2. What is the physical activity of police personnel in the Tamale Metropolis?
3. What is the nutritional status of the police personnel in the Tamale Metropolis?
4. What is the relationship between nutritional status, physical activity and dietary behavior of police in Tamale?

1.4. Objectives

1.4.1 Main objective

The main objective of this study was to investigate the eating pattern, physical activity and nutritional status of Police personnel in the Tamale Metropolis.

1.4.2 Specific objectives

Specifically, this study:

1. Assessed the eating pattern of police personnel in the Tamale Metropolis.
2. Determined the physical activities of police personnel in the Tamale Metropolis.
3. Evaluated the nutritional status of the police personnel.
4. Determined the relationship between nutritional status, physical activity and dietary behavior of police in Tamale.



1.5. Significance of the study

Professions such as police demand police officers remain fit to work because they regularly encounter physical challenges: chase suspects fleeing; climb over the fences and to the rooftops; subdue arrestors; and pile up heavy items, such as stolen property, which have been recovered. Such everyday work requirements include strength and endurance gained by a variety of exercises. The requirement that staff must bear heavy objects of extra weight on a weapon belt adds to this practical challenge: handgun, baton, mace, handcuffs and Taser. The findings from this research will provide valuable insight into the staff that could be expected to be active in implementing food-related programs and, thus, to establish successful diet management plans for the police force in Tamale. They expect to reduce the health risks and higher incidence of overweight, obese and non-communicable diseases as eating patterns of the police force are changed.

1.6. Conceptual framework of the study

Several factors predict the eating pattern, physical activity and nutritional status of populations and these factors influence each other in different ways. However, in this study, the factors of interest have been summarized below in a conceptual framework.

The factors affecting the eating pattern, physical activity and nutritional status of populations occur directly or indirectly or both. For example, the socio-economic and physiological factors affect the anthropometric indices by influencing both physical activity and dietary intake whereas physical activity and dietary intake affect the anthropometric indices directly. The interplay of these factors impacts eating pattern, physical activity and nutritional status in several ways. An explicit understanding of the relationship between these factors will provide



evidence to support context-specific policies, programs to improve the eating patterns, physical activity and nutritional status of populations.



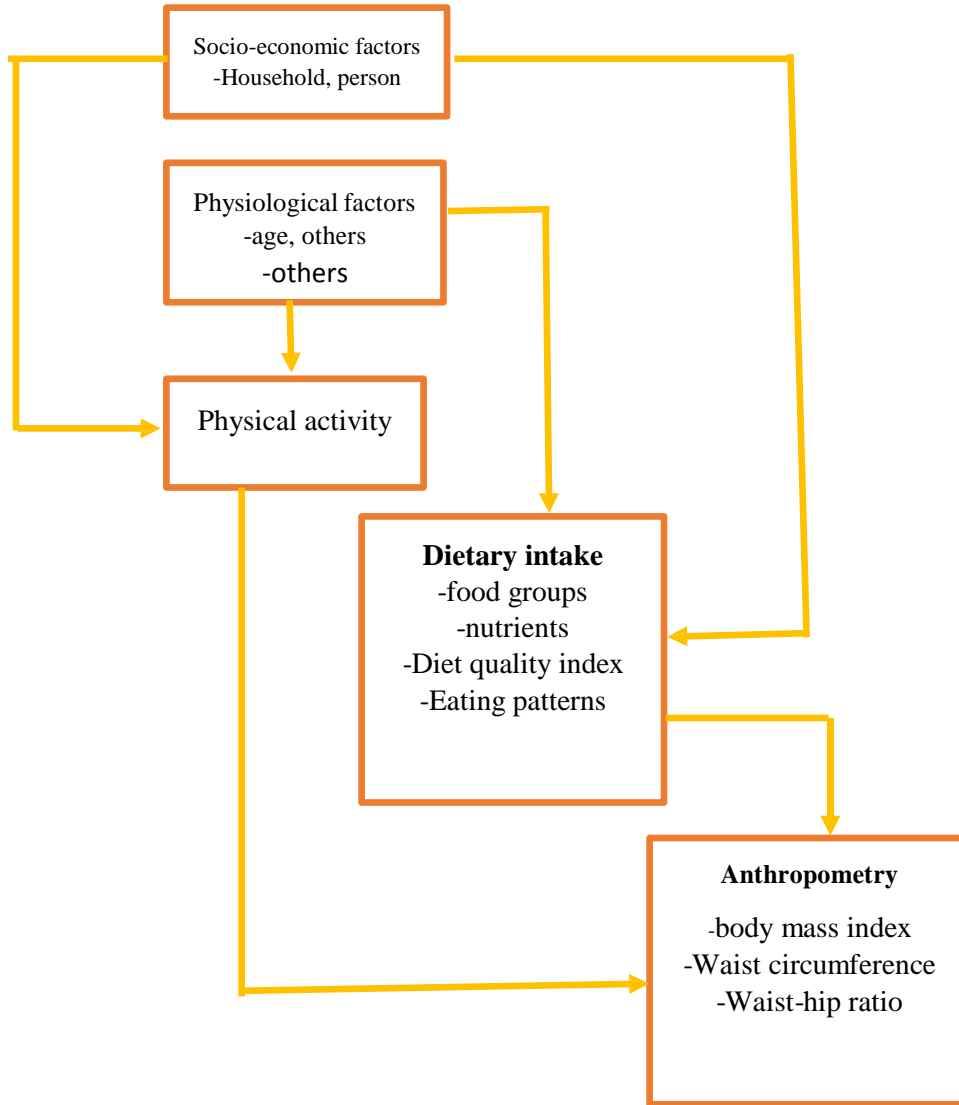


Figure 1: Conceptual framework

Source: Author's construct based on Literature review, 2019

1.7. Scope of the study

The study only focused on the eating pattern, physical activity and nutritional status of police personnel in the Tamale metropolis. The researcher set to; assess the eating pattern of police personnel, assess the physical activity of police personnel, determine the association between eating pattern and nutritional status (BMI) of police personnel and determine the association between physical activity and nutritional status of police personnel in the Tamale metropolis. The scope was set to collect data considering the time and work schedule of the researcher.

1.8. Definitions of key terms

Influence: Persuade to go a particular line

Junk food: Food containing a large number of calories from sugar or fat with little fibre, protein, vitamins or minerals

Metabolic equivalent (MET): The ratio of a person's working metabolic rate relative to the resting relative rate

Non-communicable disease: A disease that is not transmitted from one person to another directly

Obesity: Having a BMI of at least 30 kg/m²

Overweight: Having a body mass index (BMI) of at least 25 kg/m²

Physical activity: Any bodily movement produced by skeletal muscles that result in caloric expenditure



Physically active: Attaining a physical activity threshold of at least an average of 7,500 steps per day for a seven-day period

Police: Trained person responsible for the prevention and detection of crime and the maintenance of public order

1.9. Organization of the thesis

The thesis is organized into six chapters. The first chapter presents the research subject and presented the context of the analysis, described the main issue under investigation and asked the related research questions. It also set out the specific goals of the research, the importance of the study, its scope, and the conceptual framework and definition of terms.

The chapter is important to the research, as it reflects on the analysis and aims to track discrepancies. A review of the relevant literature was presented in the second chapter. This chapter helped the researcher with the knowledge required to establish a research methodology. The subsection in the chapter includes an introduction, eating pattern of police personnel, physical activities of police personnel, nutritional status of police personnel, the association between eating pattern and nutritional status (BMI) of police personnel, the association between physical activities and nutritional status of police, Ecological Systems Theory and summary of the literature reviewed.

Chapter 3 addresses the research methods implemented in the report, the data sources, the techniques for data collection used, sampling technologies, core data variables and data interpretation, among other factors, and ethical concerns. The chapter gave a guide to how the research was performed.



The fourth chapter presented the data analysis. The analysis of the data was done based on the research questions. This generated certain thematic areas relevant to the study. This is a very important research chapter because it provides information to answer the questions posed. The results are discussed in Chapter five and the study summaries, conclusions and recommendations are provided in Chapter six. Appendices for the consent form, research instruments, ethical approval etc. are however available.



CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

This chapter presents a review of related studies on the research topic. The literature was reviewed on the following thematic areas: eating pattern of police personnel, physical activities of police personnel, nutritional status of police personnel, the association between eating pattern and nutritional status (BMI) of police personnel and association between physical activities and nutritional status of police personnel. The theoretical foundation of the study and the summary of the literature reviewed is also included in this chapter

2.1. Eating pattern of police personnel

Health and lifestyle habits often change when employees like police work in unconventional hours. It is not uncommon to sleep during the day and eat at times considered unusual by most of the population. What, when, how much, and how often a person eats are factors that comprise one's eating patterns, and these can be affected by working shifts. The concept of dietary habits or eating patterns is complex and multi-dimensional (Reynolds & Shifflett, 1986). In their comprehensive analysis, Lowden et al. (2015) also recommended that changing staff like the police consume breakfasts before bedtime to prevent waking due to hunger, stick to regular food consumption habits between day and night, split the 24-hour consumption into food activities with three complete meals, each supplying 20-35 % of the 24-hour intakes; To ensure that the use of comfort foods and high carbohydrate foods during the shift is not over-dependent since diets with a high carbohydrate can have adverse metabolic impacts by increasing triglycerides and reducing LDL. In the study, they



recommended that the most meat they consume, the better calories would gain, and the healthier foods such as organic soups, vegetables, fruit bowls, pasta, sandwiches, cottage cheese or cheese (with fruit bunches), scrambled eggs, nuts and green teas (promoting antioxidants), the more they would consume, the more they would be able to eat and the safer they would be eating. Willett & Stampfer (2013) have shown that, unlike today's highly processed products and sugar, these products are detrimental to the quickly evolving insulin levels from quick digesting and absorption to foods that have fiber and micronutrients, they are best equipped to prioritize whole-grain and other less processed and complex carbohydrates. The most adverse health consequences are higher intakes of refined starches and low intake sugar with trans fatty acids. Police employees, however, tend to use high-fat and high-sugar foods (Earn, 2012).

Previous studies show that, overall, shift workers' overall energy intake is similar to that of day labour, with the latest findings confirmed by (Cervinka et al., 1984; Attia et al., 1985; Romon-Rousseux et al., 1987) (de Assis et al., 2003; Waterhouse et al., 2003; (Esquirol et al., 2009). While the actual intake of energy tends to be untouched, shift work will impact the consistency of diet. Macronutrient consumption alterations such as increased saturated fat intake (Esquirol et al., 2009) and decreased intake of polyunsaturated fat (Linseisen & Wolfram, 1994) and dietary fiber were found following the introduction of change activities (Knutson, Andersson, & Berglund, 1990). Besides, decreased intakes of several essential micronutrients, such as vitamins A, D and E, and Zn is documented among shift workers, relative to day workers (Linseisen & Wolfram, 1994). Furthermore, there has been a decrease consumption by shift workers compared to day Labourers of a variety of essential micronutrients, such as vitamins A, D and E and Zn (Linseisen & Wolfram, 1994). Moreover, one study indicated a significantly more pro-inflammatory diet for shift workers and, in



particular, rotating shift workers (Wirth et al., 2014), but this biological significance for dietary inflammatory load remains a controversial problem. Alongside food quality shifts, other new studies have shown that changing workers are isolated from day laborers in terms of their 24-hour energy consumption (de Assis et al., 2003, Pasqua & Moreno, 2004; Esquirol et al., 2009). Flawed meals, increased energy consumption and increased snacks later in the afternoon are common, with several snacks consumed in place of a full meal during the night shift. It is important to understand the importance of these modified dietary habits. There is strong evidence that evening meals can contribute to endogenous circadian cycles in comparison with daytime meals (Simon, Weibel & Brandenberg, 2000; Morgan et al., 2003), which in comparison with day shifts can contribute to substantially higher plasma glycosis rates. This can have adverse effects on health, particularly in the case of insulin resistance risk, type 2 diabetes mellitus (T2DM), and metabolic syndrome (MS).

Evidence gathered from scientific research revealed that police personnel do not get the recommended sleep and eat four fast meals per week due to their shift work (Tewksbury & Copenhaver, 2015). Consequently, it has been recommended to restrict the fat intake of staff not prepared for night-shift jobs at night (Al-Naimi, Hampton & Richard, 2004).

In a cross-sectional survey of 100 police in Bangladesh the findings found that almost all respondents had a sedentary lifestyle, almost everyone consuming rice two to three times a day and none consuming rice meat two or three times a day. Less than half of them took bread once a day and about 40 % took potatoes once a day. Therefore, roughly 50% of these people took poultry 2-3 days a week and once a week ate beef and mouton. More than half of the respondents had egg and fish once a day (Hoque & Babu, 2016). In validation, a survey to test university students who have undergone military training in Malaysia's diet and physical



exercise has shown that respondents have strong eating and food consumption skills except for erratic food time (Rashid, Rahman, Kasim, Aida & Mustapha, 2011).

In developing countries, many police suffer from divergent forms of malnutrition-related to insufficient food intake largely due to their work schedules (Alkoly et al., 2011; Ambrosini, 2013). The goal of improving the eating routine and a decent balanced diet among the policemen is adequate awareness about the food choices made and food safety (Jammanakatti & Eagappan 2017). To achieve and maintain good health, police must have basic knowledge about the importance of proper food habits for their health (Anderson et al., 1994).

Studies have shown that meal skipping has been common among police, especially during middle and late ages where the desire for certain body image reached a certain level (Jammanakatti & Eagappan, 2017). Studies suggest that limited amounts of Trans- fats come from ruminant animal products, but in the most diet, free fatty acids are derived by the partial hydrogenation of liquid vegetable oils, which can raise (LDL) and decrease (HDL), and thus researchers conclude that partially hydrogenated oils will remove trans- fat. Trans- fats are therefore to be removed from the process. (Stampfer, 2013).

Insufficient eating habits may have a huge impact on police overweight/obesity. It may be because of its high energy density and its low nutritional content, the impact of fatty foods on the BMI's benefit. Besides, by promoting excess consumption the taste of these foods can gain weight (Patra, Rao and Pradesh, 2012). Excess consumption of salt (sodium chloride) is irrefutably linked to high blood pressure which is most common with foods eaten by people on duty out of the home. A review on healthy eating by Willett & Stampfer (2013) estimated that, a reduction 3g per day of salty and pickled foods would reduce the incidence of stroke by 22% and of cardiovascular heart diseases by 16% and that, many



case-control studies have associated the consumption of salty and pickled foods with stomach cancer.

Breakfast is the most frequently missed meal among the police, according to Anderson, Plecas, and Segger (1994), since there are no time for officers, having to sleep later in the morning, a lack of appetites and a loss of weight in the diet. Studies by Giskes et al. (2005) found that 74% of women and 28% of men missed breakfast for no cause during survey day in the police division.

Research undertaken by Jahnavi et al. (2012) to assess police eating habits revealed that 33.8% of respondents had taken two meals a day, 63.5% had three meals and 2.7% had four meals a day on a regular day. Although 1.4% had one meal a day at weekends, 23% had two dinners, 62.2% had three dinners, 12.2% had four dinners, and 1.4% had fifteen meals a day. The findings indicate that more participants had three meals a day during the week and weekends. Such reports suggest that most female police officers did not provide the required regular meals. The findings show that most professional officers have time to eat in the evening (85.1%). They tend to get more than those who snack before work in the morning(58.1%).



2.1.1 Dietary Energy Constituents: The Macronutrients

The energy value of a diet has been very closely associated with the fat content of a meal; that is, foods rich in fat are typically high in energy (Skidmore, 2007). Besides, fat is the most energized macronutrient with 37.7 kJ per g and is generally advised to consume a low-fat diet in the case of weight loss and to minimize cardiac risk factors (e.g. higher blood pressure, blood cholesterol, and glucose). Results of several studies also indicate that low-fat diets were more successful than low-carbohydrate or low-protein diets for weight loss (Skidmore, 2007). Many observational trials, on the other hand, revealed contradictory results about the relationship between fat consumption and excess weight gain or obesity (Summerbell et al., 2009). Some have demonstrated, which may be due to factors beyond the intake of nutrients such as susceptibility to an organism, and to unusual genetic factors (Farooqi et Al, 1999), not that anyone in the high fat intake should be overweight or obese (Pavlou et al., 89; Wadden et al., 1989; Blundel et al., 2005). Any of these causes have been studied by people who eat a heavily fat diet regularly. The authors note a reduced degree of satiety in those with a higher BMI, a greater appetite for food and food satisfaction and behavioural differences, including the propensity to consume bigger meals and smaller fine meals, as well as snack hours (Blundell et al., 2005). The results of previous studies showed that fat consumption could contribute, in physiological terms, to increased organ fat through poor satiator capacity and lower physiological fat intake regulation over carbohydrate (Stubbs & Whybrow, 2004; Drewnowski, 1998). While several authors refuse to establish correlations between dietary fat and body weight due to limitations, and to a skewed under-reporting of these correlations in epidemiological trials (Willet,



1998; Bray, 1998; Seidell, 1998), many long-term studies indicate a moderate to significant weight reduction in low-fat dietary treatments. The effectiveness of these fat- low diets is attributed to the fact that the overall calorie consumption of the diet has been lowered (Astrup et al., 2008; Howard et al., 2006).

The individual has a diet that is typically low and demonstrates a fairly stable carbohydrate percentage that is inverse to the intake of fat (Astrup & Raben, 1995; Benton, 2005). The effect of carbohydrate is distinct from the ingest form of carbon intake, easy to complex, or liquid to a firm, in weight management and appetite (Colditz et al., 1990; Ludwig, 1999; Saris et al., 2000; Di Meglio & Mattes, 2000)). Many experiments have shown that high fiber complex carbohydrates and body weight and/or body fat are in an inverse relationship (Howarth et al., 2001; Slavin, 2005). Intervention trials have also demonstrated that high-fiber rice, fruit and vegetable diets can help minimize weight (Howarth et al., 2001; Liu et al., 2003). Increased fruit and vegetable intake, the risk of short-term blood pressure was reduced by a retrospective analysis (MuBorgraki, Satija, Willett, Rimm & Forman, 2016). Such beneficial outcomes of complex carbohydrates can be attributed to several causes, especially their capacity to improve satiety and thereby decrease energy-dense and fatty food consumption (Skidmore, 2007). This influence may be correlated with the incomplete digestion and energy absorption of this carbohydrate form (Pareira & Ludwig, 2001). Complex carbohydrates have also been shown to enhance afterprandial blood glucose and insulin reactions and affect the gut hormone of appetite control, cholecystokinin (Frost et al.,2003). Scientists have on the other hand proposed that refined carbohydrates intake can influence the metabolism of serotonin and induce appetite, low mood, and obesity (Wurtman & Wurtman 1984).



Protein is the satiating of all macronutrients and the hunger and subsequent intake of energy are also decreased as protein preloads are consumed (Lejeune et al., 2005; Bowen et al., 2006). However, there were no significant correlations between the consumption of protein and the resulting adult weight shifts in the cohort studies (Branca et al., 2007b). No statistics on the relative effect on body weight of the intake of protein from both animal and vegetable sources (Branca et al, 2007b).

2.1.1 Energy dense foods: fats, oils and sugars

The consumption of nutrients is controlled by food preferences, with the attention of the investigator shifted in the last few years to the nutritional energy value, i.e., the energy content per unit weight. In brief laboratory trials, clandestine rises in dietary energy density have repeatedly been shown to improve the random and passive power intake (Stubbs et al., 2000; Bell & Rolls, 2001; Skidmore, 2007). Physiological experiments have demonstrated that individuals cannot understand energy-rich foods and are thus unable to control them in the short term. This will pave the way for the development of adipose tissues over time by daily ingests of vast amounts of these foods (Prentice & Jebb 2003; Stubbs et al., 1995a, 1995b).

The intake of high-fat and sugar foods in the developed world is on the rise during the dietary transformation. The diet becomes more energized and rich Sweeter and fiber-processed forms of food are replaced by (Popkin, 2006; Sibai et al., 2010).



The transition of nutritional sources to inexpensive food can be due to this change (Drewnowski, 2003; Misra & Khurana, 2009). The relationship of energy efficiency to diet intake was analyzed in which a higher consumption of processed foods, oils, sugars, desserts, i.e. food products that in most countries are less energy expensive per unit, and lower consumption for fruit and vegetables, i.e. food items that in most cases require more energy per unit, was correlated with higher consumption. The consumption of sugar-sweetened beverages, whereby cross-sectional and longitudinal research data indicates a strong positive link to overweight and obesity in adolescents, teenagers and adults, is of great concern in the dietary transformation (Malik et al., 2006) (Vartanian et al., 2007; Malik, 2009; Hu and Malik, 2010.). Real tests have found that decreases in the consumption of these beverages have resulted in weight loss for both children and teenagers (Malik et al., 2006).

Interestingly enough, a new retrospective study has found that only 100 % fruit juices contain sugar and calories that are as high as candy sodas and soft drinks. Those who increased their intake of fruit juices over the years were more significant than those who hadn't been followed for up to 20 years among male and female participants (Mozaffarian et al., 2011).



In the US population, in conjunction with the obesity outbreak, consumption of sugar-sweetened soft drinks has increased, and Europe is known to account for 31 per cent of total global soft drinks (Bes-Rastrol et al., 2006). Research in Lebanon is very rare, if not insignificant, for the consumption of sugar-sweetened drinks including soft drinks. Yet, in a global school health survey commissioned by the Ministry of Health, 33 % of 7-9 grade students consume carbonated soft drinks twice or more a day (Abi Haidar et al., 2011).

Food consumption surveys in several MENA countries, such as Saudi Arabia (38 per cent) and Egypt (> 30%) showed a growing trend in energy use, particularly oils (Hassan et coll., 2006).

2.2. Physical activities of police personnel

Studies linking police work and its physical demands have proliferated in the literature (Arvey, 2014; Bissett, Bissett, & Snell, 2011; Lagestad & van den Tillaar, 2014) and that police personnel's physical abilities constitute an important step in their selection and hiring. However, variations exist in the kind of physical abilities that are required by police personnel.

Physical activity has been defined as any movement of the body where energy is expended, performed Physical activity is characterized as any movement of the body that requires energy, either as physical labor or for the sake of pleasure (Pescatello, 2001). Physical exercise may be both structured: regulated, routine and intense exercises normally undertaken or unstructured within a system. These include a wider notion of lifestyle practices in various areas, including domestic and gardening tasks, biking and cycling for commuting or recreation, as well as work involving physical activities. The individual's overall physical activity covers all hard labor, domestic and other activities, as well as travel, recreation and sports (Gebel et al., 2005).

Various studies have shown that poor physical activity is a significant risk factor for chronic diseases (Patel et al., 2010). A body of evidence has found that physical exercise that makes up less than 10 % of the overall daily expenditure on energy is deemed





inadequate to sustain healthy health (Varo et al., 2003; Warren et al., 2011).). It was also developed that physical exercise requires at least 25 minutes per day to conform with the guidelines generally agreed (León, Rodríguez-pérez & Rodríguez-benyumeda, 2007). For the police, existing research shows that participation in physical fitness by police officers is important for three primary reasons: firstly, to enable police officers to train more efficiently, secondly, to tackle circumstances of work-related need, secondly, to take care of their wellbeing and, finally, to improve their psychological well-being (Lagestad & van den Tillaar, 2014). For police, there is evidence that the presence in physical activity by police personnel is important for three main reasons: firstly, it allows police personnel to properly prepare; secondly, it enables police personnel to cope with the working conditions required to exert physical strength; secondly, it takes care in their wellbeing and, ultimately, it improves their psychological well-being (Lagestad & van den Tillaar, 2014). Arvey (2014) has recorded a variety of physical actions during police activity, with the most frequent physical activities mentioned being grappling, pushing, dragging, running and punching. Police officers referred to carrying, moving, pushing, pulling and carrying as the most difficult physical activities in another report by Bissett, Bissett and Snell (2011). The tests further indicate that, police officers are sufficiently fit to expect from the public. The present research suggests that policemen who will carry out the order at the highest planned pace are in outstanding physical health and conduct daily workouts (Holgersson, 2008). This result gives weight to many physically taxing researches. As a general theory in politics (Lagestad & van den Tillaar, 2014), Stenvik (2002) proposed that sedentary labor weakens some of the job roles and physical activity involves an optimal level of execution of activities, the results of Stenvik showed that in



the military the sedentary workers of navy vessels were incorrectly assessed after four weeks at sea in the average volume of oxygen, heart rate variation, and concentration and working memory. There were no unfavorable outcomes from the test group, made up of soldiers on the ground. Kong and colleagues have also observed that aerobic and endurance firefighters are doing better than others who don't have any physical exercise (Kong, Suyama, Cham and Hostler, 2012). From a wellbeing point of view, the effects of physical exercise are well known. Work on physical activity has naturally related inactivity to bad health (Dugdill, Crone & Murphy, 2009). Physical fitness is a vital element in ensuring that people and police officers adopt a safe lifestyle (Lim Yoo,2007).

During its research, nearly half the police officers during Norway found that they had used their spare time for the avoidance of sickness. Støren and Sunde (2003). Fitness and physical endurance training are likely to be more essential for police officers than high-powered training to protect sedentary police and shift jobs from health issues (Anderson et al., 1994; Birzer, 2016). Lönn and others (2006) also found that the average rate of the pulse of Swedish police officers has 66 beats per minute and an effective pulse of just 8 minutes for one day of service. However, another study has found that general wellbeing, which decreases the risk of accident and disease is more critical than physical ability in the police (Prenzler, 1996). Berg et al. (2006) reported that more subjective health complaints had been made by police officers than did general public and doctors. Berg submitted that this finding could indicate that after completing their police education police officers did not give the same priority to physical training. Research on the trends of physical activity among Norwegians has shown that the proportion of physically active Norwegians substantially decreases with a rising age before the mid-life



(Fasting & Sand 2015). Ligestad (2003) reported a lifespan decrease in participation, with the largest reduction in the age groups of 25–29. Similar patterns have been shown in other research (Breivik & Vaagbø, 1998. Most individuals are joining employment in this age range, as well as police trainees who usually complete police education in their mid-1920s. Ligestad (2011) has been seen to train regularly in the Norwegian Police University College by police students. Five days a week or more, about half of the students trained, and the other half, two to three times a week. Most had specific expectations on both their physical fitness and wellness plans, which they wished to do. Ligestad found that. police officers were much more involved than civilians. Studies from elsewhere (Wählman, 2005; Tärnklev & Widing, 2010) have confirmed the observations.

In their longitudinal study involving police staff as trainees, Ligestad and colleague observed, three years after training, that there were significant changes in the frequency of physical activity and priority level of training forms during the three-year work as police officers. During that time, the proportion of senior active officials declined in their three years as police officers. A decline in the use of targets and training programs was also observed. Over the same period, the proportion of participating low- and medium- level officers increased to 10 per cent. In this period, the use of training programs and goal-oriented courses was also reduced. The study participants reported reduced use of the aims and structured training schemes after three years of working as police officers. Moreover, over that period, the priority level of the training type has changed greatly. During this period, endurance training, sprint and strength training has been increased and the strength and construction of the batteries have been achieved (Ligestad & van den Tillaar 2014). There is a mixed picture that documented proof of the effects of shifts on physical activity. The studies reported negatory or no effects in shift workers' physical activity relative to day



workers (Bushnell, Colombia, Caruso, & Tak, 2010), or positive or non-effects (Karlsson, Knutsson, Lindahl & Alfredsson, 2003). Nonetheless, the meanings of physical activity used may lead to these false findings, at least in part. Various steps are used: leisure time, daily tasks, full activity and/or work. Even if studies analyzed work and leisure activities, there were differences in results. Some have reported shifting employees having significantly increased occupational activity compared to the day labor force, resulting in a significant increase in the overall total activity (Peplonska, Bukowska, & Sobala, 2014). While others have reported that shift workers had lower occupational activity but higher leisure-related activity (Barbadoro et al., 2013). Although there is little data, barriers have been studied in this community to the participation in daily physical activity. Shift staff may find it difficult to adopt and sustain active lifestyles, including exhaustion due to a challenging schedule, difficulties with exercises or in a team sport, potential increased exercise, and tiredness during the night or early morning exercise. (Atkinson, Fullick, Grindey, Maclaren, & Waterhouse, 2008) (Kaliterna et al., 2004) another concern may be the lack of resources available to shift staff and the police at times. The health consequences of an inactive lifestyle are wide, with unquestionable evidence that regular exercise is effective in the prevention and premature death of chronic non-communicable conditions (Warburton, Nicol and Bredin, 2006). In cases of physical failure, the risk of chronic disease among police officers may, therefore, be exacerbated.

Physical exercise is a central occupational necessity for general duty police work and frequently includes walking, climbing staircases, moving objects, twisting / turning, pulling / pushing, jumping, bending, squatting and kneeling, and raising and carrying (Anderson, Plecas and Segger, 2001). Moderate to intense physical activity in leisure time is also correlated with a decreased risk of metabolic syndrome diagnosis (Rennie et al., 2003).



Also, raising fitness levels and increasing obesity rates by coordinated physical activity programs result in lower workplace health care expenses. Notably, physical exercise tends to reduce the onset of medical conditions, thereby reducing absenteeism in the workplace. A Minneapolis Police Department personnel analysis evaluating health and injury showed that those deemed more physically fit were less likely to suffer musculoskeletal injuries, such as sprains, back pain and chronic pain (Nabeel et al., 2007). Workers in their leisure time who were more physically active reported a decrease in absenteeism compared to those who were not active (Ludovic et al., 2006).

Research by Soroka and Sawicki (2016) indicates that police officers have high rates of physical activity that they develop and retain during their police career during the initial training. Syafika & Sarina (2016) conducted a study among police personnel and trainees in confirmation and found high rates of physical activity between them. In comparison, Rashid et al., (2011) found that 73.6 % of military personnel were engaged in light activities, 19.7 % were involved in moderate activities and 7.4% were involved in heavy activities. Regular physical activity is an effective means of reducing waist circumference, visceral fat, and subcutaneous fat (Ross et al., 2004). Besides, physical activity helps to reduce both weight gain and weight loss (Hansen, Dendale, Berger, Loon, & Meeusen, 2007), and eventually avoid obesity (Wing & Hill, 2001).

The recommended dose of physical activity needed to prevent adverse health effects is moderate intensity of 150 minutes within 7 days (Samitz, Egger, & Zwahlen, 2011). The volume of activity can be measured in various ways, such as leisure time activity (i.e. recreational and sports events), job activity or everyday life tasks (i.e. domestic responsibilities) (Howley, 2001). Accumulating physical activity in each of these fields offers similar health benefits and can minimize mortality risk (Samitz et al., 2011).

2.2.1 Energy Balance: Energy Consumption and Energy Expenditure

Obesity has been recognized as an unavoidable human natural result of the plentiful, cheap, and energetically advanced worldwide food flexibly, combined with mechanical advances prompting a decrease in every day physical action rates (Drewnowski and Darmon, 2005; Ulijaszek and Lofink, 2006).

In any case, an exploration issue stays: to what degree do changes in physical movement versus increments in vitality utilization cause an ascent in body weight (Finucane et al., 2011)? Numerous specialists likewise censure this ascent for expanded physical idleness and others for over-utilization of vitality, both connected to specialized developments; they additionally accuse evolving socio-segment factors (Bleich et al., 2008). Bleich et al (2008) perceived the impact of overconsumption related with vitality awkwardness on certain advancement highlights, for example, lower food costs, expanded urbanization identified with increasingly inactive ways of life, and expanded nation net improvement items among created and creating nations. Other than overconsumption, the pervasiveness of physical latency among most MENA nations is high, as expressed by the WHO/EMRO managed Stepwise reviews (WHO, 2009). Segment information for nations of the Eastern Mediterranean locale indicated that with urbanization, occupations requiring physical action have declined to progressively stationary ones (Musaiger, 2011). Expressly, there are three essential segments of vitality consumption: basal digestion, thermogenesis, and physical action; just the last has a critical deliberate control measurement (Prentice and Jebb, 2004). Vitality admission then again is willful except in clinical conditions. Hence, just two factors of the vitality balance condition are modifiable: physical action and food admission; each is a complex bio-conduct wonder subject to hereditary, physiologic and segment impacts (Prentice and Jebb, 2004). It is delineated that low degrees of physical action or high latency are



significant drivers of positive vitality balance, yet don't without any assistance cause stoutness. Weight increase possibly happens when vitality admission isn't managed to coordinate the low vitality consumption (Prentice and Jebb, 2004). Then again, vitality admission is completely deliberate, aside from under clinical conditions. Accordingly, just two vitality balance condition factors are modifiable: physical action and food consumption; each is a complex bio-social wonder subject to hereditary, physiological, and segment impacts (Prentice and Jebb, 2004). It is demonstrated that low degrees of physical movement or high inertia are significant drivers of positive vitality balance, yet don't cause corpulence without anyone else. Weight gain happens just when there is no guideline of vitality admission to coordinate low vitality consumption (Prentice and Jebb, 2004). On the move nations, individuals may encounter an adjustment in labor rehearses that could prompt a decrease of up to 50 % in physical activity and along these lines absolute vitality consumption. If not followed by a decrease in vitality.



2.3. Nutritional status of police personnel

Nutrition is the foundation of good health; health is the foundation of all happiness, skill and performance (Hoque and Babu, 2016). In many countries, policemen who deviate from the optimum nutritional status are compulsorily given leave to regain their fitness. Several studies have documented the nutritional status of police (Earn, 2012; Hoque and Babu, 2016; Syafika and Sarina, 2016; Izzatun et al., 2018). According to Earn (2012), the majority of the police in Kota Kinabalu had a high prevalence of overweight and body fat. Similarly, a study conducted in Turkey among police personnel found that about 32% of them were normal, 52% were overweight and about 16% were obese (Celik & Savas, 2012). Izzatun and colleagues also found that 34%, 43% and 22% of Malaysian royal police were normal, overweight and obese respectively (Izzatun et al., 2018). It has likewise been indicated that the danger of weight builds as indicated by the span of the presentation to move work (Parkes, 2002). Studies that recorded longitudinal patterns in BMI and specialist move status found that holding or changing occupation move status could affect BMI (Morikawa et al., 2007; Zhao, Bogossian and Turner, 2012). The individuals who kept up examples of move work, or who moved from customary daytime hours to moving work, had a critical increment in BMI. Those affiliations stayed in the wake of jumbling factors were balanced. While BMI is a valuable apparatus for assessing muscle versus fat, abdomen and midriff circuit: hip proportion helps evaluate focal related to expanded wellbeing hazard. Studies assessing focal adiposity uncovered a critical relationship between moving work and expanded abdomen: hip proportion (Mina and Ark, 2005; Nakamura et al., 1997), yet these examinations didn't uncover any noteworthy relationship among BMI and moving work. This proposes while moving work may not really increment generally speaking body weight it might unfavorably



influence the conveyance of muscle versus fat with a propensity towards focal adiposity, which may have potential ramifications for move laborers' metabolic and cardiovascular wellbeing. A study conducted to determine the nutritional status of police officers and trainees revealed that although there is overweight and obesity among police and trainees in Negeri Sembilan, trainees have a better nutritional status (Syafika & Sarina, 2015).

However, obesity was highly prevalent among police personnel, according to Gu et al., (2012), adiposity measures such as waist circumference and abdominal height were more prevalent in men than women police. A cross-sectional study conducted to assess police health issues in Viayawada reported 58 % being average, 35 % being overweight and 7 % being obese. It has also been recorded that 25 % of police personnel were anaemic (Jahnavi et al., 2012 in agreement, Hoque & Babu (2016) found that the majority (72%) of police personnel in Bangladesh had normal nutritional status, 24% were overweight, 3% were obese, while underweight was negligible.





Additionally, Santana and colleagues conducted a study among 53 police personnel to determine their nutritional status and reported that 64% were overweight, about 45% were pre-obese while 18% were obese. Waist circumference did not indicate any risk in almost 68% of them but the increased risk was observed in about 20% and substantially increased risk was observed in about 11% police officers. Excess fat was reported in 53% of the police officers and total cholesterol was recorded in about 33% of the police officers (Santana, Keila, Gomes, Marchi, & Girondoli, 2012).

Another study was carried out among 837 police personnel with the New York police department to establish the relationship between health and personal risks and reported that 30% of them had elevated waist circumference, 15% had elevated triglycerides and 21% had glucose intolerance (Violanti et al., 2014).

Assessment of the nutritional status of the Polish army revealed that 3% were underweight, almost 13% were overweight and about 1% were obese. About 82% recorded a normal body mass index (BMI) (Bertrandt & Klos, 2011). Evidence from another study among Indian police also showed that 46% of them had normal nutrition, 44% of them had hyper nutritional status and the remaining 10% of them were obese (Jammanakatti & Eagappan, 2017).

The prevalence of overweight and obesity among military trainees in Kuala Lumpur was 14% (Zulaikha et al., 2011). Higher prevalence (42.1%) was reported by Nadiy et al. (2013) among Army personnel in Kuala Lumpur, which was similar to findings (41.9%) reported by (Can & Hendy, 2014) among police personnel in the United States of America. Similarly, Syafika and colleague assessed the nutritional status and physical activity of Royal Malaysian

police personnel and trainees at the police training centre and reported that the trainees had better nutritional status than the personnel. Approximately, 42.2 % and 8.3 % were overweight and obese respectively while about 23 % of the trainees were overweight. In terms of waist circumference, almost 58 % of the police personnel and about 35 % of the trainees had a waist circumference above the cutoff point of 90cm for male and 80cm for female. For the waist hip ratio, most of the personnel and trainees were reported to have a waist-hip ratio below the cutoff point of 1cm for male and 0.85cm for female (Syafika & Sariman, 2015).

In a cross-sectional investigation including 378 male military faculty in Kuala Lumpur, 3.2 % of them were accounted for to be underweight, 54.8 % were ordinary, 32.8 % were overweight and 9.3 % were large. It was additionally seen that 40.2 % of the police workforce had abdomen periphery estimation of 90cm or more and were considered as having high hazard for diabetes and cardiovascular illnesses (Nadiy et al., 2013). Numerous word related components can add to stoutness rates among law requirement populaces, for example, the nature and amount of work, changing calendar of movements and stress-related with the work. When all is said in done, cop jobs require a few hours of additional time, frequently as move work, which may prompt sporadic rest designs, decreased responsibility to an exercise schedule, and deficient chance to design and eat nutritious dinners. Furthermore, officials regularly have no entrance to sound food decisions or refrigeration when working in the field, further adding to a decrease in diet quality (Denysshchen, Cardina, Sobol, Zimmerman, Gavronsky, 2018). Adequate vitality isn't created, and body tissues can't create except if the supplement components that the body needs are taken at the necessary levels, because of which ailing health happens (Anschutz, Engels and Strien, 2008). Ailing health can likewise



happen if the off base food is chosen, food isn't taken in the necessary amounts and assortments or food is improperly cooked (Rodriguez-Ramirez et al., 2011).

2.4.1. Obesity

A clear understanding of the growing prevalence of the obesity epidemic is imperative in elucidating the magnitude of the burden of cardiovascular disease that many populations face. An examination in the US recorded that the commonness of corpulence in grown-ups expanded from 12 % to 20.9 % somewhere in the range of 1991 and 2001. The level of grown-ups overweight rose from 45% to 58%. Diabetes, hypertension, raised cholesterol, asthma and joint pain were the co-morbidities considerably connected with being overweight and hefty (Mokdad et al., 2003). Another cross-sectional examination likewise found that the commonness of corpulence was 29.5 % and the pervasiveness of overweight was 63.3 % (Yun, Zhu, Black, and Brownson, 2006), demonstrating that the predominance proportion of various heftiness related co-morbidities including diabetes, gallbladder infection, hypertension and osteoarthritis (Must, Spadano, Coakley, Fi) expanded slowly. State organizations and partners have in this manner suggested dietary rules and a few weight reduction mediations including nourishment, exercise, prescription, and medical procedure (U.S. Preventive Services Task Force, 2003). Concerning nourishment, it is suggested that legitimate extents and measures of protein, starches and fat ought to be devoured to forestall overabundance calorie. A top-notch diet, reliable with the countries' Dietary Guidelines, underlines an assortment of supplement thick nourishments devoured. People ought to eat two cups of organic product, over two cups of vegetables, three cups of low-fat or without fat milk, and three ounces of entire grains a day dependent on a reference 2,000-calorie admission. Also, people can eat only 20 % to 35% of the calories from



complete fat, principally polyunsaturated and monounsaturated fats while eating under 10% of the calories from immersed fat and keeping the utilization of trans-unsaturated fats and cholesterol (close to 300 milligrams for every day) to a base. At long last, short of what one teaspoon of salt (2,300 mg of sodium) ought to be eaten day by day (U.S. Branch of Health and Human Services and USDA, 2005). Depending on the composition of a person and the daily calorie requirements, the recommended amounts above will be higher or lower.

2.4.2 Cardiovascular Disease Risk Reduction

Police officers are employees of public security. Alongside paramedics, firemen, and so forth, cops serve in the field of law authorization and frequently react to calls including the debilitated and harmed with the previously mentioned workforce. In certain occurrences, cops add to cardiovascular patient consideration (Van Alem, Vrenken, de Vos, Tijssen, and Koster, 2003). Proof shows up in the writing that cops have comparable wellbeing status issues as firemen.

Their physical and psycho-social feelings of anxiety are high (Anderson, Litzenberger and Plecas, 2002). There are likewise target proportions of physical activity during shifts that demonstrate that police work is an inactive occupation with lower vitality use, movement power and venture by - step tally every hour (Ramey et al., 2014). Australian research recommends that cops with a stationary occupation, and like paramedics, must react rapidly to unforeseeable circumstances (Decker, Orr, Pope, and Hinton, 2016). In another examination, da Silva et al. (2014) noticed the attributes of military cops as hazard factors for the cardiovascular malady.



Focusing on the leading cause of death is one big approach to improving wellbeing and raising the burden of disease and associated disparities (CDC, 2004). This will allow targeted interventions to achieve positive results with limited resources. McCullough et al., (2002) in a huge planned examination found that guys with higher eating routine quality scores had a fundamentally lower relative danger of CVD. A high-fat eating regimen is usually characterized as a dietary admission of more than 30 % of fat calories, which has nine calories for each gram and is found in creature and plant sources. Joined with a stationary way of life, inordinate admission of dietary fat makes a vitality consumption irregularity which prompts weight gain. The exploration discoveries in the 1987-1988 Nationwide Food Consumption Survey proposed that under 15 % of American respondents kept up fat admission at 30% or less of vitality and just 16 % met the objective of decreasing immersed fat admission to under 10 % of vitality (Patterson et al., 1994). Regions of dietary fat-related practices that could be changed incorporate adding fat to food as a topping, cooking with fat, choosing high-fat food decisions and not subbing low-fat food options for high-fat nourishments (Kristal et al., 1990). Since cops might be at high hazard for CVD, and diet is a significant part of infection control, improving dietary propensities among cops is a significant region for word related wellbeing experts to mediate.



2.5. Association between eating pattern and nutritional status (BMI) of police personnel

Universally, the commonness of overweight and weight is on the expansion among police while the predominance of undernutrition has not changed significantly over the previous decade. While the commonness of underweight is still high, overweight and corpulence presently win in low-and center salary nations (Kayapinar & Savas, 2012). The expanding pervasiveness of overweight, heftiness and non-transmittable sicknesses in sub-Saharan

Africa (SSA) coincides with the high under-nourishment trouble (Bolajoko et al., 2014; Burt et al., 2013). A cross-sectional investigation was led in 2013 at the Iganga-Mayuge Health and Demographic Surveillance Site in eastern Uganda with 1210 arbitrarily chose grown-ups matured 18 years. The overweight/stoutness factor was the accompanying: female, peri-urban, ages 35 to 44, 45 to 54, 55 to 64, €65, and in the third, fourth and fifth quintiles, and the social and monetary status of the SES (financial status). There was overweight/stoutness among grown-ups.

Overweight/stout has been associated with being female, being 35 years old and more established, living in a peri-urban region and having a higher financial status (SES) (Nasruddin, Sedek and Zubairi, 2018). Studies have shown that the dietary change from conventional plant-based diets is being gradually substituted by sugar and animal fats that are low in vitamins and higher in cholesterol, thereby fostering many chronic conditions among sedentary staff. This is further compounded by the general trend towards a sedentary lifestyle (De, 2013).

Jahnavi et al. (2012) conducted a cross-sectional study assessing the weight status of Delhi's 85 male police head constables. To obtain information on the participants' socio- demographic and job profile, a predesigned and pre-tested questionnaire was used. The participants were measured in height, weight, waist circumference (WC), percentage of body fat (BF), and blood pressure. Results showed that according to the World Health Organization (WHO) classification of the body mass index (BMI), 60% (n=51) of the subjects were overweight and 12% (n=10) were obese class I.



According to the adult treatment panel (ATP III) classification of the waist circumference 41.2 % (n=35) of the subjects had above the desired WC level. It was observed that 47.1 % (n=40) had an overweight category BF percentage, and that 45.8 % (n=39) were in the obese category. BMI and body fat had found a strong positive correlation. Around 23.5% (n=20) of subjects were found to be pre-hypertensive, and

63.6% (n=54) had hypertension in stage I. The study concluded that a noticeable prevalence of overweight and obesity, along with associated comorbidities, was found among police constables, emphasizing the need for appropriate prevention strategies. Additionally, a report was performed to examine the association between dietary patterns and the police body mass index (BMI). The study used a purposive sampling technique to sample the respondents. The results showed strong eating habits for most police and bad eating habits for 30.7 per cent. Roughly 34 % belonged to the average and underweight, 21.4 % was obese, and 10.6 % was overweight, according to the BMI estimate. Also, no connection between BMI and eating habit was found. The study concluded that the prevalence of unhealthy eating habits, obesity and overweight among police officers was common (Kayapinar & Savas, 2012). Jahnvi et al. (2012) revealed that about 45 per cent of police interviewed in a study had a healthy pattern of eating. Results revealed that police (34 %) belonged to the average and underweight, 21.3 % were obese, 10.7 % were overweight, and no link between BMI and eating habits was also found. Coimbatore conducted a study in comparison to co-relate the eating patterns and body mass index of the policemen. The finding has revealed a correlation between the eating habits of policemen and the index of body mass. It found that most subjects (69.3 per cent) had a balanced eating pattern, and poor eating patterns (30.7 per cent) (Jammanakatti & Eagappan, 2017). In a cross-sectional descriptive study, Illiade (2013) surveyed to evaluate improvements in sedentary lifestyle and dietary transition. The



research used a mixed data collection method using simple random sampling technique for sampling the respondents.

Findings from the study showed that males who regularly consumed fast foods (3 times a week) had significantly lower BMI compared to males who irregularly frequented fast-food restaurants (2 times a week). The study concluded that there was no statistical correlation between fast food intakes 3 days a week and higher BMI ratings. Understanding that the availability of healthy foods at home and away from home would increase consumption of these foods is important (Danquah, Amoah & Opare-Obisaw, 2013). However, access to healthy food options is limited in many work environments since most food vendors and catering outlets only make convenient foods such as fries, pies, doughnuts etc available. This is particularly true for those with odd hours or special needs (Gonzalez-Gross, & Melendez, 2013; Briddle, O'Connell & Braithwaite, 2011). Only in a report on snacking in combination with food consumption and police nutritional status in Nairobi, Muthoni (2012), Kenya found a rise in the number of snacks eaten by police from high socioeconomic class families compared with those of a lower class. Moreover, proof accessible demonstrates that the police taking an interest in food undertakings were likewise more averse to expend additional vitality or exercise than their companions, which may likewise clarify the expanded pervasiveness of overweight and stoutness among female police in the examination networks (Jammanakatti & Eagappan, 2017).



A distinct cross-sectional study led by Story et al. (2008) found a relationship between the information on inactive specialists about leafy foods and the assorted variety of utilization of both (those with low information ate a normal of 181 g day by day of products of the soil, contrasted with 255 g/d in those with high information).

2.5.1 Smoking

Cigarette smokers are regularly considered to have lower body loads than non-smokers (Lissner, 1997), as smoking assists with stifling craving and through its thermogenic impacts to raise the metabolic rate (Lean, 2000). Smoking was in this manner associated with slimness, and smokers, including pregnant ladies, communicated worry that end of smoking could add to expanded food utilization, diminished vitality use, and eventually, overweight and heftiness (Lissner, 1997; Santos and Barros, 2003).

Having a lower BMI than ex-smokers and non-smokers doesn't, in any case, mean smokers are not inclined to expand instinctive fat as appeared by Esther and associates in an investigation (Esther et al., 2009). In smokers, the creators revealed higher instinctive fat.

Considered a weight the board approach, smoking has now gotten famous among overweight and stout people (Lean, 2000), a pattern that makes the connection among smoking and corpulence in this day and age increasingly hard to comprehend.

Expanded tobacco utilization was seen in creating nations experiencing segment change (rustic to urban) and noteworthy greatness of smoking-related medical issues was recorded (Baddoura and Chidiac, 2001). All Eastern Mediterranean district nations report



higher commonness of male smokers contrasted and female smokers. In Lebanon (46 %), Jordan (48 %), and Syria (51 %), alarmingly high smoking rates were accounted for in guys. The most elevated smoking rates for females were found in Lebanon (35 %) (WHO, 2003).

2.5.2 Alcohol

Liquor utilization is another socially and to some degree touchy factor which may show a relationship with BMI. Liquor is a dietary wellspring of 28.8 KJ/g (Rumplet et al., 1996), and its constituent ethanol is the least satisfying macronutrient in the eating routine (Yeomans et al., 2003; Almiron-Roig et al., 2003). Physiologically, by giving an additional wellspring of vitality and going about as an impetus for expanded food consumption by animating hunger, liquor can add to overabundance body weight (Yeomans et al., 2003; Caton et al., 2004; Breslow and Smothers, 2005). The connection between the admission of liquor and BMI, then again, includes ways of life and social elements making it increasingly mind-boggling and, therefore, no immediate reason/impact affiliation is accepted (Almiron-Roig et al., 2003; de Castro, 2000).

Studies on the commonness of liquor utilization and its relationship with body weight are uncommon in the MENA area. In Lebanese people > 15years separately, predominance paces of liquor utilization were accounted for to be 69% and 45, 8% (WHO 2003). An ongoing report on liquor use among Lebanese college understudies detailed lifetime utilization of liquor in 71 percent of understudies, essentially higher in guys (Ghandour, 2009).



2.6. Association between physical activities and nutritional status of police

Physical exercise and great wholesome status of the populace stay fundamental to the field of general wellbeing (Aazam et al., 2013). Wellbeing speaks to one's physical, passionate, and social prosperity in general. Wellbeing, as we as a whole know, is a trademark that isn't steady in time and can change over a continuum from close demise (sick wellbeing) to ideal physiological working (elevated level wellbeing), and great populace wellbeing status relies upon individuals' dietary status (Ani, Uvere and Ene- Obong 2014). Nutritional status is an individual's physiological state arising from the interaction between nutrient intake and requirements, and from the capacity of the body to digest, consume and use these nutrients (Moonmoon & Shakhawat, 2016).

Scientific evidence is compelling that daily physical exercise has diverse benefits for wellbeing. Physical movement, among different advantages, adds to the avoidance of various malignant growths, exorbitant weight gain and cardiovascular sickness and improves cerebrum wellbeing (De, 2013; Egbi, 2012). Most deficiencies in micronutrients primarily affect the police because of their busy schedules for adequate food procurement. However, over nutrition and nutritional imbalances, which can lead to chronic diseases, police staff are split into multiple socio-economic boundaries (Assah et al., 2015).

Studies on the effects of physical activity on police nutrition status present mixed findings. Although a study conducted among university students participating in military training showed that physical activity was positively correlated with body mass index, waist-hip ratio, and nutrient intakes except for vitamin C intake (Rashid et al., 2011), a study conducted to assess anthropometric variables and police trainees' physical activity indicated that physical activity was not involved in military training. In support of Rashid and



colleagues' findings, Syafika and Sariman (2015) found that physical activity was inversely associated with the index of body mass, waist circumference and waist-hip ratio among police personnel.

In addition, a body of research has shown that body activity is associated significantly with circumference of the waist, body fat, and body mass index (Nasruddin et al., 2018). In a descriptive cross-section of police personnel Tambe, Singh & Narang (2012), the results suggest a link between physical activity and police nutrition, to assess risk factors of chronic diseases. Similarly, a weight assessment study by Hoque & Babu (2016) has revealed a clear positive association between BMI and police physical activity among police officers in Delhi. The study found that the police constables and their associated co-morbidities had a noticed prevalence of overweight and obesity and highlighted the need for proper prevention strategies, particularly physical activity. However, the moderate strength of each individual's fitness level is necessary to consider (Violanti et al., 2014). For a fitter individual, for example, to feel the same feelings of increased breathing, heart rate and temperature which characterize moderate-intense activity, a person with greater absolute intensity should conduct an activity than an unfit person (Gu et al., 2012).

Moreover, physical activity can and occurs all through all parts of the day, and with scarcely any special cases, a physical movement's wellbeing improving worth is autonomous of the reason for executing it. Therefore, non-recreation types of physical activity, for example, transportation-related physical exercises, for example, cycling to work, are presently perceived as physical movement advancement choices (Jammanakatti and Eagappan, 2017; Briddle, O'Connel and Braithwaite, 2011).





Physical activity can be grouped into four domains, according to Anderson, in Litzenberger & Plecas (2002). Physical activity at work is carried out while one is working. Instances of work related physical movement include stacking racks in a shop, circulating items in an office, preparing or serving food in a café or conveying apparatuses in an age. The physical action of transportation is done to get starting with one spot then onto the next. Models are strolling or cycling to and from the workplace, school, transport center points or a strip mall. Physical movement at the family unit is done in or around the home (Iannotti & Wang, 2013). It covers schoolwork, for example, cooking, cleaning, home fix, yard work, or cultivating. Relaxation time physical exercise is done at one's attentiveness when one doesn't work, transports to a particular area and doesn't perform family unit tasks. Instances of recreation time physical movement incorporate games or exercise, cycling and messing around (hopscotch, ball) (Anderson, Plecas & Segger 2001).

Essentially, physical activity was reviewed by Colpani et al. (2014) into mellow force, extreme power and moderate power. Force of light is the point at which an individual is locked in at a level of light power and can sing or carry on an ordinary discussion while carrying out the responsibility. Straightforward strolling or washing will be one case of a light activity. Also, moderate power is one that is dynamic at a moderate force level ought to have the option to carry on a discussion while taking part in the movement, however with some trouble. Energetic strolling, biking, or moving will be one model. Lively power is the conduct might be called overwhelming if an individual is winded or exhausted to carry on a discussion easily. Instances of lively action would incorporate running or running and exhausting games, for example, ball, swimming and handball (Anschutz, Engels & Strien, 2008).

The study findings of Jammanakatti & Eagappan (2017) revealed that physical activity was associated with nutritional status among police personnel. Anderson, Plecas & Segger (2001) reported the same findings in their study involving police, that physical activity was significantly related to the nutritional status of police.

According to Jahnavi, Patra & Chandrasekhar (2012) lack of physical activity among police was associated with obesity and overweight. The findings revealed that police were more likely to eat junk food and carbonated soft drinks always because of lack of time and engage in less physical activity leading to increased obesity.

The results from a study showed, in a related development, that less involvement in physical activity was associated with increased BMI. The findings also suggested that watching television among police was significantly linked to increased snack consumption, which was also a strong predictor of BMI growth (Ambrosini, 2013; Anderson, Litzenberger & Plecas, 2002). Humans are meant for physical activity. Health linked positively to human activity (Danquah, Amoah & Opare-Obisaw, 2013). The physically active lifestyle has changed, and it would appear that many people are not active enough (Davidson et al., 2013). There is strong scientific evidence today that regular physical activity promotes health, and many chronic diseases are prevented. Physical activity has multifactorial effects, which means that it simultaneously impacts multiple processes in the body and can thus influence both physical and mental wellbeing (Tambe et al., 2012; Brug & Klepp, 2007; Chambers et al., 2008).

2.7. Ecological Systems Theory

A theoretical framework can be used to understand the multiple factors relating to personal behaviors and environments that influence police personnel's eating behaviours. This study adopted the theory of ecological systems as a theoretical base for the study.





The Theory of Ecological Systems is otherwise known as The Theory of Human Ecology. The famous psychologist Urie Bronfenbrenner (1917-2005) developed the theory (Bronfenbrenner, 1990; Addison, 1992). The essential standard of the Theory of Ecological Systems is that people and their condition have a dynamic and social nature. Biological wellbeing conduct models for the most part center around singular impacts, for example, physical action and stationary action, and on social factors, for example, family dinners and natural variables, (for example, access to food). These elements may have a positive or negative impact on singular conduct.

The model additionally features factors that impact wellbeing and sustenance, stationary specialists and their environmental factors at various levels. Comprehension, conduct, organic, and segment factors are largely factoring at the individual level. The natural components incorporate the prompt social condition, for example, family, occupation, companions and friend systems, and identified with the physical condition are different factors, for example, work, cheap food outlets and social and social standards.

Notwithstanding food dispersion frameworks, approaches and laws managing food- related issues, for example, evaluating, food creation and showcasing, the broad communications and publicizing are factors identified with large scale level conditions. Hereditary inclinations, for example, inclinations for a specific sort of food and its taste, and the propensity to dismiss new food, have been alluded to as social eating settings, eating food with loved ones. Food inclinations are found out through the experience of individuals with food and eating, and this relies upon the food that is made accessible and open and stresses the basic job the food condition plays in deciding eating routine amplexness. Albeit large scale frameworks or social powers play an increasingly distal and

circuitous job in choosing eating conduct, they are viewed as one of the few components perceived as applicable to choices made by police staff for food. For this examination, the reason for utilizing a hypothetical structure was to lead a preliminary to comprehend and foresee some police-related conduct, particularly eating member conduct. The present investigation picked the hypothesis since it consolidates a staggered approach.

2.8. Summary of the literature

There is an increasing variety of lifestyle and person or community-based studies. In terms of obesity or high BMI, most cross-sectional studies indicated police increase weight gain and obesity prevalence was high among police especially among women. Other research, however, showed a higher level of meal intake and/or low quality of nutrition among police. The overall effect is that poor physical activity hurts policing health and nutritional status. Police eating habits are affected by a wide range of factors including family, social and physical environmental factors including attitude, subjective norm, purpose and the target eating behavior.



CHAPTER THREE

METHODOLOGY

3.0 Introduction

This piece of the analytical investigation centers on the examination's methodological perspectives. These incorporate; study region, study structure, populace study, test size and examining system, information gathering devices, information gathering procedure and information examination. In this area, additionally, moral thought is stressed.

3.1 Study area

Tamale is the capital of the Ghana Northern Region and the nation's fourth-biggest city (GSS, 2010). The Metropolis of Tamale is likewise profoundly critical in associating the North toward the South and has a wide populace size of 23, 3252, which is disaggregated by sex and comprised of multiethnic networks. Guys make up 47.3 % while females make up 50.3 %. 80% of these populaces live in metropolitan urban territories. There are 219,911 family units with a normal family size of 6.3 people living in 19,389 houses. The populace is 46.6 % hitched, 44.2% not married, 4 % bereft. 57.5% of the married population have no conventional training while 23.3% have just basic education. 60.6% of the populace is independently employed while 19.5% are workers (GSS, 2014). The Northern regional police command is headquartered in Tamale with seven units, 5 divisions, 21 districts and 50 police stations/posts. The Tamale Metropolis alone has 5 districts under its command (<https://police.gov.gh/en/index.php.northern-region/>: Accessed: 15th April 2020).

Tamale Metropolis was selected for this study since several studies in Tamale have identified a growing prevalence of overweight, obesity and hypertension (Amidu,



Owiredu, & Mohammed, 2016; Mogre, 2016; Mogre, Nyaba, Aleyira, & Sam, 2015). Due to the growing prevalence of fast food vendors in the area, inadequate dietary practices and physical inactivity can contribute to the increasing prevalence of these chronic diseases in the town.

3.2 Research design

This study was a descriptive cross-sectional in design.

3.3 Study population

The research population involved all police personnel working within the Tamale Metropolis. The Tamale Metropolis has a total manpower of 1590, made up of about 1266 males and about 324 females (Dako-Gyeke, 2019; GPS, 2018). Hence, the sample size was taken from this sample frame of 1590 personnel.

3.3.1 Inclusion criteria

Personnel were included in the study based on the following conditions:

Only police personnel with at least 2 years of being in the service

Police personnel who were fairly well and gave their consent for this study

3.3.2 Exclusion criteria

Personnel were excluded in the study based on the following conditions:

Police personnel with less than 2 years of work

Pregnant policewomen

Personnel with known cardiovascular disease



3.4 Sampling

The respondents were disproportionately drawn from all the three police stations in the Tamale Metropolis. This made data truly representative of the study area and eliminated any form of biases. Cochran's single proportion formula was used to estimate sample size.

3.4.1 Sample size determination

The formula below proposed by Cochran (1950) was used to estimate the number of police personnel to be recruited in this study

$$n = N / (1 + Ne^2) \dots\dots\dots (1)$$

Where n = sample size

N = target population of police personnel

e = marginal error (5%)

Thus N = 1590

$$n = (1590) / (1 + 1590 ([0.05]) ^2) = 320$$

To make up for non-response and errors in answering or recording data, a 20% (64) upward adjustment was made to give a total of 384 as the final number of police personnel to be interviewed in the study.



3.4.2 Sampling technique

The study employed a simple random sampling technique to sample respondents in the studied area. This sampling technique was chosen to give each personnel in the study setting an equal chance of being selected for the study. To give each police officer equal opportunity of taking part in the study, yes/no was written on pieces of papers based on the number of respondents in each police station and kept in a basket for respondents to pick. Whoever picked yes was recruited for this study.

3.5 Data collection

Data were gathered using questionnaires for the dietary example. Data on socio-segment qualities, taking care of propensity, and dietary practices were gotten utilizing polls controlled by the respondents themselves. Every survey was coded with an exceptional number every respondent spoke to. The poll was utilized to gather subtleties beneath;

3.5.1 Socio- demographic characteristics

This comprised information on age, sex, educational status, marital status, working experience and duty posting.

3.5.2 Dietary practices assessment or feeding habits

A few dietary assessment methods were utilized to evaluate basic dietary admission. Those have been arranged into –meal based day by day utilization strategies, for example, 24-hour review and food reports, or rundown based review normal food utilization techniques, for example, food recurrence surveys and diet history (Murphy, 2003; Thompson and Subar, 2008).





There is an intrinsic measure of blunder in each procedure, some impressively more than others (Kipins et al., 2003). Notwithstanding, they all offer a significant wellspring of mistake that has been recognized as distorting, including both under-and over- announcing of devoured food identified with a scope of natural and psychosocial factors. Specialists examining relationships among eating regimen and corpulence have detailed a deliberate distorting of vitality utilization, regardless of the dietary assessment approach utilized (Livingstone and Black, 2003; Subar et al., 2003; Fernanda et al., 2006); the issue gives off an impression of being increasingly unpredictable in information gotten from wide healthful overviews (Garriguet, 2008a; McCrory et al . , 2002). While over-detailing isn't as pervasive as under-revealing, this is known to happen at a genuinely higher size; the two sorts of off base announcing ought to be considered while distinguishing erroneous reports of vitality consumption (Mendez et al., 2011; McCrory et al. 2002). Research shows that the vitality admissions of conceivable correspondents have more grounded relationship with the level of corpulence and other medical issues contrasted with all columnists' vitality admissions (Bailey et al . , 2006; Ferrari et al . , 2004; Rosell et al . , 2003; Garriguet, 2008). Besides, a few different examinations have discovered more grounded relationship with dietary corpulence, underlining components, for example, weight, sugar, and fiber consumption (Mendez et al., 2004; Howarth et al., 2005).

Significantly, they found that both implausible classifications were identified with singular qualities (Mendez et al., 2011). People with overweight and other people who watch dietary constraints tend to underreport food utilization (McCrory et al., 2002; Ferrari et al., 2004; Rennie et al., 2007). There were likewise sex contrasts where underreporting in ladies was more common than in men (Mendez et al., 2011; Mirmiran et al., 2006; Scagliusi et al.,

2006). The underreporting of vitality utilization would go from 10-88 % relying upon the populace overviewed and the dietary assessment framework utilized (Black et al., 1991). In many cross-sectional examinations researching dietary \ admission, underreporting has been explored. Studies in Iran, Jamaica, and South Africa have discovered that underreporting of vitality admission ranges from 30 % to 40 % in grown-ups of both genders (Mirmiran et al., 2006; Mendez et al . , 2004); MacIntrye et al., 2001). Underreporting in created nations, for example, Canada and Greece were seen as 10-12 % lower (Garriguet, 2008; Yannakoulia, 2007).

Legitimate examining and utilization of help during the assortment of dietary information can improve the memory of food admission, eating time, and evaluating the segment size of the food expended (Polusna et al., 2009).

The 24-hour Recall

A few analysts concur that the 24-hour review instrument is more dependable than both the food recurrence survey and food reports, as its organization doesn't modify the typical admission of food (Lee and Nieman, 2007; Thompson et al., 2010). Albeit 24-hour reviews center around a constrained utilization time (the past 24 hours), they additionally remember progressively nitty-gritty data for the sorts of food and the amounts expended. Be that as it may, a solitary 24-hour review or even normal admission over a time of a couple of days (by extra information assortment days) to represent the day by day inconstancy in the admission of free-living nourishments doesn't sufficiently mirror the nourishments most oftentimes devoured (Murphy et al. , 2003; Dodd et al., 2006). All things considered, specialists have indicated that, when applied to a gathering of at least 50 people, an



adequately huge number of 24-hour reviews give a substantial gauge of the mean admission of vitality and supplements (Kipnis et al. 2009; Lee and Nieman 2007; Magarey 2003).

Practically speaking, the 24-hour review approach puts little weight on the respondent regarding the time and education required for his/her sake during the information assortment process (Lee and Nieman, 2007; Thompson and Subar, 2008); a detectable angle that is additionally limited when the instrument is controlled by a very much prepared questioner (Thompson et al., 2010) is that a total token of a day's dietary utilization cake is given.

The Food Frequency Questionnaire

The Food Frequency instrument normally records more than 100-150 individual line items, proposed to gauge the admission of vitality and additional supplements. Respondents are solicited to record their everyday level from the utilization of each type of food on the rundown over a specific timeframe: weeks, months or years, contingent upon the reason for the examination (Lee and Nieman, 2007; Thompson and Subar, 2008); the most ordinarily utilized FFQs are quantitative and respondents are frequently approached to appraise the standard serving size of the food thing recorded as expended; in any case, the food thing is accounted for as being devoured.

As a rule, errors in the FFQ coming about because of insufficient posting of every single imaginable food, since it is basic that the nourishments recorded in the instrument are demonstrative of the most widely recognized nourishments devoured by the review respondents (Lee and Nieman, 2007). Inferable from blunders in ascertaining admission volume, errors may likewise happen, where it is particularly hard to acquire genuine data



about nourishments devoured both as single things and in blends. Normal part size appraisals of the expended food may likewise be wrong, basically because it very well may be hard for respondents to assess overall strategies for assessment. In any case, the psychological weight in the FFQ is more noteworthy, where respondents are approached to appraise a normal part estimates that are conceivably exceptionally conflicting over an assortment of eating events (Thompson and Subar 2008). Furthermore, the meeting time required to finish the long FFQ rundown can be as high as an hour; this raises worries about the instrument's length and its impact on the reaction rate just as the honesty of the announced data from the respondent (Thompson and Subar, 2008).

The rationale for Use of the 24-hour Recall Instrument for this Study

Considering both the points of interest and disadvantages of the 24-hour review instrument and the poll on food recurrence, the specialist picked to utilize a 24-hour meet regulated review way to deal with gather dietary information for the examination. The following are the purposes behind picking the strategy for gathering dietary information:

1. The 24-hour single review strategy is a reasonable apparatus that is broadly utilized in epidemiological examinations and has been effectively applied in national dietary observation throughout the years.
2. By following a normalized methodology, the nature of the dietary information gathered through the 24 hour review can be improved.
3. It requires some investment to conceivably acquire right dietary data with less confounded intellectual procedures and less strain on the respondent contrasted with the FFQ framework.



Weekdays and Time Sampling for the 24-hour Recall

For this investigation, information assortment endeavors were made to remember weekdays and ends of the week for the 24-hour reviews given by the members, and visits were booked to happen from Monday to Friday and in this way incorporate Saturday and Sunday as the representative end of the weekdays. Now and again, be that as it may, the distributed days for visiting respondents have been interfered with bringing about a lopsidedness of the times of the week for the assortment of dietary information. The explanations behind this were startling conditions, for example, delay in accepting endorsement to visit a respondent, the need to lead an invigorating instructional meeting on estimating apparatuses or the need to align hardware. One focal element of free-living individuals' dietary admission is the everyday variety overlaid by a fundamental constant example. Day of the week or period of the year can present factors that add to the standard variety in dietary admission administered by social and ecological contemplations. In Ghana, for instance, Saturday and Sunday are the week-end days on which both open and private parts are authoritatively shut; it is the ideal opportunity for family social events and excursions. Be that as it may, Friday is simply a large portion of a day of work in open parts. Likewise, Friday is an occasion in numerous spots where most of the inhabitants are Muslims, and family social affairs additionally happen, which can likewise impact dietary patterns. It's not the situation for a significant number of Ghana's police staff as they run shifts, except for senior officials who appreciate ends of the week on Saturday and Sunday. Dietary reviews recorded higher admissions among people on ends of the week than during the week, and it was in this manner proposed that at any rate one end of the weekday be remembered for the investigation to limit vitality consumption blunder (Yunsheng et al., 2009). In a few dietary examinations, on weekdays and ends of the week, specialists intentionally test accepting that this division of



days establishes a reasonable order of conduct impacts (Buzzard, 1998). This investigation was directed during weekdays and ends of the week relying upon the accessible time of the individual respondents.

Implementation of the 24-hour Recall

Information on the number of suppers eaten every day, dinner inclinations, nibbling propensities, food source, liquor admission, and the week after week food recurrence utilization of nine nutrition classes among the 8–12 suggested were gathered (FAO/WHO, 2003). The evaluation for the number of suppers devoured in a day depended on World Health Organization proposals (FAO/WHO, 2003).

3.5.3 Food groups used in dietary diversity score

The dietary assorted variety score (DDS) utilized eight nutrition types. The food classes are grains, roots and tubers, organic products, vegetables, meats, eggs, fish, and delicate refreshments. The DDS (a factor demonstrating the different nutritional categories and assortments devoured) was named low DDS (<3 nutrition types), medium DDS (3–5 nutrition classes) and high DDS (6 nutrition types) because of the proposal of the WHO (FAO/WHO, 2003). This was determined by the number of nutrition classes devoured by study respondents.

3.6. Physical activity assessment

Substantial and solid physical action measures are significant in considers planned for recording the recurrence and dissemination of physical movement in recognized populaces (Al Hazzaa, 2005), just as in contemplates intended to assess the physical action factor



expected to influence a specific wellbeing result (Wareham, 2007). A few methods are utilized to quantify physical movement, with shifting degrees of estimation simplicity and exactness. These incorporate accelerometry, pulse checking, pedometers, and self-detailing techniques (Neilson et al., 2008; De Cocker et al., 2007); the latter is the most advantageous and least expensive approach to assemble physical action information from huge quantities of individuals in a moderately brief timeframe (Matthews, 2002; Armstrong and Bull, 2006). They give information on the elements of physical activity, for example, recurrence, power, term and type, in the various structures wherein physical movement happens amusement, occupation, transportation, and family unit/garden errands (Armstrong et al., 2000). Surveys on physical movement (PAQs) shift significantly in their detail and period of reference, and in this manner, the decision of the instrument is controlled by a few variables including the plan of the investigation, the exploration question identifying with the sort of data required and the assets accessible (Shepard, 2003; Hallal, 2010).

For reconnaissance purposes, an assortment of surveys has been created throughout the decades and used to order individuals into general classifications of physical activity for insightful examinations. These surveys permitted a few spaces to measure physical movement utilizing the Compendium of Physical action (Ainsworth et al., 2000).

Instances of these approved strategies incorporate Baecke's physical movement survey, Bouchard's 3-day physical action record (Sallis et al., 1985; Sallis et al., 1993; Pereira et al., 1997), EPIC's physical action poll, EPAQ2 (Wareham et al., 2002; Wareham et al., 2003), the outside physical movement survey. The last two polls were built for observation considers, and the GPAQ for creating nations all the more solely (Armstrong and Bull, 2006). The IPAQ



was created under the protection of the World Health Organization (WHO) and the United States Centers for Disease Control and Prevention (CDC) (Craig et al., 2003), and the GPAQ (Armstrong and Bull, 2006).

This examination adjusted from a past report a multi-day Physical Activity Recall (PAR) poll to assess the all-out long stretches of Physical Activity (PA) in the earlier week before this investigation (Sallis et al., 1985). Nearly, this survey has numerous points of interest: it can ascertain a PA measure most importantly, by requesting the measure of time spent doing various exercises. Other than that, it describes action force as moderate, hard, or very hard, lastly indicates the sorts of exercises in the seven-day PAR, for example, work, sports, or family exercises. Past research (Gross et al., 1990) distinguished the test unwavering quality of this physical action assessment instrument ($r = 0.99$ test-retest gauge and $r=0.86$ between two interviewees).

In light of the 7-day PAR survey, respondents detailed the hours spent at every one of the accompanying powers for three kinds of PA (work related, sports, and family unit) in the earlier week to this examination: moderate, hard, and troublesome. Since some staff may likewise have labored for a second or third activity and there was no different announcing of time spent on work related PA for each activity, the time spent on work related PA in the current examination alluded to the exercises from all occupations. For every power level, instances of various kinds of work related, game, and family unit exercises are given (see table 1 beneath).



Table 1: Criteria for Classification of Type and Physical Activity, Tamale Metropolis,

Type	Level		
	Moderate	Hard	Very hard
Occupational	Patrolling on foot, House painting, truck driving (making deliveries, lifting, and carrying light objects)	Heavy carpentry, Construction work, doing physical labour	Very hard physical labor, digging or chopping with heavy tools, carrying heavy loads such as bricks or lumber.
	Volley ball, Brisk walking or walking to work, playing golf, walking, and pulling or carrying	Tennis doubles, disco, square, or folk dancing,	
	clubs, callisthenic exercises (sit-ups, push-ups, trunk twists , jumping jacks etc.)	cross-country skiing, downhill skiing-moderate/	Jogging or swimming, singles tennis, soccer, cross-country skiing –
	Downhill skiing—light effort	vigorous effort	indicated as hard and fast.
Household	Raking the lawn, Scrubbing floors, Sweeping and mopping, Mowing, Cleaning windows	Scrubbing floors	not applicable

Source: Field survey, 2019

3.7. Anthropometric measurements

Anthropometric measurements according to normal protocol were taken. The measured parameters were circumferences of height, body weight and waist (WC). The study respondents' height was assessed to nearest 0.1 cm with no shoes using an SECA stadiometer 208 (Seca, Germany). Bodyweight was measured to nearest 0.1 kg using SECA (Seca, Germany) digital weighing scale. The respondents were advised to wear minimal-weight clothing as much as possible before weight was taken. During the calculation, the estimated weight of the uniform and boots which was measured using the average weight of three police uniforms and boots were removed for respondents who could not do so and were in their police uniform. A flexible, non-stretchable plastic measuring tape was used to determine circumferences of the waist and hip up to nearest 0.1 cm. Waist circumference was measured using a midpoint, measuring tape was placed between the last rib's inferior margin and the iliac crest. Staff with WC greater than 90 cm based on the WHO cut-off recommended for Populations were considered to have increased risk of cardiovascular disease, while those with WC less than 90 cm were identified as non-risk (WHO, 2000). The widest circumference around the buttocks, below the iliac crest, denoted the hip circumferences. All measurements were taken twice, and the final analysis used the average (means) of two valid measurements.

The Body Mass Index (BMI) was calculated using the weight and height data as a kilogram weight divided by height in square meters (kg / m^2). Underweight was defined as $\text{BMI} < 18.5$; healthy (normal) weight was defined as $\text{BMI} 18.5$ to 24.9 ; overweight was defined as $\text{BMI} 25.0$ to 29.9 , and obesity was defined as $\text{BMI} 30$ or greater (WHO, 2000). By dividing the waist circumference in centimeters, the Waist Hip Ratio (WHR) was determined by the hip circumference in centimetres. A WHR of > 0.85 cm has been described as having



increased risk for cardiovascular diseases whereas a WHR of < 0.85 cm has been described as risk-free.

3.7.1 Waist Circumference as a Proxy Method for Adiposity

The utilization of abdomen perimeter is featured as an anthropometric indicator supplementing BMI estimations in perceiving people with an expanded danger of weight-related bleakness because of stomach fat collection (World Health Organization, 2000; World Health Organization, 2011b).

Abdomen perimeter was preferred over other intermediary measures (proportion midriff to hip and proportion midsection to tallness) utilized as an option in contrast to BMI when estimating the danger of infection (World Health Organization, 2011b). Even though BMI and stomach corpulence measures can be profoundly connected, the World Health Organization suggests the handiness of joint utilization of these two pointers (WHO, 2011b). In this examination, raised shorts on the midriff circuit were utilized to recognize the predominance of the expanded danger of metabolic issue among Tamale Police. Abdomen perimeter might be a superior indicator of adiposity in more seasoned grown-ups than BMI, since the last has its confinements in identifying the physiological age-related changes of lean mass to fat mass (Zamboni et al., 2005).

3.8.1. Training of research assistants

Five nutrition university graduates with prior experience in the study were recruited as research assistants (RA's) and trained over a two-day period; first day indoor training and second day field training.



On the first day, RA's were taken through the survey methods, objectives and protocol, paying particular attention to how questions should be asked and how measurements should be carried out. They were made to undertake measurements on each other to apprise themselves with instrument. The second day was characterized by the practical demonstration of the first day's lessons. RA's were sent to a police station in Kumbungu to demonstrate practically how to perform measurements and ask questions. It provided RA's with helpful insights on how to ask questions. A consensus was reached at on appropriate data during debriefing sessions.

3.8.2. Pilot study

Five RAs and Principal Investigator (PI) carried out the pilot exercise in Savelugu, one of the 21 districts in the Northern region of Ghana. The exercise was carried out in 5% of the study sample. It was done to check for glitches in the wording of questions for better understanding, clarity of instructions, response rate and cooperation of personnel. Minor refinements were made to the protocol and instrument after debriefing on the pilot exercise.

3.8.3. Data entry and analyses

Data were entered and analyzed statistically using Statistical Package for Social Sciences (SPSS version 21).



Frequencies were generated to detect errors and missing values during data cleaning.

Univariate analysis was run to generate descriptive statistics for background characteristics, eating pattern, physical activity and nutritional status of police. Tables, graphs, percentages and frequencies are used to present results. Chi-square or Fisher exact tests of significance were used to compare frequencies in categorical variables, as appropriate. Variables that showed significance at $p < 0.05$ were incorporated into a logistic model.

Two logistic models: univariate and multivariate logistic modelling were fitted to determine if the odds for being overweight or obese was influenced by dietary behavior and physical activity. In the univariate analyses, nutritional status (overweight/obesity) was incorporated with dietary behavior (breakfast intake pattern), physical activity and socio-demographic characteristics of respondents: age, sex, marital status, educational qualification, working experience, duty post (either office or field). In the multivariate logistic modelling, the estimates were adjusted for all these variables. Statistical significance was considered at $p < 0.05$.

3.9. Ethical consideration

To maintain the rights of the respondents, ethical approval was obtained from the Kintampo Health Research Center Institutional Ethics Review Committee (KHRC-IERC) which a unique number KHRCIERC/2019-27 (certificate is enclosed: see appendix D) Written permission was also sorted from the Northern Regional Police Command and the respective police stations



3.9.1. Informed consent

Permission and consent were obtained from each respondent before questionnaires were administered. Study purpose and benefits were explained to participants in clear simple terms for their better understanding and to gain their trust and cooperation. They were informed about their right to discontinue the study when they desired to do so in the course of the study without losing any benefits.

3.9.2. Privacy/confidentiality

Voluntary consent was sought from respondents. All interviews and measurements were conducted at places deemed comfortable to respondents. These locations were devoid of third parties unless the respondents duly consented to their presence. Data collection tool was anonymized and data collected were coded. Completed questionnaires were kept under seal and lock and used only for study purposes.

3.9.3. Compensation

No form of compensation was given to respondents. This was made known to all of them before questionnaires were administered. However, their concerns were duly acknowledged during data collection.

3.9.4. Conflict of interest

Aside from the academic and public health importance of this study, the principal investigator has no conflict of interest to declare.



3.9.5. Potential risks/benefits

The study had no identified risks to the study population except the discomfort associated with measurement of anthropometric indices. However, there are envisaged benefits to both study populations. Study population stands to gain appreciable knowledge of their eating pattern, physical activity and nutritional status and this can change their dietary habits and health outcomes. Notwithstanding, identified enablers and barriers of the food retail environment were immediately addressed.



CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the results of the study using both descriptive statistics. The study was carried out in police stations within the Tamale Metropolis in the Northern Region. The respondents were police personnel who were randomly selected by the Principal Investigator (PI) using computer-assisted random sample selection. The study was carried out in three (3) police stations, namely: Tamale central, Sakasaka and the Tamale District Police stations. Results are presented according to the objectives of the study. It includes; eating pattern, physical activity and nutritional status of police personnel in the Tamale Metropolis.

4.1. Socio-demographic characteristics of study respondents

A total number of 384 respondents took part in the study, representing a 100% response rate. Of the 384 respondents, half (50%) were aged between 31-35 years and the majority (62%) were males. In terms of educational qualification, the majority (62%) were certificate holders followed by diploma holders (25%). Few of them had a degree (10%) and HND (4%). Slightly over half (57%) of the personnel were married while 37% were single. The remaining 6% were separated.

For working experience, a majority (64%) had worked for 2 years while the remaining 36% had worked for 3 or more years with the Ghana Police Service (GPS), and close to two thirds (70%) of them worked in a field post while the remaining 30% worked in offices. The results are as shown in table 2.



Table 2: Socio-Demographic Characteristics of Study Respondents (N=384 Unless Otherwise Stated)

Variable	Frequency (n)	Percentage (%)	
Age			
26-30	104	27	
31-35	191	50	
36+	89	23	
Sex			
Male	237	62	
Female	147	38	
Educational qualification			
Certificate	234	61	
Diploma	97	25	
HND	15	4	
Degree	38	10	
Marital status			
Single	142	37	
Married	219	57	
Separated	23	6	
Work experience (years)			
2	138	36	
3+	138	36	
Work post	Field	267	70



Data are presented as n, %.

Source: Field survey, 2019

4.2. Eating pattern of police personnel in the tamale personnel

Tables 3, 4, 5 and figure 2, summarizes the eating pattern of police personnel in the Tamale Metropolis. Nine food groups were used to assess the dietary diversity of the police personnel.

4.2.1 Meal pattern of police personnel in the Tamale Metropolis

Of the 384 respondents, more than three quarters, 320 (83.3%) of them took 2 meals a day followed by 40 (10.4%) who took three meals a day. About 5% of the police personnel took a meal a day while the remaining 1% took more than three meals a day.

In terms of the source of meals, 95% of them bought food, 4% prepared it at home and 1% were provided with food at work. About 74% of the police personnel skipped breakfast, 24% skipped lunch and about 1% skipped supper. Almost all (91%) the respondents reported eating in between meals.

For alcohol consumption, 320 (83.3%) reported consuming alcohol and of this number, more than half (65.6%) consumed alcohol weekly, 15.6% consumed alcohol daily, 10.6% consumed alcohol monthly and 8.1% consumed alcohol occasionally.

In terms of smoking, only 53 (13.8%) reported smoking. Of this number of smokers, about 37% smoked daily, 34% smoked occasionally and about 28% smoked weekly.

The results are as shown in table 3.



Table 3: Meal pattern of respondents (n=384 unless otherwise stated)

Variables	Frequency(n)	Percentage (%)
Number of meals in a day		
1	20	5.2
2	320	83.3
3	40	10.4
>3	4	1
Usual source of meals		
Bought	366	95
Prepared at home	14	4
Provided at work	4	1
Skip meals		
Breakfast	286	74.5
Lunch	93	24.2
Supper	5	1.3
Eat between meals		
Yes	353	91.9
No	31	8.1
Take alcohol		
Yes	320	83.3
No	64	16.7
Frequency of alcohol intake		



Daily	50	15.6
Weekly	210	65.6
Monthly	34	10.6
Occasionally	26	8.1

Smoking

Yes	53	13.8
No	331	86.2

Frequency of smoking

Daily	20	37.7
Weekly	15	28.3
Occasionally	18	34

Source: Field Survey, 2019, data are presented as n, %

4.2.2. Frequency of intake of main meals by police personnel

In the week preceding this survey, 71% did not take breakfast, 23% and 6% took breakfast often and not always respectively. Over half (52%) of them took lunch often while 27% did not take lunch and the remaining 21% took lunch not always. Forty- three percent of them did not take supper, 40% took supper not always and 17% took supper often. The results are as shown in table



4.

Table 4: Frequency of Intake of the Main Meals in the Week Preceding the Survey

Variable	Frequency (n)	Percentage (%)
Breakfast		
Often	90	23
Not always	23	6
None	271	71
Lunch		
Often	201	52
Not always	79	21
None	104	27
Super		
Often	65	17
Not always	155	40
None	44	43

Data are presented as n, %

Source: Field survey, 2019



4.2.3. Frequency of consumption of different food groups by the police personnel.

In the week preceding the survey, about 86%, 71%, 61% and 50% ate foods belonging to the meat, soft drinks, fish, grain and eggs groups' ≥ 3 times respectively. About 92%, 89% and 84% of the respondents ate foods belonging to vegetables, fruits, and roots and tubers < 3 times respectively in the week preceding the survey. The results are as shown in table 5 below.

Table 5: Frequency of Consumption of Different Food Groups In the Preceding Week to the Interview (N=384 Unless Otherwise Stated)

Food groups	<3 times N (%)	≥ 3 times N (%)
Grains	147(38.3)	237(61.7)
Roots and tubers	326(84.9)	58(15.1)
Fruits	344(89.6)	40(10.4)
Vegetables	354(92.2)	30(7.8)
Meats	53(13.8)	331(86.2)
Eggs	190(49.5)	194(50.5)
Fish	109(28.4)	275(71.6)
Soft drinks	95(24.3)	289(75.3)

Data are presented as n,%

Source: Field survey, 2019



4.2.4. Over all dietary diversity scoring of police

In terms of dietary diversity, the majority (48.7%) of the police had medium dietary diversity followed by high dietary diversity (25.8%) while 25.5% had low dietary diversity. The results are as shown in figure 2

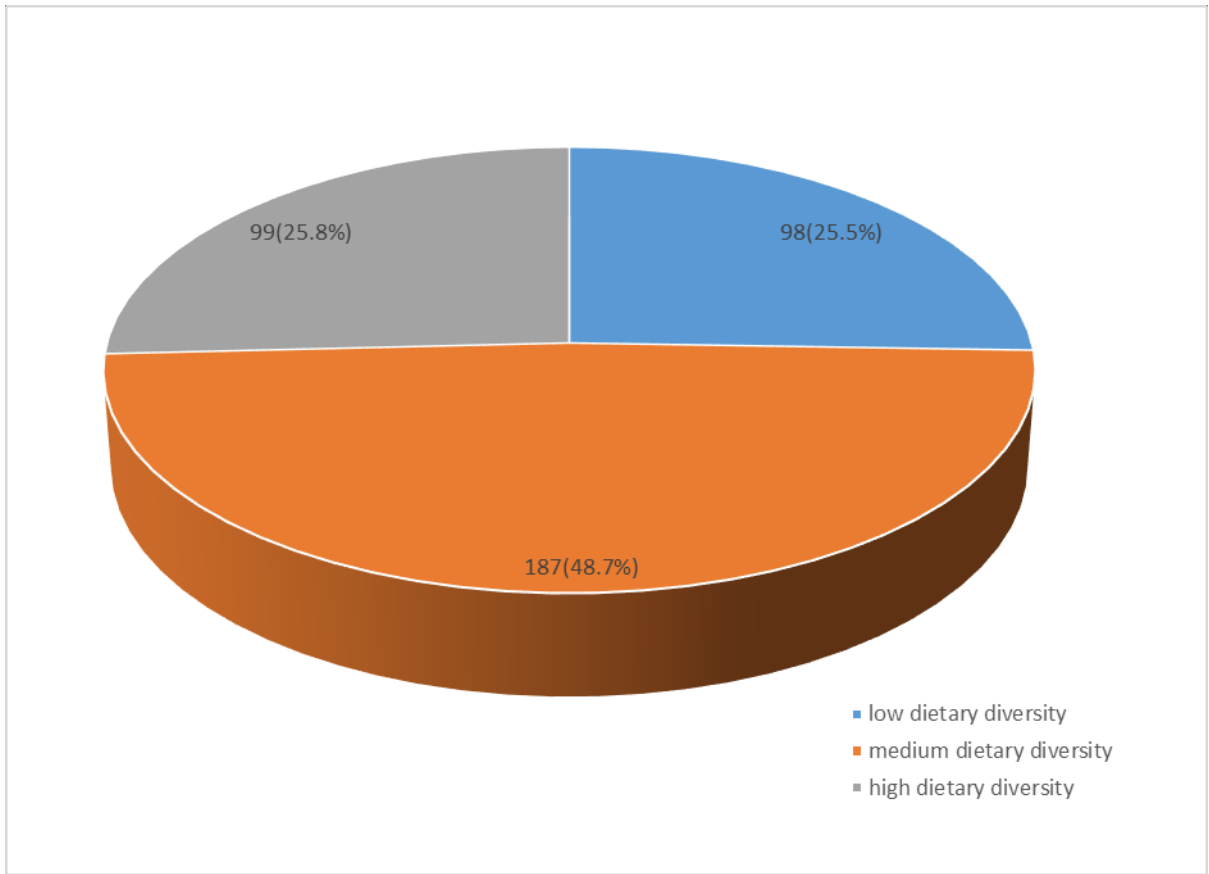


Figure 2: Overall dietary diversity of respondents in the preceding week to the survey

4.3. Physical activities of police

Objective 2 of this study aimed to establish the police personnel's physical activities in Tamale Metropolis. This was determined as either moderate, hard or very hard physical activity based on three categories: physical activity in the occupational, sport, and



household. The results are as indicated in Table 6. In terms of occupational physical activity, the majority (59.9%) had performed moderate physical activity in the week preceding the survey, followed by 23.2% hard and almost 17% very hard physical activity.

For sport, more than half (66.4%) had moderate physical activity, 21.3% had very hard physical activity and 12.2 % had hard physical activity in the week prior to survey. In the physical activity of the household, slightly more than half (53.4%) had moderate physical activity, while 46.6% had hard physical activity during the week immediately preceding the survey.

For frequency of physical activities among police in the Tamale Metropolis, the data show that the majority (71.6%) exercised 1-3 times weekly and the remaining 28.4% exercised daily.

In terms of timing of exercises, close to half (49.5%) did 40-44minutes, followed by 45minutes -1 hour (25.5%), <30minutes (18.2%) and the remaining 6.8% exercised for more than an hour in the week preceding the survey.



Table 6: Prevalence of Physical Activities By Type Of Physical Activity, Tamale

Variable	Frequency (n)	Percentage (%)
<hr/>		
Occupation		
Moderate	230	59.9
Hard	89	23.2
very hard	65	16.9
<hr/>		
Sport		
Moderate	255	66.4
Hard	47	12.2
very hard	82	21.3
<hr/>		
Household		
Moderate	205	53.4
Hard	179	46.6
<hr/>		
Frequency of exercise		
Daily	109	28.4
Weekly (1-3 times)	275	71.6
<hr/>		
Time spent		
<30 minutes	70	18.2
30-44 minutes	190	49.5
45minutes -I hour	98	25.5
>1 hour	26	6.8

Data are presented as n,%

Source: Field survey, 2019



4.4. Nutritional status of police

The third objective of the study intended to assess the nutritional status of police in Tamale Metropolis. This was determined by administering the dietary recall questionnaire and taking anthropometric measures of the study respondents. Table 7, shows the distribution of variables related to the nutritional status of respondents.

Of the 384 police personnel, the majority (65.9%) had a normal BMI, 20.1% were overweight, 8.1% were underweight and 6% were obese. More than two-thirds (77.1 %) of respondents had no risk of waist-based cardiovascular disease while 22.9 % had an elevated risk of cardiovascular disease.

Concerning the waist-hip-ratio, the majority (72.3 %) had no risk of cardiovascular disease, while the risk of cardiovascular disease increased by 27.3 %.



Table 7: Distribution Of Variables Related To The Nutritional Status Of Respondents, Tamale Metropolis. 2020 (N=384)

Variable	Frequency(n)	Percentage (%)
<hr/>		
BMI (Kg/m ²)		
Underweight	31	8.1
Normal	253	65.9
Overweight	77	20.1
Obese	23	6
<hr/>		
Waist circumference (cm)		
No risk	296	77.1
Increased risk	88	22.9
<hr/>		
WHR (cm)		
No risk	279	72.7
Increased risk	105	27.3

Data are presented as n, %; BMI=Body Mass Index; WHR=Waist-to-Hip Ratio

Source: Field survey, 2019



4.5. Relationship between nutritional status, dietary behaviour and physical activity of police in Tamale

Tables 8 and 9 show the results of both bivariate and multinomial regression analyses of factors associated with the nutritional status of police personnel in Tamale. Factors such as frequency of consumption of breakfast, lunch, dinner/supper and physical activity levels (moderate, hard and very hard intensity) were cross-tabulated with nutritional status (overweight and obesity).

The chi-square analysis revealed that the frequency of breakfast intake and physical activity level was significantly associated with overweight and obesity ($p < 0.05$ in each case; see table 8). However, the frequency of intake of lunch and dinner did not show any significance ($p > 0.05$ in each case; see table 8). Further analysis using logistic modelling also showed that there was a significant association between the frequency of intake of breakfast and overweight/ obesity. In the univariate analysis, independent variables (dietary intake frequency, physical activity levels) that showed significant association with the dependent variables (overweight, obese) during the chi-square or Fisher exact tests were incorporated into the model. The results showed that, compared to police personnel who took breakfast often, those who took breakfast not always and none had significantly higher chances of being overweight/obese [OR=2.00, 95% CI (1.35-2.94); OR=1.80, 95% CI (1.21-2.68) respectively]. Interestingly, in the multivariate analysis, the trend did not change in terms of significance in the statistical analysis that was performed. Higher chances of being overweight/obese were still observed in those who took breakfast not always and none [AOR=1.82, 95% (1.22-2.71); AOR=1.69, 95% (1.12-2.56) respectively]. (See table 9 b).



For physical activity, the results showed a protective effect on overweight/obese status. In the univariate analysis of the logistic modelling, those who were involved in hard and very hard intensity physical activity had reduced chances of being overweight or obese compared to those who were engaged in moderate intensity physical activity. The protective effect of physical activity on overweight/ obesity did not change in the multivariate regression analysis; police personnel who were engaged in hard and very hard intensity physical activity still had lower chances of being overweight/obese [AOR=0.49, 95% CI (0.34-0.70); AOR=0.71, 95% CI (0.54-0.94) respectively] compared to their counterparts (See table 9)



Table 8: Dietary Behaviour, Physical Activity with Overweight and Obesity of Police

Variables	Total sample(n=384)	Normal(n=263)	Overweight(n=87)	Obese (n=34)	P value
	n (%)	n (%)	n (%)	n (%)	
Breakfast					
Often	213(60.3)	183(85.9)	23(10.8)	7(3.3)	0.002**
Not always	118(33.4)	56(47.5)	50(42.4)	12(10.2)	
None	22(6.2)	14(63.6)	4(18.2)	4(18.2)	
Lunch					
Often	275(77.9)	201(70.1)	56(20.4)	18(6.5)	0.743**
Not always	56(15.9)	45(80.4)	9(16.1)	2(3.6)	
None	22(6.2)	7(31.8)	12(54.5)	3(13.6)	
Supper/dinner					
Often	297(84.1)	216(72.7)	63(21.2)	18(6.1)	0.136**
Not always	42(11.9)	30(71.4)	9(21.4)	3(7.1)	
None	14(4.0)	7(50.0)	5(35.7)	2(14.3)	
PAL					
Moderate	265(75.1)	201(75.80)	53(20)	11(4.2)	0.031*
Hard	57(16.1)	38(66.7)	12(21.1)	7(12.3)	
Very hard	31(8.8)	14(45.2)	12(38.7)	5(16.1)	

P values are significant at <0.05; *,** are from chi square and Fishers exact; PAL=Physical activity level

Source: Field survey, 2019



Table 9: Logistic Regression Analysis of Dietary Behaviour and Physical and Physical Activity Associated With Overweight of Police in Tamale

Overweight, including obese (n=353)		
Variables Crude	OR (95% CI)	Adjusted OR (95% CI)
Breakfast		
Often	Ref	Ref
Not always	2.00 (1.35-2.94)	1.82 (1.22-2.71)
None	1.80 (1.21-2.68)	1.69 (1.12-2.56)
PAL		
Moderate	Ref	Ref
Hard	0.51 (0.36-0.74)	0.49 (0.34-0.70)
Very hard	0.74 (0.56-0.97)	0.71 (0.54-0.94)

Source: Field survey, 2019

*p <0.05, ref=reference, PAL=physical activity level, the model is controlled for age, sex, marital status, educational qualification, work post; physical activity includes Volley ball, Brisk walking or walking to work, playing golf, walking, pulling etc. (see methods section for details) R²=0.324, this coefficient of determination explains that the model was able to explain about 32% variability in the dependent variable (overweight including obese).



CHAPTER FIVE

DISCUSSION

5.0 Introduction

In this chapter, the results of the study will be discussed in the context of established literature. The study's main objective was to investigate the eating pattern, physical activity and nutritional status of Tamale Metropolis Police personnel. The discussion is done under themes, namely; eating pattern of police personnel, physical activity of police personnel and the nutritional status of police personnel.

5.1. Eating pattern of police personnel

The respondents' dietary pattern demonstrates that a greater part (83.3 %) of police laborers eat two fundamental dinners daily required for good wellbeing. This is like outcomes from an investigation did by Essien and associates, who expressed that most police laborers in Ghana eat two times every day (Essien et al., 2019). This finding is additionally predictable with the discoveries of a Nigerian report among college understudies where most respondents ate a few primary dinners daily (Omage and Omuemu, 2018). However, majority of the police personnel either skipped breakfast or ate in between meals (74% vs 91%), similar to the study in Negeri Sembilan which found that most police personnel skip their main meals and eat a large portion of food at an irregular time (Syafika & Sarina, 2005). Skipping meals is a common practice among Ghana's police (Essien et al., 2019). Even though morning meal is significant for the body's wellbeing and prosperity, police staff may think that it's hard to accept it as they are consistently in a rush to go for their initial morning obligations or return worn out and lethargic to their homes and may simply rest without eating. It may not always be the case though, because some may purposely miss breakfast because of



their body weight and appearance consciousness. This is more common among females who know their diet more (Carmel & Camilleri, 2011).

While the majority (83.3%) of the staff consume alcohol and smoking was very low (12.8%) among the staff, the majority of those who drink alcohol do so regularly and the majority of those who smoke do so daily or weekly. Knowledge of the health implications of alcohol consumption and smoking among police personnel may be responsible for avoiding such practices. Police personnel's dietary trend evaluations also suggest that most (95 %) of the workers consumed food outside their home. This agrees with the discoveries of a Ghana study that detailed that a higher lion's share of police staff ate food from outside food sellers, for example, food arranged outside the home (Essien et al., 2019). Another investigation in the United States additionally announced comparable discoveries that cops expended food arranged outside the home over four days every week (Tewksbury and Copenhaver, 2015), so Wilcox and associates revealed that cops devoured more calories because of high utilization of food arranged outside the home, especially quick nourishments (Wilcox, Sharpe, Turner-McGrievy, Granner and Baruth). The probable reason is that police personnel spend more time outside their homes of residence. Additionally, the police personnel although may be married, but may not be staying with their partners who can cook for them in the same environment because of the frequent nature of their transfers. Thus, this may affect their eating pattern and frequency of food consumed per day by the police personnel

The respondents' meal pattern also shows that most of them consumed more of meat, soft drinks, fish, grain and eggs, and fewer foods belonging to the group of vegetables, fruits, and roots and tubers. This can influence the accessibility to the respondents of the supplements inborn in those nutritional categories. The respondents' dietary decent



variety scoring (DDS) shows that a greater amount of them ate at least 3 nutrition types, which gives the supplements expected to ideal wellbeing. The respondents' dietary decent variety may mirror a superior comprehension of the essential health benefits of the different nutrition classes. High dietary assorted variety incorporates food from numerous nutrition types (almost 3), which gives for ideal wellbeing adjusted supplements. The respondents' high DDS demonstrates their utilization of wide food assortments which guarantees the accessibility of valuable and adjusted supplements. This guarantees ideal nourishment which decidedly influences their dietary and wellbeing status. A few people may imagine that missing dinners might be useful, because they eat less calories, wanting to get thinner. Sadly, this isn't the situation, in actuality, missing suppers can prompt voraciously consuming food. Skirting a dinner causes somebody to feel hungrier, and prompts more than typical eating. What's more, the individuals who miss dinners expend less calories and have less vitality. What's more, the individuals who miss suppers devour less calories and have less vitality. This identifies with the digestion of a person. At the point when food is eaten, the degrees of digestion increment. Digestion levels go down without processing food. No food in an unfilled stomach implies there can be no picking up vitality. These unfriendly wellbeing impacts incorporate weight gain, voraciously consuming food, lower paces of digestion, mental fixation misfortune and expanded danger of diabetes advancement.



5.2. Physical activity of police personnel

Police practicing includes itself generally in any substantial movement that improves or keeps up physical wellness and by and large wellbeing and health. The information from this examination shows that for word related, game, and family unit exercises moderate power physical movement (PA) was higher than hard and exceptionally hard PA. This finding is predictable with the discoveries of a U.S. study, which revealed that the predominance of moderate-power PA (for word related, sports, and family unit exercises) was higher than hard-escalated and hard-serious movement among the two people, paying little mind to move work status (Ma et al., 2011). In any case, it is likewise in opposition to the investigation discoveries in Poland which uncovered that cops present high physical activity levels inside the work area (Soroka and Sawicki, 2014). Despite the fact that it is broadly perceived that standard physical action diminishes the danger of ceaseless ailment bleakness and mortality (Thorp, Owen, Neuhaus, and Dunstan, 2011), considers have discovered that the present workplace altogether decreases the need to take part in physical activity, advancing a stationary way of life that is regularly joined by a sharp increment in stoutness (WHO, 2000). As indicated by a Canadian report, physical exercise expanded utilization of fiber-rich nourishments, and decreased admission of soaked fats lessens low lipoprotein thickness levels and consequently builds high lipoprotein thickness levels (Cohen-Mansfield et al., 2013).



Physical exercise is viewed as imperative to keep up physical wellness including solid weight; manufacture and keep up sound bones, muscles and joints; advance physiological prosperity; decrease careful dangers, and reinforce the insusceptible framework. It has been focused on that both elevated levels of physical capacity and physical action are important to guarantee that police staff perform well when in obligation, halfway because of the continuous need to pursue, capture and keep suspects (de Lo! s &Jansson, 2002).

5.3. Nutritional status of police personnel

Most police officers are aware of good nutrition, and physical activity can help keep a healthy weight. But well nutrition benefits go beyond weight. Good nutrition can help to reduce the risk of certain diseases, including heart disease, diabetes, stroke, certain cancers and osteoporosis. Good nutritional status helps a person maintain all important functions of the body so that the person can properly grow and develop and lead healthy, active lives. Nutrition is the foundation of all happiness, skill, performance etc. The present study found most (65.9%) of the police personnel had normal BMI. On the contrary, the majority of the police personnel in Kota Kinabalu were overweight (54.9%) and having high body fat percentage (Earn, 2012). Prevalence of overweight and obesity in the present study were 20.5% and 6% respectively. A prevalence study conducted in Bangladesh among police personnel revealed that 42.2% and 8.3% were overweight and obese respectively (Hoque & Babu, 2016). Another study conducted among Malaysian army found that 32. 8% were overweight while 9.3% were obese (Nadiy et al., 2013). Findings of this study suggest there is a need to enhance nutrition education among the Police. The police department in Ghana and for that matter Tamale Metropolis may institute good nutrition courses for personnel. There is also the need for creating an enabling environment where police staffs working



outside jurisdictions with healthy food can access good nutrition, perhaps by providing them with such foods while at field post instead of consuming fast foods. Eating premises within the Police Department should be directed by nutrition standards to ensure that the police are supplied with easy, nutritious, diverse, appropriate and inexpensive meals to avoid dependence on unhealthy easy fast foods that expose police to preventable health risks in the future. Peer support provides the potential for strong linkages within police networks and motivation. Further studies on the intake of strategic nutrients by police can be conducted and factors influencing their dietary practices can be investigated as they exhibited average nutritional knowledge and strong positive attitude towards nutrition but not optimal dietary practice. Effective implementation of a physical fitness program, regular balanced diet, inoculation of stress management training can improve police staff's life and make them less likely to be obese and related (Raju, 2017).

5.4. Relationship between nutritional status, dietary behavior and physical activity.

Dietary behaviors and physical activity are significantly associated with the risk of being overweight and obese among police personnel in Tamale. Personnel who took breakfast not always and none had higher chances of being obese and overweight. Skipping breakfast may increase the risk of type 2 diabetes independent of lifestyles and baseline BMI level (Uemura et al., 2015). The probable reason for this trend could be that, when personnel skip breakfast, they tend to consume more calories during lunch and dinner much more beyond what they expend, thereby leading to the building of exercises without any corresponding physical activity to take care of the excesses. It is a well-known fact that binges eating without



corresponding physical activity often leads to overweight and obesity, which are risk factors for cardiovascular diseases.

The findings of the survey also suggest that physical activity level is inversely related to nutritional status (overweight/obese). This finding is in line with the findings of Syafika and colleague who reported that increased physical activity level reduced BMI among Malaysian police (Syafika & Sarina, 2015). However, the findings of Zulaikha and colleagues who reported that respondents with higher physical activities, rather had higher BMI and WHR (Zulaikha et al., 2011). A study among Tampan police reported that there was a significant relationship of energy intake, nutrition knowledge, physical activity, and the incidence of overweight in police officers (Rany, Putri & Nurlisis, 2018). Dominski and colleagues reported in their study among police personnel that younger officers and officers with lower body fat had faster reaction time compared to the older officer and those with high body fat. The examination likewise found that response time was contrarily connected with physical activity and decidedly connected with muscle versus fat and BMI (Dominski et al., 2018). Structure of the body is not able to influence wellbeing and execution in cops. Yoo (2007) detailed that more significant levels of physical movement are related to diminished metabolic disorder predominance in this one of a kind word related gathering for a given degree of saw pressure. Wellness and exercise can help cultivate a solid, prosperous workforce that takes less debilitated leaves and feels better arranged to adapt to ceaseless pressure (Gerber et al., 2010). In a broad audit by Amlani & Munir (2014), the physical movement has been seen as viable in decreasing nonappearance of the disorder.



The measure of physical action expected to forestall weight increase can change among populaces and life stages (Saris et al., 2003). In Western nations, a normal of an extra 418.4 kJ every day is evaluated to be burnt through on making an effort parity and decreasing weight gain (Hill et al., 2003). The American College of Sports Medicine revealed that moderate physical movement of 150-250 min/week with a vitality use of around 5016 to 8360 kJ/week appears to be adequate in many grown-ups to forestall weight increase of more than 3 % (Donnelly et al., 2009). In any case, the advantages of physical movement at various levels and in a wide range of populaces, including empowering sound dietary propensities that would forestall weight pick up and decrease later dangers of incessant ailments in the youth (Brage et al., 2004; Andersen et al., 2006), to adulthood when the steady loss of bulk and quality regularly happening with maturing could be decently balanced. In that capacity, the advantages of physical activity are clear in any event, for people who had long stretches of early adulthood inactive way of life however turned out to be genuinely dynamic as a more seasoned individual (Blair et al., 1995; Blair, 2007).

The significant job of physical movement goes past keeping up a solid weight; it improves mental, intellectual, and passionate prosperity in all age gatherings (WHO, 2004), and improves physical capacity and prosperity in more established grown-ups (Taylor et al., 2004). Thusly, and because of its significant effect on general wellbeing, physical movement ought to be started in adolescence, proceeded through early adulthood, and kept as far as might be feasible into mature age. The Global Diet, Physical Activity and Health Strategy (WHO, 2004) takes note of that people will take part in fluctuating paces of physical movement during their lifetime; changing sorts and amounts are required for various wellbeing results.



The United Kingdom Department of Health (Miles, 2007), the United States Health Organizations (Haskell et al., 2007) and the World Health Organization (WHO, 2004) advocate an hour of moderate physical movement daily to forestall stoutness and in any event, 30 minutes of moderate physical activity on most days of the week to diminish the danger of cardiovascular illness, diabetes, bosom disease and colon tumors. For this explanation, it is significant for the police office in Tamale and Ghana to actualize physical preparing programs all through their vocation to stay away from wellbeing related issues that may meddle with work execution and wellbeing.

5.5 Strength and limitations of the study

As far as I am aware, this study is the first to undertake a stepwise objective assessment of the eating pattern, physical activity levels and nutritional status of police in Tamale.

The study has several limitations; the study included only nine food groups in the dietary diversity scoring which may make it difficult to conclude all food groups. Secondly, the study was quantitative thereby creating a barrier in probing to unravel detail on the eating pattern and physical activity levels of police in Tamale.

Generalization cannot be drawn on the eating pattern, physical activity levels and nutritional status of all police personnel in Ghana since this study was conducted in only Tamale.



CHAPTER SIX

6.1. Conclusions

This study sought to assess the eating pattern, physical activity levels and nutritional status of police in Tamale.

Findings of the study suggest that majority of the police eat two main meals, skip breakfast or eat in between meals, consume alcohol, ate foods belonging to the meat, soft drinks, fish, grain and eggs groups and their diet were more moderately diverse.

The survey findings also suggest that most of the police personnel had moderate-intensity physical activity.

Almost 66% of the police personnel had normal BMI while 20% and 6% were overweight and obese respectively.

Dietary behavior is reversely associated with overweight and obesity while physical activity is also reversely associated with overweight and obesity

6.2. Recommendations

Based on the findings of this study, it is important to adapt strategies to improve the eating habits, physical activities and nutritional status of police in Tamale. The following have been suggested for consideration:

6.2.1 Practice

Given that police in Tamale eat two main meals, skip breakfast, consume alcohol and consume diet that is moderately diverse, the police department should institute health education programs on the benefits of good dietary practices to achieve optimal health.



Because police personnel in the studied area are engaged in moderate-intensity physical activity, regular training exercises should be organized for police personnel in Tamale. Given that physical activity has a positive association with overweight and obesity, police personnel should constantly be encouraged and provided with the necessary environment to perform regular physical exercises.

6.2.2 Policy

Following findings of the survey that majority of the police personnel in the studied area had normal BMI with a few being underweight, overweight and obese, nutrition should be instituted as a major course in police training schools.

Because, personnel who took breakfast not always and none had increased chances of being overweight/obese, the police department should institute a policy that will ensure that all personnel take their breakfast often.

6.2.3 Research

Since this study used a relatively small sample, more research works should be carried out using a much larger sample to conclude larger populations.

Qualitative or mixed methods research should be conducted to elucidate the eating pattern and physical activities of police personnel.

A similar study should be conducted among the other services (Armed forces, Fire, Prisons and Immigration) within the region and the nation as a whole.



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APPENDICES

APPENDIX A:

INFORMED CONSENT FORM

Project Title

Eating pattern, physical activity and nutritional status of police personnel in the Tamale Metropolis

Principal investigator: GIFTY SELORM BANSAH

Address: Department of public health, university for Development Studies

General information

I am GIFTY SELORM BANSAH, a student of the school of public health, university for Development Studies. I'm conducting a study titled: "**Eating pattern, physical activity and nutritional status of police personnel in the Tamale Metropolis**". I am interested in finding out about your eating pattern, physical activity level and nutritional status. The information I seek to gather are geared towards providing a basis for nutrition sensitive and nutrition related interventions for personnel in Tamale.

The survey will take an average of 15 minutes

Why the study

Eating pattern, physical activity and nutritional status have been implicated in nutrition related non-communicable diseases (NR-NCDs) and related inequalities as many populations are



incorporating what is accessible, affordable and aspirational to them. NCDs account for over 50% of global deaths especially in developing countries.

Possible risks and discomforts

There are no known risks associated with this work. However, if you become uncomfortable about any of the questions asked, you have the right not to answer or seek for clarification.

Possible benefits

Information given will help the researcher to know and understand the dietary patterns and nutrition status of police and to make recommendations.

Compensation

There would be no form of compensation to study participants. However, concerns raised in the course of the study will be used a medium to address them

Right to Refuse

Participation is completely voluntary and you have the right to refuse participation or withdraw from the study at any point in time or refuse to answer any question you feel uncomfortable about.

Confidentiality

Any information given would be respected and kept confidential and used only for research purposes.

I hope that you will participate fully since information from you is vital for this study.

N/B: Are there any questions you wish to ask before consenting to the study?



If yes.....
.....

Contacts for additional information:

Name: GIFTY SELORM BANSAH

Telephone: 0244926699 / 0201739339

Email: selorm5139.gifty@gmail.com

Name: YIDANA ADADOW (PhD)

Telephone: 0207436468

Email: adadowy@yahoo.com

Please confirm your acceptance by ticking in the box ()

By ticking in this box, I give my consent to be interviewed, with full awareness of the purpose, terms and conditions of the information given

Signature/thumbprint: ----- Date: ____/____/____

DD MM YY

PI/Research Assistant's name: _____ Sign- _____ - Date: ____/____/____

DD MM YY



CONSENT:

I.....declare that the purpose, benefits and other aspects of this research has been fully explained to me. All questions and doubts have been answered and I have understood. I hereby agree to participate.

.....

__ __ / __ __ / __ __

(Signature /thumbprint of participant)

(Date)

I verify that the purpose, risk and benefits have been fully explained to the participant. All questions and doubts have been answered to the understanding of respondent. The participant has willingly agreed to take part in the study.

__ __ / __ __ / __ __

(Signature of PI/research assistant)

(Date)



APPENDIX B:

VOLUNTEER AGREEMENT

The document above describing the benefits, risks and procedures for the research titled: **“Eating pattern, physical activity and nutritional status of police personnel in the Tamale Metropolis”** has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

(Date) (Name and Signature or mark of volunteer)

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits; risks and procedures were read to the volunteer. All questions were answered and the volunteer agreed to take part in the research

(Date) (Name and signature of witness)

I certify that the nature and purpose, the benefits and procedures of the study associated with participating in this research have been fully explained to the above individual.

(Date) (Name/sign of person who obtained consent)



APPENDIX C

QUESTIONNAIRE

University for Development Studies

School of Allied Health Sciences

Informed consent

Good morning Sir/Madam.

My name is Gifty Selorm Bansah, i am a master's student of the above University. I will be very appreciative if you could assist provide me with key information leading to the completion of this questionnaire to aid me to conduct my study. Any information you might want to know about the study, we can discuss it before, we proceed. This questionnaire is designed to assist the researcher to collect data for a research study on the topic: **Assessing eating pattern, physical activity and nutritional status of Police personnel in Tamale Metropolis**. Your opinion is very important and your participation is voluntary. All information you provide will be used solely for academic purposes and will be kept confidential.

Section I: Demographic data of respondents

1. Indicate your age (years)
2. Sex a. Male () b. Female ()
3. Marital status a. Single () b. Married () c. Separated ()
4. Ethnic affiliation: a. Akan b. Mole-Dagbon c. Ewe d. Mande e. Frafra f. Grusi h. Dagaba i. Guang j. Konkomba k. Builsa l. Gonja m. Other
5. Educational qualification a. Certificate () b. Diploma () c. Degree ()
d. Masters ()
6. Work experience (in years)



7. Duty work post a. Out/Field post b. Office-post
8. Religious affiliation: Muslim () Christian () Traditionalist () Others

Section II: Socio-Economic Status

9. What type of house do members of the household dwell in? Blockhouse [] Brick house [] Mud house [] Others (specify).....
10. What kind of toilet facility do members of the household usually use? Own flush toilet [] Public or shared flush toilet[] Own pit toilet [] Public or shared pit toilet []No facility[]
11. What is the source of lighting for the household? Electricity [] Gas [] Kerosene [] Others(specify)...
12. What type of fuel does your household mainly use for cooking? Electricity [..] LPG [..] Charcoal [] Kerosene [] Firewood [] Others (Specify).....
13. What is the main source of drinking water for members of the household? Pipe water [..] Borehole [..] Dug well [] Bottle /Sachet water[] Others (specify)...



14. Does your household have any of these assets? (Tick Yes or No)

ITEMS	YES	NO
Radio		
Clock or watch		
Colour TV		
Flat screen TV		
Sewing Machine		
Mattress		
Bed		
Table		
Chair		
Refrigerator		
Computer		
DVD/VCD player		
Electric Fan		
Telephone/mobile		
Bicycle		



Motorcycle		
Animal-drawn cart		
Car/truck		
Ownership of livestock		



Section III: Eating pattern and frequency

15. Who does the shopping for foodstuff at home? a. Self (..) b. Partner (..) c. Relatives (..) d. helper (..)
16. Who does the cooking at home? a. Self (..) b. Partner (..) c. Relatives (..) d. Helper (..)
17. What food do you eat at home? a. Whole-meals (..) b. Snack (..) d. Others (..)
18. What food do you eat at the workplace? a. Whole-meals (..) b. Snack (..) d. Others (..)
19. How often do you eat the following foods?



INSTRUCTION: TICK THE APPROPRIATE RESPONSE.

	Daily	Once a week	2-3 times in a week	> 3 times a week	Once a month	> 1 a month	Not at all
Energy giving foods							
Fufu							
Cassava and plantain							
Yam							
Cocoyam							
Others							
Boiled tubers (ampesi)							
Cocoyam							
Plantain							
Sweet potatoes							
Yam							
Cassava							
Others (specify)							
Rice and beans(waakye)							
Spaghetti/pasta/macaroni							





Gari							
Tuo-zaafi							
Banku							
Akple							
Kokonte/abeti							
Mpotompoto							
Plain rice (white)							
Plain rice(brown)							
Fried rice							
Jollof rice							
Vegetable rice							
Omo-tuo							
Ekwegbemi (Kpacherima)							
Hausa koko							
White porridge							
Tom brown							
Buff loaf							
Tea bread							
Sugar bread							
Wheat bread							
Butter bread							
Fruit juice							

Energy drinks							
Carbonated drinks							
Non-carbonated drinks							

20. Indicate the frequency of eating meals in a day

Meal type	Often	Not always	Missing always
Breakfast			
Lunch			
Supper			

21. What is the source of the meal for your breakfast? a. Bought (..) b. Prepared home (..) c.

Provided at workplace ()

22. What is the source of the meal for your lunch? a. Bought (..) b. Prepared home (..) c.

Provided at workplace (..)

23. What is the source of the meal for your supper? a. Bought (..) b. Prepared home (..) c.

Provided at workplace (..)

24. Do you skip meals sometimes? a. Yes (..) b. No (..) c. Do not know (..)

25. What is the frequency of meal skipping? a. Very often (..) b. Quite often (..) c.

Sometimes (..) d. Never (..)

26. Which type of meal do you skip? a. breakfast (..) b. lunch (..) c. supper (..)

27. Reasons for skipping meals a. Lack of time (..) b. Lack of accessibility (..) c. Weight

control (..) d. Not in my habits (..)



28. Which meal time will you like to improve upon? a. Breakfast (..) b. Lunch (..) c. Supper (..)

Section IV: Physical Activities

I am interested in finding out about the kinds of physical activities that people of your age do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person

Think about all the vigorous and moderate activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: Job-Related Physical Activity

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, compound work, general maintenance, and caring for your family. These are asked in Part 3.

29. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, heavy construction, or climbing upstairs as part of your work?

Think about only those physical activities that you did for at least 10 minutes at a time.

Days per week..... ***(If no vigorous job-related physical activity Skip to question 31)***



30. How much time did you usually spend on one of those days doing vigorous physical activities as part of your work? Hours per day minutes per day.....

31. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads as part of your work? Please do not include walking. Days per week..... (*If no moderate job-related physical activity Skip to question 33*)

32. How much time did you usually spend on one of those days doing moderate physical activities as part of your work? Hours per day..... minutes per day.....

33. During the last 7 days, on how many days did you walk for at least 10 minutes at a time as part of your work? Please do not count any walking you did to travel to or from work. Days per week..... (If no job-related walking Skip to PART 2: TRANSPORTATION)

34. How much time did you usually spend on one of those days walking as part of your work? Hours per day..... minutes per day.....



PART 2: Transportation Physical Activity

These questions are about how you travelled from place to place, including to places like work, stores, movies, and so on.

35. During the last 7 days, on how many days did you travel in a motor vehicle like a motor, bus car or tricycle? Days per week..... (*If no traveling in a motor vehicle Skip to question 37*)

36. How much time did you usually spend on one of those days traveling in a motor, bus, car or other kind of motor vehicle? Hours per day..... minutes per day.....

Now think only about the bicycling and walking you might have done to move to and from work, to and from school, to do errands, or to go from place to place.

37. During the last 7 days, on how many days did you bicycle for at least 10 minutes at a time to go from place to place? Days per week..... (*If no bicycling from place to place Skip to question 39*)

38. How much time did you usually spend on one of those days to bicycle from place to place? Hours per day..... Minutes per day.....

39. During the last 7 days, on how many days did you walk for at least 10 minutes at a time to go from place to place? Days per week..... (*If no walking from place to place*



Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE AND CARING FOR FAMILY)

40. How much time did you usually spend on one of those days walking from place to place?

Hours per day..... minutes per day.....

PART 3: Housework, House Maintenance, and Caring for Family

This section is about some of the physical activities you might have done in the last 7 days in and around your home, like housework, farming, compound work, general maintenance work, and caring for your family.

41. Think about only those physical activities that you did for at least 10 minutes at a time.

During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, chopping wood, or digging in the compound or farm? Days per week..... *(If no vigorous activity in compound or farm, Skip to question 43)*

42. How much time did you usually spend on one of those days doing vigorous physical activities in the compound or farm? Hours per day..... minutes per day.....



43. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate activities like carrying light loads, sweeping, scrubbing bath or floors, sweeping inside your home and hoeing the yard or compound? Days per week.... *(If no moderate activity, skip to question 45)*

44. How much time did you usually spend on one of those days doing moderate physical activities in the farm or compound? Hours per day..... minutes per day..... *(If no moderate activity inside home Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY)*

45. How much time did you usually spend on one of those days doing moderate physical activities inside your home? Hours per day..... minutes per day.....

PART 4: Recreation, Sport, and Leisure-Time Physical Activity

This section is about all the physical activities that you did in the last 7 days solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.



46. Not counting any walking, you have already mentioned, during the last 7 days, on how many days did you walk for at least 10 minutes at a time in your leisure time? Days per week..... *(If no walking in leisure time Skip to question 48)*

47. How much time did you usually spend on one of those days walking in your leisure time? Hours per day..... minutes per day.....

48. Think about only those physical activities that you did for at least 10 minutes at a time.

During the last 7 days, on how many days did you do vigorous physical activities like aerobics, running, fast bicycling, competitive football, volleyball or basketball game or fast swimming in your leisure time? Days per week..... *(If no vigorous activity in leisure time Skip to question 50)*

49. How much time did you usually spend on one of those days doing vigorous physical activities in your leisure time? Hours per day..... Minutes per day.....

50. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities like bicycling at a regular pace, swimming at a regular pace, none competitive volleyball, basketball, football and doubles tennis in your leisure time? Days per week..... *(If no moderate activity in leisure time*



Skip to PART 5: TIME SPENT SITTING

51. How much time did you usually spend on one of those days doing moderate physical activities in your leisure time? Hours per day..... minutes per day.....

PART 5: Time Spent Sitting

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

52. During the last 7 days, how much time did you usually spend sitting on a weekday?
Hours per day..... minutes per day..... (Estimate time spent for lessons in the case of those in school)

53. During the last 7 days, how much time did you usually spend sitting on a weekend day?
Hours per day..... minutes per day.....



Section V: Anthropometry

54. Record your weight: (kg)

55. Record your height.....(cm)

56. HIP..... (cm)

57. Waist..... (cm)



APPENDIX D

Kintampo Health Research Centre (KHRC) Institutional Ethics Committee (IEC)
P.O Box 200
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Ghana, West Africa



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FULL ETHICAL APPROVAL CERTIFICATE

Selorm Gifty Bansah
University for Development Studies
Box TL 1350
Tamale, Ghana.

Date: 18th December, 2019

Study ID: KHRCIEC/2019-27

Title of study: Assessing Eating pattern, physical activity and Nutritional status of police personnel in Tamale Metropolis.

Principal Investigator: Selorm Gifty Bansah (UDS/MPHN/0004/17)

Supervisor: Dr. Adadow Yidana

Type of Review: Full Board Review

Approval Date: 17th December, 2019

Expiration Date: 17th June, 2020

1. The Kintampo Health Research Centre Institutional Ethics Committee (IEC) is constituted and operates in conformance with requirements of 45 CFR 46, 21 CFR 50, 21 CFR 56 and section 3 of the International Council on Harmonization Guidelines, as well as all applicable regulatory, legal, and other ethical requirements governing human subject research in Ghana. The OHRP Federal Wide Assurance number for the committee is 00011103; the IRB registration number is 0004854.
2. The above study in title was reviewed by the IEC on 17th December, 2019 and given full ethical approval.
3. The following documents have been reviewed and approved for use;
 - 3.1 Assessing Eating pattern, physical activity and Nutritional status of police personnel in Tamale Metropolis. Version 3, Dated 9th December 2019.
 - 3.2 Participant Information sheet and informed consent form. Version 3, Dated 9th December 2019.
 - 3.3 Data collection tools Version 3, Dated 9th December 2019.
 - 3.4 Study Budget
 - 3.5 Curriculum Vitae of study Investigators.
4. Changes or modifications to the information sheet and informed consent form must be submitted and approved by the IEC before they are implemented.

Study File number: 2019-27

THE CHAIRMAN
KINTAMPO HEALTH RESEARCH CENTRE
INSTITUTIONAL ETHICS COMMITTEE.

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Kintampo Health Research Centre (KHRC) Institutional Ethics Committee (IEC)

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5. During study implementation, the IEC must be informed within 72 hours by the principal investigator (PI) of learning of any (a) unexpected, serious, study related adverse events; (b) disclosed adverse events, or (c) unanticipated problems with the study which may pose risk to study participants or others, if applicable.
6. All safety monitoring reports, including DSMB summaries and reports, must be submitted to the IEC as soon as they become available to PI, if applicable.
7. Changes or modifications to this research activity must be submitted and approved by the IEC before they are implemented.
8. PI(s) would be required to submit application for renewal of this approval certificate (if the study lasts for more than 6 months) plus a progress report.
9. PI(s) is required to notify the IEC of study completion (end of data collection/last follow-up) or early termination of the research project.
10. Submit final report of the study one month after approval certificate expires (study closure).
11. Before conduct of the study, submit original/final copy of your informed consent form for **authentication stamp** before making photocopies for your consent process.
12. Regulated study records, including IEC approvals and signed consent forms, must be securely maintained by PI(s) and available for audits for three years after the study is closed with the IEC.

Sincerely,

Nana Franklin Fei
Second vice Chair
Institutional Ethics Committee
Kintampo Health Research Centre

THE CHAIRMAN
KINTAMPO HEALTH RESEARCH CENTRE
INSTITUTIONAL ETHICS COMMITTEE.

Study File number: 2019-27

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