

**ASSESSMENT OF SELECTED HEALTH RELATED FITNESS
COMPONENTS OF THE UGANDA POLICE FORCE
FROM THE CENTRAL REGION OF UGANDA**

BY

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**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
AWARD OF A DEGREE OF MASTER OF SCIENCE IN
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DECLARATION

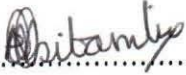
I, **BALAGANA CHARLES GODWIN MUKIIBI**, hereby declare to Kyambogo University Senate that, this Thesis is my original work and has never been submitted to any other University for the award of a Masters Degree or any other academic or professional award.

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APPROVAL

This is to certify that this thesis of **BALAGANA CHARLES GODWIN MUKIIBI**, under the title "**Assessment of selected Health Related Fitness Components of the Uganda Police Force from the Central Region**" has been constantly under our supervision and is now ready for submission.

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DEDICATION

This work is dedicated to my wife Sylvia, our children Martin, Arthur, Andrew and my Dad and Mum, Mr. and Mrs. A.L. Mukiibi.

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The completion of this work would not have been possible without the contributions of the following persons to whom I feel most profoundly indebted and wish to express my sincere appreciation: my wife, Mrs. Sylvia Mukiibi, for her support and encouragement throughout the course; and my Supervisors, Dr. Njororai W. W. Simiyu and Mrs. Connie Nsibambi, whose help, patience, and guidance saw me through the entire course.

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ABSTRACT

This study was conducted in the Police force from the central region of Uganda. The objectives of the study were: to establish the fitness levels of the Uganda Police force with regard to selected fitness variables and to ascertain the relationship between duty performance and the selected fitness variables in the police force. Four (4) health related physical fitness components were assessed and these are: Aerobic endurance, Flexibility, Strength endurance and Percent body fat. The sample comprised of 60 subjects split equally between the Traffic police and the Riot police departments. A pre-experimental research design was used in this study. Purposive sampling procedure was employed in selecting the Police Departments. Stratified random sampling procedure was used in selecting the subjects and simple random sampling technique was used to choose the subjects per their duty stations, within the same department and of the same gender. The results were then compared to the already established norms as published by the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD 1985). Fitness tests for each of the selected fitness components were carried out and the data obtained was compared with the norms as established by AAHPERD (1985). There after, the data was analyzed using the analysis of variance (ANOVA) method in order to test the research hypotheses. For the aerobic condition, 73.3% from the traffic police department and 53.3% from the riot police department showed bad aerobic condition. For strength endurance levels; 60% of the subjects from the traffic police department scored strength endurance levels below average while 50% of the subjects from the riot police department scored above average. On the side of flexibility scores; 66.6% of the total sample from the riot police department had flexibility scores above the average mark while 50% of the total sample from the traffic police had their flexibility scores above the average mark. The flexibility scores from both the riot and traffic police departments therefore put all the subjects within the acceptable range. Body composition results revealed that there was no subject that was over fat from both the riot and traffic police department. It was recommended that regular fitness test programmes should be initiated in the Uganda police force.

TABLE OF CONTENTS

Title page.....	i
Declaration page.....	ii
Approval.....	iii
Dedication.....	iv
Acknowledgments.....	v
Abstract.....	vi
Table of contents.....	vii
List of figures.....	ix
List of Tables.....	x
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background to the Problem.....	1
1.2 Statement of the Problem.....	3
1.3 Purpose of the Study.....	4
1.4 Objectives of the Study.....	4
1.5 Research Hypotheses.....	5
1.6 Conceptual Framework.....	5
1.7 Significance of the Study.....	6
1.8 Assumptions.....	8
1.9 Limitations.....	8
1.10 Delimitations.....	8
1.11 Definition of Operational Terms.....	9
CHAPTER TWO: REVIEW OF RELATED LITERATURE	10
2.1 Introduction.....	10
2.2 Physical Fitness.....	10
2.3 Entry Requirements in the Police Force.....	12
2.4 Fitness Test Batteries.....	13
2.5 Selected Health Related Fitness Components.....	15
2.5.1 Aerobic Endurance.....	15
2.5.2 Flexibility.....	18
2.5.3 Body Composition (percentage body fat).....	21
2.5.4 Strength Endurance.....	22
2.6 The Benefits of the Health Related Fitness to the Police.....	24 26
2.7 Other Research Studies.....	28
2.8 Summary.....	

	CHAPTER THREE: METHODOLOGY.....	30
3.1	Introduction.....	30
3.2	Research Design.....	30
3.3	Target Population.....	30
3.4	Sample Size and Sampling Techniques.....	30
3.5	Research Instruments.....	31
3.6	Piloting	32
3.7	Data Collection Procedure.....	32
3.8	Data Presentation and Analysis	35
	CHAPTER FOUR: PRESENTATION OF RESEARCH FINDINGS AND DISCUSSION.....	36
4.1	Introduction.....	36
4.2	Age Distribution.....	36
4.3	Gender Distribution.....	37
4.4	Experience in the Police Force.....	38
4.5	Analysis of the Selected Health Related Fitness Components.....	40
4.6	Data Analysis in Relation to the Research Hypotheses.....	56
4.6.1	Police Duty Performance and Selected Health Related Fitness Components.....	57
4.6.2	Experience in the Police and Levels of Fitness.....	60
4.6.3	Age and Fitness Levels.....	62
	CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.....	66
5.1	Introduction.....	66
5.2	Summary of Findings.....	66
5.3	Implications of the Findings.....	67
5.4	Conclusion.....	69
5.5	Recommendations.....	69
	References.....	71
	Appendix I.....	77
	Appendix II.....	78
	Appendix III.....	79
	Appendix IV.....	80
	Appendix V.....	81
	Appendix VI.....	83
	Appendix VII.....	84

LIST OF FIGURES

Figure 1.1	Conceptual framework.....	6
Figure 4.1	Gender distribution.....	37
Figure 4.2	Aerobic condition.....	42
Figure 4.3	Flexibility Levels.....	46
Figure 4.4	Strength Endurance Levels.....	50
Figure 4.5	Percentage body fat rating.....	55

LIST OF TABLES

Table 4.1	Age distribution.....	36
Table 4.2	Experience (years) in the police force.....	38
Table 4.3	Results of the 12 minutes Walk/run test for the Traffic Police Department.....	40
Table 4.4	Aerobic Condition of the subjects from the Traffic Police Department.....	41
Table 4.5	Results for sit and reach flexibility test of the riot police Department.....	44
Table 4.6	Results for the sit and reach flexibility test of Traffic Police department.....	45
Table 4.7	Results of the 1minute push-up test for the riot police department.....	48
Table 4.8	Results of 1minute push-up test for the traffic police department.....	49
Table 4.9	Estimated fat composition from the riot police department.....	53
Table 4.10	Estimated body composition from the traffic police department.....	54
Table 4.11	One-way ANOVA for the relationship between duty performance and the selected health related fitness components in the selected Police departments.....	57
Table 4.12	One-way ANOVA for the relationship between Experience and selected health related fitness components for duty performance in both riot and traffic police departments.....	60
Table 4.13	One way ANOVA for the relationship between Age and the health related fitness components of the subjects from both riot and traffic police departments.....	63

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Physical fitness is an important aspect of day to day life and of great significance to all mankind for purposes of efficiency in performance of daily chores. Every individual is therefore required to be in an optimum state of fitness in order to perform one's daily routine satisfactorily. The benefits of physical fitness go beyond the preparations for participation in sports. Being fit improves on one's health status. The World Health Organization (WHO) defines health as the state of complete physical, mental and social well-being and not merely the absence of disease (Hawes and Scotchmer, 1993). Also according to Ryan, Nicklas and Elahi (1994), anyone who lives a sedentary life and does not exercise, regardless of the good diet and sound medical principles, will have painful days and his strength shall wane. There is therefore a close link between exercise, physical fitness, health and work.

Physical fitness is therefore a major requirement for the members of the Uganda Police Force in order for them to carry out their duties effectively. The level of fitness required of the police personnel, however, is not uniform and is expected to vary according to the type of duties the members of the police force in question are assigned to perform. Some duties put a lot of demand on particular fitness components than others. Nevertheless, all police personnel are expected to require some basic level of fitness for effective delivery of services.

Physical fitness is the capacity to sustain physical activity without excessive fatigue. The components of physical fitness are categorized into two namely; health related and Performance related physical fitness components (Miller and Allen, 1989).

The performance related physical fitness components include; Speed, Reaction time, Power, Coordination, Agility, Balance. The health related physical fitness components are;

Aerobic endurance, Flexibility, Muscular endurance and Percentage body fat (Corbin and Lindsey, 1988). The selected health related fitness components that were considered in this research included: Aerobic endurance, Flexibility, Percentage body fat and Muscular strength endurance. These health-related fitness components are useful in the day-to-day functioning of human beings (American College of Sports Medicine, 1998).

The police force largely deals with human beings; therefore it is important that the police personnel have physical fitness level above that of the average person. The emphasis here is that for one to keep a sound mind in order to stay emotionally stable and also to be in a good position to carry out the various physical tasks efficiently as required, one must strive for above ordinary physically fit state. This is based on the fact that, intelligence, emotional stability and physical ability are some of the major requirements in duty performance of the police. Various physical fitness components are required, but the health related fitness components are basic in relation to improving all the other fitness components (Cooper, 1968).

Recent studies have shown that many members of the Uganda Police Force were unable to carry out their duties effectively due to lack of fitness. By March 2003, hundreds of unrepentant ineffective members of the police force were retired. In addition, many more sought for retirement (Kavuma and Mwanguhya, 2003). This was because of failing the mass fitness test that was ordered for all members of the Uganda Police by the then Inspector General of Police, Major General Edward Katumba Wamala in 2002 (Kavuma and Mwanguhya, 2003).

In November 2003, the Police Council announced the sacking of another three hundred (300) members of the police force due to incompetence and inadequacy in carrying out their duties (Kavuma and Mwanguhya, 2003). The Police Council further warned that even some senior police officers would be retired in public interest. There were many reasons for this mass retirement that included drunkenness, absenteeism and others. But above all, their poor physical fitness played a major role. By the nature of their duties, Police Officers are supposed to be reasonably fit so as to carry out their work diligently.

At the same time, the Uganda Government spends a lot of resources on the development and maintenance of the Police Force. For example, the government meets all the training costs, pays their salaries, and buys the uniforms and all other police accessories. In addition, the government buys fuel for the patrol cars and pays rent for accommodation and office space of the police force (Human resource department/Research and statistics department- Uganda Police, 2004). All these are geared towards enhancing effective performance of the police force. Thus retiring more than three hundred (300) members of the police force prematurely would mean wasting the taxpayers' money. Continuous retiring of the members of the Police force would mean reduction in their numbers thus making the force more ineffective in performing its duties. This would lead to various other consequences like increased insecurity, increased lawlessness, and increased road accidents to mention but a few. It was with this background that the researcher carried out a study on the health related fitness level of the members of the police force and how this level affects their performance. The results of this study would be useful in sensitizing the police force in enhancing their physical health and thereby be better placed to discharge their duties effectively.

1.2 Statement of the problem

Members of the Uganda police force perform various physically and mentally demanding duty assignments. In order to perform all the arduous and hazardous daily activities without necessarily getting easily fatigued, they require a certain level of physical fitness. Physical fitness has a significant impact on the physical health, emotional health and job performance of the law enforcement officers. This, therefore, calls for the concerned individuals to live a physically active life style in order to keep up with the demands of their jobs.

It has also been well documented that the police personnel (as an occupational class) have serious health risk problems in terms of cardiovascular diseases, low back disorders, and obesity (Jurkanin, 2002). This comes due to their involvement in specific critical tasks in which poor physical performance puts the officer or public in jeopardy.

These include; running short and moderate distances in foot pursuits, climbing stairs and fences, jumping and dodging obstacles, lifting and carrying objects and people, use of hands and feet for self-defense and many others. Physical fitness is therefore a health domain, which can minimize the “known” health risks for the police officers. It is also an important area for minimizing liability. That is to say, the unfit officer is less able to respond fully to strenuous physical activity. Consequently, the risk of not performing physical duties is increased. If one takes some time without upgrading one’s fitness, then such a person’s level of fitness will become so low that s/he will be inadequate for effective duty performance. This is based on the fact that one’s physical fitness cannot be stored and for one to keep in a good physical condition, it requires one to keep training. Information as provided by the Human resource department at the Uganda police training school Kibuli (2003) indicated that a high level of physical fitness is a prerequisite to joining the police force. During training also, the recruits are continuously exposed to physical workouts in order to keep them in good physical condition. However on qualifying in the police force no follow up is done and no guidelines are provided for the police officers about the importance of physical fitness. This creates a problem and therefore need to emphasize it to the concerned people later to cater for it.

The study investigated how the levels of physical fitness of the members of the police force affected performance of their duty assignments. It also determined the fitness levels for the members upon which the Government can base to periodically evaluate the members of the police Force.

1.3 Purpose of the study

The purpose of this study was to assess the selected health related fitness components of the members of the Uganda police in the central region in order to establish the relationship between the fitness level and the duty demands in the police force.

1.4 Objectives of the study

These included the following;

- 1) To establish the selected demographic details of the sampled members of Uganda Police.
- 2) To establish the fitness levels of the Police force with regard to aerobic endurance, flexibility percentage body fat and strength endurance,
- 3) To ascertain the relationship between duty performance in the Uganda police force and the selected health related fitness components.

1.5 Research hypotheses

It was hypothesized that:

- (HO₁) There was no significant relationship between the type of work and level of fitness in terms of;
- Aerobic endurance
 - Flexibility
 - Percentage body fat
 - Strength endurance
- (HO₂) There was no significant relationship between experience in the police force and level of fitness in terms of;
- Aerobic endurance
 - Flexibility
 - Percentage body fat
 - Strength endurance.
- (HO₃) There was no significant relationship between age of the members of the police force and level of fitness in terms of;

- Aerobic endurance
- Flexibility
- Percentage body fat
- Strength endurance

1.6 Conceptual framework

This study was based on the strong belief that physical fitness is vital to law enforcement officers (Hopkins, 2003). Therefore, for professional efficiency, new recruits and in-service law enforcement officers need to undergo duty related fitness tests. This study was about assessment of selected health fitness components of the members of the Uganda Police force (Central region). It was conceptualized that duty performance in the police force is highly dependant on level of fitness of the individual. The level of fitness is also associated with sex, age, rank, experience and type of work of the members of the police force. Living a sedentary life style leads to the deterioration of the fitness level of the individual, thus resulting into inefficiency in duty performance in the police force. Thus for effective performance of the duty demands in the police force, the above mentioned variables should be put into consideration as one establishes the appropriate routine that should be followed by the members of the police force. This implies that each individual police officer's fitness level should be maintained to the appropriate level of physical demands throughout the officer's service duration. According to a model adapted from Hill and Melanson (1999), the duty performance of the Police officer is dependent on the level of fitness of the officer. The level of fitness of the police officer in turn is derived the combined effect of sex, age, rank, experience and type of work assigned.

The Figure 1.1 illustrates the relationship between duty performance, fitness levels, sex, age, rank, experience and type of work as contributing factors.



FIG 1.1: Relationship between duty performance and fitness level in accordance to sex, age, rank, experience and type of work (Adapted and Modified from Hill and Melanson, 1999).

1.7 Significance of the study

The police occupation is one area whose many duties are largely influenced by the physical ability of the performer. Various physical fitness components are normally put into consideration so as to enable effective duty performance. Since 1976 the Cooper Institute of aerobic research (2002) has been working hand in hand with various law enforcement departments in America with the aim of establishing the physical fitness requirements for their personnel. Indeed through out United States of America, each state has established its own physical fitness requirements for its law enforcement officers. Various components of physical fitness are considered differently by the various states to be of value to duty performance.

In the Uganda police, physical fitness requirements are emphasized as entry point, which are only maintained during training. On graduation from Training College, the police force have not yet established means of emphasizing a particular level of physical fitness that should be maintained by the police officers in relation to duty performance leave alone

which physical fitness components to be considered important (Human resource department at the Uganda police training school Kibuli, 2003). The implication here is that nothing is known about the fitness status of the members of the police force. This study was therefore carried out so as to provide a basis on which to develop fitness maintenance programmes for the police force and other uniformed forces in the country. This study was based on the fact that before anything else, one's health status and emotional stability should be proven to be sound if one is expected to serve with diligence in the stressful environment of the police force.

This study therefore, can be utilized as a source of reference for the relevant authorities in the police force in regard to the importance of physical fitness. In addition, the findings here would enable the police administration to appreciate regular testing and assessment of the members of the police force. The police administration can utilize this information to compile a data bank, which will act as a guide to objective promotion of the members of the police force. From this study, other research studies can be carried out which will be beneficial to the police force in Uganda. The study will benefit other security organs in Uganda like the army, the prisons and the private guards. Being the first study of its kind in Uganda, it would narrow the research gap on fitness among the uniformed forces.

It has been well documented that police personnel (as an occupational class) have serious health risk problems in terms of cardiovascular diseases, lower back disorders, and obesity. The consequences of this phenomenon are also well known. These include; greater vulnerability to duty injury and illness, increased exposure to liability and loss of respect by the public at large among others (Jurkanin, 2002).

1.8 Assumptions

Assumptions made while carrying out the research were;

- a) All subjects understood fitness components.
- b) The norms of the fitness tests to be carried out are applicable in the Ugandan situation.
- c) Subjects carry out regular fitness activities on their own.

1.9 Limitations

- a) Collection of data was a problem in that at first the police force was reluctant to withdraw such a big number of police constables for the fitness tests.
- b) Many of the police Officers were not comfortable with the fitness tests because of the fear to expose their weaknesses.

1.10 Delimitations

The study was delimited to the following:

- a) The subjects who were members of the police force specifically from the traffic police and riot police departments.
- b) The subjects were from the central region of Uganda that included the capital city.
- c) Assessment was only for flexibility, strength endurance, aerobic endurance and percentage body fat, using the tests in Appendix I, II, III and IV.

1.11 Definition of operational terms

Members of the police force	Men and women of the police force within the Riot and Traffic police departments.
Fitness	Health related fitness components including; flexibility, strength endurance, aerobic endurance and percentage body fat.
Flexibility	The ability of an individual to move body joints through a given range of motion without undue strain. The score is the inches reached on a yardstick.
Strength endurance	Ability of the muscles to exert sub maximal force for extended periods. The score is in the number of push-ups per minute.

Aerobic endurance

Ability to take in and deliver oxygen to working muscles to produce energy to sustain the activity, determined by the number of meters ran/walked in 12 minutes

Percentage body fat

It is the proportion of body fat to lean body tissue. It is determined by getting the total amount of skin folds in millimeters from the various sites on the body in relation to age of the individual as shown in appendix III

Duty performance

Sections under which the police members work including traffic and riot departments.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter contains the reviewed literature on the following important aspects of the study: physical fitness, aerobic endurance, flexibility, percentage body fat, and strength endurance. It also explains the entry requirements in the Police force from various dimensions and the fitness batteries established by some sampled departments worldwide. Finally the chapter contains a section on the benefits of the health related physical fitness components to the police force.

2.2 Physical fitness

Physical fitness is defined as the capacity to perform everyday activities with reserve energy for emergency situations (Miller and Allen, 1989). In relation to law enforcement officers, physical fitness is also referred to as the physical ability to perform all of the arduous and hazardous daily activities of any law enforcement officer without undue physical stress and to have enough physical ability reserves for sudden physical emergencies like chasing illegal aliens or pursuing and subduing criminal aliens (Henderson, 2004).

Physical fitness consists of a number of different components. These were categorized into two groups namely; performance-related physical fitness components and health related physical fitness components (Honeybourne, Hill and Moors, 1996). On the one hand, the performance related physical components relates to many of the tests one may have taken, usually in schools, which measured one's level of strength, skill, power, endurance, agility, in particular physical activity. They thus measure only a limited aspect of fitness. These include; speed, reaction time, power, coordination, agility and balance (McGlynn, 1999). On the other hand, the health related physical fitness components cover the aspects of our physical and psychological makeup that affords us some protection against coronary heart disease, problems associated with being over-weight, a variety of muscle and joint

ailments, and the physiological complications of our responses to stress. These include; aerobic endurance, flexibility, muscular strength, percentage body fat and muscular endurance, (McGlynn, 1999).

Numerous studies show that physical fitness is a fundamental determinant of the quality of physical activity performance and alertness (Amusa, 1981; Reilly, Secher, Snell and Williams, 1990). Physical fitness is vital to law enforcement officers due to the numerous benefits it offers that include;

- Reduction of high blood pressure as well as offering a reduced risk of developing high blood pressure.
- Reduction of high cholesterol.
- Reduction of the risk of developing diseases such as cardiac diseases, diabetes, colon, prostate and breast cancer and many others.
- Reduction of body fat composition.
- Building and maintaining healthy muscles and bones.
- Developing toughness to handle emotional stress (Henderson, 2004).

Thus the level of physical fitness greatly matters to law enforcement officers in regard to the activity demands subjected to them during duty assignments.

Physical fitness has been also demonstrated to be a bonafide occupational qualification. It underlies the factors that determine the physiological readiness to perform a variety of critical tasks as demanded by the police force. Fitness levels have also been shown to be predictive of sick time and job performance indicators. Therefore, physical fitness is an important area for minimizing liability. The unfit person is less able to respond fully to strenuous physical activity, consequently, the risk of not performing physical duties is increased (Wade, 2004).

The police have unique job functions, some of which are physically demanding and risky. The police officers' capability to perform those functions can affect personal as well as

public safety. In most cases when the police are called upon for help they take a long time without responding even when they are close to the crime scene (Kavuma and Mwanguhya, 2003).

Physical fitness therefore underlies an officer's ability to perform the frequent and critical job tasks. The minimum fitness standards identified are the requisite levels for an officer to effectively learn the frequent and critical job motor skills. High levels of fitness are associated with better performance of physical job tasks (Wisotzki, 2002). Since the police personnel are constantly subjected to physical performance demands, it is important that they keep themselves in shape in order to meet the requirements of such demands. Practical exercise performance requirements are physical activities related to the police tasks (Blagojevich, 2004).

Physical fitness is achieved when the organic systems of the body are healthy and functions efficiently so as to resist disease and to enable the fit person engage in vigorous activities. Thus improvement in the physical fitness components leads one to elude illness and makes one able to perform routine activities better and with ease (Andes, 1991).

2.3 Entry requirements in the police force

In order to gain entry into the police force, one is required to pass a physical fitness test. To some it requires being able to run a certain distance under a certain time and to do some exercises such as push-ups and sit-ups. For example in the Mississippi police corps the following fitness tests is undergone by whoever wants to join the police and one must score over 60% of the established norms (Hoffman and Collingwood, 1995).

- Agility runs- 18.60secs for males and 21.10secs for females
- Trunk flexion- 11units for males and 12units for females.
- 1.5mile run- 14.30mins for males and 17.18mins for females.
- Push-ups- 25 in 2 mins for males' and 13 in 2 mins for females.

This signifies the importance of physical fitness in the police force. However, the level of physical fitness should not only be good at entry in the police force but through out one's career in the police force.

Habitual participation in physical workouts induces specific adaptation in the performance in line with the demands of the physical activity. These specific physical - physiological adaptations have been shown to vary from activity to activity (Carter, Anbry, Hebbelink and Bons, 1982).

The in-service physical fitness policy guidelines for law enforcement officers were established in USA. These emphasize regular assessment of the in-service law enforcement officers as a requirement in serving in the American forces. In the policy, general guidelines provision and target values for the screening and physical fitness evaluation of the law enforcement officers are stated that must be followed (Henderson, 2004).

Specific physical fitness tests to measure particular components of fitness are carried out regularly to determine where any limitation may lie. The important thing to consider is the validity of the tests and how they are related to the individuals' performance in the field and also how it relates to work performance in the job itself (Wade, 2004).

The most identified fitness components that are job related in the police force include: power, body fat, strength endurance, Aerobic endurance, speed, flexibility, agility and reaction time (Hopkins, 2003). Fitness test batteries that are carried out, therefore, must at least cover a number of the above mentioned fitness components.

2.4 Fitness test batteries

The Mississippi police corps for example established a test battery that includes:

- Agility runs
- Trunk flexion
- 1.5 mile run
- Push ups

The individual's performance in each is compared with the established norms and whoever does not achieve the required standard is retired from the forces (Hoffman and Collingwood, 1995). Similarly the Iowa Law enforcement Academic established physical

fitness standards which must be achieved by whoever wants to join the academy prior to being accepted. These standards involve fitness tests that include:-

- Sit and reach test
- 1 minute sit up test
- 1 minute push-up test
- 1.5 mile run

The standards established insist that at least one scores 50% of the established norms in the above tests in order to be accepted in the academy (Quinn, 2004). Physical fitness for effective performance has many inter-related components involving intellectual, emotional and physical factors. The tendency of one to perform routine activities better and with ease largely depends on the health related physical fitness components (Sharkey, Gaskill and Brain, 1997) that include: -

- Aerobic endurance
- Strength endurance
- Flexibility
- Percentage body composition

These underline the ability to move well in numerous situations and having the desire to perform physical activities.

Since physical fitness is an element of the police's arduous and hazardous job descriptions, then it follows that members of the police force must have adequate physical fitness in order to perform these duties. Therefore, it is important that all members of the police force include physical fitness as a job element in their regular performance work plan.

2.5 Selected health related fitness components

2.5.1 Aerobic endurance

Aerobic endurance is considered to be the most important fitness component because it underlies life and is the most indicative measure of a person's physical condition (Baumgartner and Jackson, 1999). It is defined as the ability to perform whole body activity for an extended period of time without undue fatigue. It consists of systems that are vital to

living and are responsible for producing and transporting oxygen and nutrients from where they are provided into the body to where they are required in the body. The systems are also responsible for the removal of the waste materials of metabolism, which would otherwise be toxic in the body if left to accumulate. Aerobic endurance is the best index of physical fitness as it indicates an individual's ability to perform work (Astrand and Rodahl 1986).

Therefore one's level of aerobic endurance can be determined depending on the duration one takes in performing a given task. In the police, this fitness area relates to performing tasks that may involve sustained activity such as a lengthy foot pursuit followed by a physical confrontation. A police personnel is therefore expected to be in a better physical condition to carry out such.

The rationale for using oxygen up take as a valid index of physical fitness was summarized by Astrand and Rodahl (1986) as follows:-

"That during prolonged heavy physical work, the individual's performance capacity depends largely on his ability to take up, transport and deliver oxygen to working muscles. Subsequently, the maximum oxygen up- take is possibly the best measure of a person's physical fitness" (pp.315).

This implies, therefore, that an individual's working capacity depends largely on his oxygen consumption. If one consumes and utilizes less oxygen, then one's capacity to perform work is greatly limited. Johnson and Nelson (1988) also pointed out that the most accurate measure of aerobic endurance; the key component of physical fitness is the maximal oxygen uptake. Performance of prolonged physical activities when one has a low aerobic endurance will affect the vital systems to living. Low aerobic endurance contributes to some of the following problems:-

- Hypertension
- Coronary heart diseases
- Obesity

- Chronic low back pain
- It is also linked strongly to diabetes, osteoporosis and cancer (Corbin and Lindsey, 1988; Jackson and Squirres, 1982).

A good aerobic endurance indicates that the body is sufficiently supplied with oxygen, which facilitates complete breakdown of food to provide maximum energy in the body. According to Bouchard and Lortie (1984) and Pak-kwong (1995), physical activity improves aerobic endurance. The cardio-vascular system improves due to increased stroke volume, increased blood volume, increased mitochondrial activity and hypertrophy of the myocardia. The respiratory rate, improves due to increased lung volume, lowered respiration rate, improved pulmonary ventilation and diffusion (Wilmore and Costill, 1994).

Members of the police force need enough energy to enable them carry out physical work for long periods of time. There are numerous exercise protocols that were established to evaluate aerobic endurance in the world ranging from sophisticated laboratory tests, to simple field tests (Lippincott and Wilkins, 2000).

The laboratory tests include the use of advanced machines to determine oxygen intake of an individual. The machines include the Treadmill (cycle ergometer), the bicycle ergometer and the swim flume among others. These are large and very expensive gadgets that could not be easily acquired for this study. They also require highly technical personnel to handle them effectively. For this study, field-tests were used because of the following reasons;

- They can be used to test large groups of subjects at ago.
- They are not expensive.
- They are less time consuming.
- They are easy to administer (need very little specialized training) (American Association for Health, physical Education, Recreation and Dance (AAHPERD), 1980; Borms, 1984; Clarke and Clarke, 1987; Harvey and Scott, 1967; Johnson and Nelson, 1988).

Most commonly used field tests include;

- **Rockport test**

This was developed at the Rockport walking Institute. It is suitable for subjects who are between the ages of 20 - 69. Here the subject is required to walk for one mile as quickly as possible. There after the subject takes his heart rate for 15seconds. Charts are applied to classify the subjects' fitness level.

- **Cooper test**

Cooper (1982) developed this in 1968. The test was found to have a high Vo₂ Max correlation of 0.9. It is a 12-minute run-walk test, which is time based, therefore the subject is supposed to walk or run continuously for 12 minutes. There after the distance covered is calculated in meters and compared with the norms as established by Cooper in order to determine one's level of fitness (Cooper Institute Aerobic Research, 2001).

- **The Institute of American Alliance for Physical Education, Health, Recreation and Dance established another walk-run test.**

Here unlike Cooper, they measured time taken to complete a specified distance and the distances that were considered are; 1-mile and 1.5-miles. The subject is supposed to walk or run continuously a distance of either 1mile or 1.5miles. There after the time taken to cover the given distance is recorded and compared with the established norms (Cooper Institute Aerobic Research, 2002).

- **Step tests**

These are field tests that require the subject to step up and down from a platform. They apply the post-external heart rate response to predict oxygen consumption by the subject. These step tests can be; single stage or multiple stages, externally paced or self paced, and may have continuous or discontinuous workload with predetermined arbitrary work points. Administration of a single externally paced test uses a 3-minute time period, cadence of 26 steps per minute. The step height should be appropriate to the individual subject. The participants step up and down a single step such that the feet both go up and then both

return to the initial level in the rhythm "up-up, down-down". When the 3-minute stepping period is completed, the heart rate is measured for 15 seconds within 5 seconds of the completion of the test. This study employed the Cooper test (12 minutes run-walk test) when carrying out the aerobic endurance test (Ohtake, 2000).

2.5.2 Flexibility

Flexibility is an important aspect of physical fitness and the lack of it can create disorders or functional problems for any individual. Anyone with a stiff spinal column is at a disadvantage in many physical activities and also fails to get full value from the shock-absorbing arrangement of the spine when walking, running or jumping (Miller and Allen, 1989).

Flexibility is defined as the ability of an individual to move the body joints through a maximum range of motion without undue strain (Safrit and Wood, 1995). Flexibility is not a general factor but is specific to given joints and to particular physical activities. It is more dependent on the soft tissues (ligaments, tendons and muscles) of a joint than the bony structure of the joint itself. Factors that affect flexibility include: - joint structure, body size, sex, age and physical activity (Safrit and Wood, 1995).

Flexibility increases with growth until the adolescent stage when it starts to decline (Borms, 1984). Failure to continuously move a joint through its full range of motion can lead to shortening of muscles and ligaments. Flexibility is lost easily during periods of inactivity (Wilmore and Costill, 1994). Physical activity improves trunk flexion hence reducing risks of low back pain and joint injuries (Bonneau and Brown, 1995).

Extreme flexibility, however, has disadvantages. If one's joints are too loose, one may be more susceptible to joint injuries. Thus the members of the police force require a given level of flexibility in order for them to be effective in their duty performance. Good flexibility reduces the possibility of aches, pains, and inflammations associated with joints that are stressed through rigorous activities (Getchell, Mikesky and Mikesky, 1998). It is

also an important remedy for lower back disorders. With the required level of flexibility, members of the police force are able to carry out their duties effectively. There is no single test that gives you a score for overall flexibility. Each test is specified to a particular movement or joints (Honey Bourne, Hill and Moors, 1996). Most of the flexibility assessments that are done are based on static flexibility. There are two testing procedures of flexibility, these are; direct methods and indirect methods.

The direct methods

These involve the use of machines to determine flexibility at a particular joint. These devices give the precise measure of flexibility. The devices include; a manual goniometer, the Guymaon electric goniometer, and the Leighton flexometer. All the above apply the same principle in determining the flexibility of an individual (McGinnis, 1999). Though they are precise and give the most accurate results, they are not commonly used. This is because they are expensive and even their administrability is somehow complex. Also they were not readily available when the study was being conducted

The Indirect Methods

These are also known as the field tests. Because of the specific nature of the flexibility tests, not many of the practical tests have a high degree of validity as measures of general flexibility. But all have certain usefulness as measures of the flexibility of specific body parts. Most of the tests are measured in the distance covered and not the angle through which the joint was moved. Hence there is need of a tape measure, or ruler or a sliding caliper. Most common and popular field test includes:

- **Kraus-Weber Sit and Reach Test**

This was designed to measure flexibility of the low back and posterior thigh muscles. Here the subject is long seated with feet flat against the side of the sit and reach box. A sliding scale is fixed on top of the box. The subject then puts the hands on top of each other and gently pushes the slide to the maximum possible point without bouncing. The score got is recorded to the nearest whole number (Baumgartner and Jackson, 1999).

- **Kraus-Weber floor touch test**

The objective of this test is also to measure trunk flexibility or the length of the back and hamstring muscles. The subject assumes an erect standing position on bare feet, with feet together, arms hanging by the sides. The subject then leans downwards, attempting to touch the floor with the fingertips, and hold the floor touch position for 3 seconds. The knees must be straight throughout the test. If the subject touches the floor for 3 seconds, he passes the test otherwise it is a failure (Getchell *et al.*, 1998).

- **Trunk Extension**

Cureton (1985) developed this Test. Its objective is to measure the ability to hyperextend the trunk. The subject initially lies in a prone position on the mat. Both hands are placed on the lower back. A partner holds the hips against the mat. Thereafter with the use of a tape measure the distance from the mat to the superasternal notch is determined. However, for this test no standard norms have been determined yet. Each individual applies own standards.

- **Forward Bend of Trunk test**

This test was designed to measure the flexion of the trunk and hips. The test can be administered either on the floor or on a table. The subject assumes a sitting position with the fit against the wall, hips-width apart, knees straight through out the test and the palms against the mat next to the upper thighs. The subject leans forward and downward as far as possible towards the heels of the feet. Thereafter the vertical distance from the superasternal notch to the floor is measured and recorded. The lower scores (shorter distances) represent greater flexibility. No norms have been established (Mo, 2001).

The researcher used the Sit and reach test. This is because it is a test that is easy to administer. At the same time, the equipment used can easily be obtained locally.

2.5.3 Body composition (percent body fat)

In recent years body fat content has become widely used as one of the indicators of health and fitness. By monitoring percentage body fat and weight regularly, there are many things

a person can learn about his/her fitness and changes in fitness as time progresses (Wallace, 1995). Body composition refers to the proportion of body fat to lean body tissue (McGlynn, 1987). The relative balance of these two body components is a better gauge of fitness level than ordinary body weight.

According to Wallace (1995), a person's body is made up of many different components. Some of the major components are: bones, muscles, organs and fat. The amount or percentage of the fat components determines ones' physical appearance, health status, fitness and longevity (Jackson, Morrow, Hill and Dishman, 1995). Possession of extra pounds of fat tissue in one's body leads to a condition called obesity. Obesity is one of the most known health problems confronting people today. Obesity is referred to as excessive enlargement of the body's total quantity of fat (Abraham and Vintallie, 1980). Although there is little agreement as to the exact causes of obesity, there is considerable information regarding the associations between excessive body fatness and a number of health risks that include; Impairment of cardial function, Hypertension, Diabetes, Renal disease, Gall bladder disease, Pulmonary diseases, Osteoarthritis and many others (Abraham and Vintallie,1980). When one exercises, one inevitably utilizes more calories than when one is sedentary. Therefore, one starts to lose weight. Also there is an increase of muscle tissue with a decrease in stored fat. One's body dimension changes, resulting in a slim waist, trim hips and thighs, and an improved overall appearance (Getchell *et al.*, 1998).

Eating food rich in excess calories and inactivity are the main sources of accumulation of excess fats in an individual (Fox and Mathew, 1981). Much as members of the police force need a lot of calories in their bodies, they must be in position to utilize them in order to avoid obesity. The obese condition affects their appearance and their ability to work. For example, the enlarged abdomen, fat cheeks and big buttocks distort the general body shape of the individual. It may even not fit well in the police uniform (Graham, 2004). Therefore, the percentage body fat must be kept at the required level because it plays a major role to one's appearance, health, and longevity (Wallace, 1995). Also several studies have indicated that increased body fat is detrimental to performance especially where the body

has to be moved through space (Martin and Coe 1991). According to Wilmore and Costill (1994), being overweight is not a problem but over fat.

Several scientific procedures have been developed to measure the percentage of body weight made up of fat tissue. These include the following:

- Skinfold measurement
- Body Mass Index (BMI)
- Waist to Hip Ratio
- Hydrostatic Weighing
- Bioelectric Impedance
- Dual-Energy x-ray Absorptiometry

Each of the above mentioned techniques has its own advantages and disadvantages. Some involve the use of very expensive equipment and facility while others are not easy to administer. The most common method used by many of the researchers is to measure body fat by the skin-fold procedure. Skin-fold measurements are also simple and therefore can easily be carried out to big numbers of subjects without wasting a lot of time (Getchell *et al.*, 1998).

2.5.4 Strength endurance

Strength endurance is the ability of a muscle group to exert sub maximal force for extended periods (Heywood, 1991). Strength endurance is the ability to sustain some form of physical activity for a long duration. Strength endurance is also another important component of physical fitness. Optimal levels of strength endurance are needed to perform daily routines at home and at work and to partake in active leisure time pursuits without undue stress or fatigue (McGlynn, 1987). High levels of strength endurance lessen the chance of developing low back problems and injury to the muscular skeletal system. This is seen in the long periods of standing and waving of hands to direct cars at peak hours done by the traffic police, also the continuous walking throughout the day experienced by foot

patrol police officer and men. Inability to resist fatigue in the muscles leads to physical break down (Anderson and Plecas, 1999).

Strength endurance also helps in stabilization of the torso. This provides a rigid base around which the muscles of the extremities can apply force. Individuals are, therefore, able to stand for long hours in the correct posture, without getting fatigued. Policemen and women stand for long hours especially the traffic police and as such need good strength endurance to enable them to persist (Wilmore and Davis, 1979). Studies have indicated that physical activity improves muscular endurance (Vogel, 1986; Wekesa, 1994; Wilmore and Costill, 1994). Increased muscular endurance reduces problems associated with low back pain (Pak-Kwong, 1995). Increased muscular endurance is associated with an actual chemical change by which fuel is made more available, fuel is stored in greater amount and oxygen is more abundant owing to adequate circulation of blood through the muscles (Martin and Coe, 1991; Wilmore and Costil, 1994).

Different muscular endurance tests were designed for testing the muscular endurance of different body parts. These include the use of special devices/instruments such as Dynamometers, Cable Tensiometer, Electromechanical instruments, Hydraulic devices and Resistance machines. All of these however, are highly sophisticated, expensive and are not easily obtained. Calisthenics type of measurement is largely used. This involves the use of ones own body weight as resistance during the test. These include such tests like;

- **Sit-ups (Crunch test)**

The purpose of this test is to determine the muscular endurance of the abdominal muscles (Getchell *et al.*, 1998). It was proved that the abdomen is the fulcrum of ones' body and is important in many tasks involving lifting, pulling, and dragging (Canadian Police research Centre, 1997).

- **Pull-up Test**

These are also applied to measure the muscular endurance of the arms and shoulders (Tandeske *et al.*, 2005).

- **Squats**

Squats also involve the use of one's body weight as resistance. Squat test when used, helps to determine one's muscular endurance of the lower body especially the legs. Depending on how many squats one can perform in a given time, one's muscular endurance fitness level can be determined (Shepard, 2005).

- **Push-up Tests**

The push-ups are used to determine the strength endurance of the upper body, namely; chest, arms and shoulders (Getchell *et al.*, 1998). Because of the simplicity of performing the push-ups, and the need of very little test equipment, which are readily available, it was ideal for the researcher to use this test for the study.

2.6 The benefits of health-related fitness to the police

Physical fitness is a prerequisite to effective performance of duty in the police force. Numerous researches have been conducted to support this. Of the many fitness tests that were suggested to be of great use, most approved flexibility, muscular endurance and aerobic capacity as key fitness components whose level should be tested. (Shepard, 2005), insisted that physical fitness as a status pertaining to the individual officers' ability to perform maximum physical effort, consists of three areas. These are; aerobic capacity, strength and flexibility. All the mentioned areas are within health related fitness components.

The Rockton police department (2005) found out that practical exercise performance requirements are physical activities related to law enforcement tasks. The tests that the police department's board identified as most suitable include flexibility, muscular endurance and aerobic capacity. Also, the Cooper Institute for aerobic research (2001), emphasized that greater importance should be put on health related components because they make a person fit for life.

Health related fitness components, relate to overall health and well being as they include cardio-respiratory endurance for heart and lung efficiency, dynamic strength for muscle strength and endurance, and flexibility for efficient range of movement (Collingwood, 1978). Basing on this information as put forward by different scholars (Bonneau and Brown, 1995, Indiana State Police, 2002, Canadian Police Research Center, 1997) it is evident that health related fitness components are an important integral of the police life for better job performance.

The ability to perform the frequent and essential tasks, in this case, the physical tasks of police personnel at a minimum level of safety and effectiveness, requires knowledge, skill, and physical ability. The underlying constructs of physical job task performance are health and fitness (Smith and Gregory, 2002). According to these scholars, six components of physical fitness were identified. These included; cardiovascular endurance, anaerobic power, muscular strength, muscular endurance, flexibility, and body composition. This further proves the importance of health related fitness to performance of the police duties.

The lifestyle habits of the members of the police force are a common secret to many. However it could be that the lifestyle of some of these personnel could eventually lead to their inefficiency in job performance. Some of these for example show signs of cigarette smoking, obesity, poor nutrition, stress, sedentary living, alcoholism, divorce, domestic violence, sexual harassment, child neglect, abandonment of families which have been often reported in the Ugandan media (Kavuma and Mwanguhya, 2003). It is therefore the duty of the police administration to devise means of day-to-day supervision of the police force, to follow a particular lifestyle as dictated by the police council and the police code of ethics. This therefore calls for positive improvement and self-responsibility of the individuals in the police force. As observed by Lee (2005) in a study among the police force in South Korea, this situation can be improved through emphasis on increased alertness, reduced absenteeism, increased productivity and reduced health care cost hence better duty performance in the police force.

Other sources of literature on exercise science and sports medicine, indicate, that through wellness, one fosters a lifestyle that leads to a sense of physical well being. Fitness is achieved when the organic systems of the body are healthy and functions efficiently so as to resist disease and to enable the fit person engage in vigorous activity. This can be by enhancing the five health related fitness components namely: Aerobic endurance, muscular strength, muscular endurance, flexibility, and percentage body fat. As these are enhanced, people avoid illness and tend to perform routine activities better (Andes, 1991). There is no getting around the benefits of consistent exercise. The risk of developing diabetes, hypertension, and heart diseases go down as your physical ability goes up (Wendo, 2004). Hence, due to its benefits, a total fitness and wellness programme is recommended that must be adhered to by the police force.

2.7 Research studies on fitness

Many studies have been carried out in relation to fitness level and job performance in the law enforcement officers. Most countries in Europe and America carry out regular testing of the Law enforcement officers. The tests carried out are in line with the fitness components of the individuals. This is also used as a yardstick for promotion, deployment and retiring of the police personnel. This in turn improves the health status reducing the high incidence of stress-related disorders.

Greenberg and Berger (1983) studied a model to asses one's ability to apprehend and restrain a resisting suspect in police work. The purpose of the study was to develop a test model that could be used to predict the ability to apprehend and restrain resisting suspects in police work. 5 experts in martial arts and in personal defense tactics agreed on a competitive task that would measure those physical qualities involved in making an arrest but would require minimal skill. Subjects were college-aged males (n = 32) and females (n = 12). The criterion task was competition between individuals who attempted to push or pull each other out of a 5 feet circle. A step-wise multiple regression analysis revealed that 5 variables were sufficient to predict performance. It was concluded that the model is

appropriate for developing criterion related validity test for screening job applicants in police work.

Spitler, Jones, Hawkins and Dudlea, (1987) studied body composition and physiological characteristics of law enforcement officers. The sample included 12 law enforcement officers (9men and 3 women). Subjects included a representative sample from occupational categories of detectives, investigative and patrol officers. Mean maximal Oxygen uptake of the men was 42.1 ± 8.9 – min – 1 with mean values of 41.5 ± 8.7 ml.kg – 1min – 1 for the women. Measurement of body composition indicated an average of $24.4 \pm 7.1\%$ body fat for the men and $30.9 \pm 1.2\%$ for the women. Muscular power, strength and endurance as measured by isolated limb flexion – extension movement and fitness test performance was considered average with no excessive bilateral differences. The results of this study were compared with other investigations of law enforcement officers of similar age groups. The officers displayed average or above health and physical fitness scores for their age classification and were able to complete all police task-oriented tests.

Boyce, Jones and Haitt (1991), studied 514 police officers to determine the relationship between fitness capacity and annual absenteeism rate. Hierarchical regression analysis revealed that for officers aged 34 years and younger, only 5% of the variability could be accounted for by age, sex and physical fitness variables. For officers 35 years and older 7% of variability were explained by the variables and bicycle ergometer score was a significant predictor of absenteeism. Each individual test to an overall physical fitness score was classified into 5 levels. ANOVA revealed no significant differences between overall fitness levels and absenteeism. However, 35 year old men and over were most fit on the bicycle ergometer test, had fewer absences, and women 34 and under who were thinnest had more absences.

Rhodes and Farenholtz (1992) investigated police officers physical abilities test compared to measures of physical fitness. The study compared the police officers physical ability tests (POPAT) with selected field and laboratory tests of physical fitness. 98 volunteer

police officers (73 men and 25 women) completed all aspects of the testing. 55% of the total group passed the POPAT by improving on the 4 minutes 15 seconds “cut” point. Only 16% of the women and 68% of the men passed the overall test. Laboratory tests revealed a rather unfit sample of subjects (mean Vo_2 max = 42.6 ml. kg min⁻¹; % body fat = 22.9). Stepwise multiple regressions indicated that 55% of the variance on the run component of the test was accounted for by maximal aerobic power and anaerobic capacity. The fight component of POPAT did not correlate highly with standard field tests of strength. Pass/fail aspects of the test were not clearly delineated by selected lab and field tests. It was concluded that POPAT being a valid, task-specific, job related test consists of motor ability and techniques as much as generalized fitness parameters.

2.8 Summary

All the studies were consulted to provide primary evidence were from outside Uganda.

- i. Some of the studies carried out were in line with developing appropriate tests that could be used in future to determine the police officer’s abilities in physical performance (Greenberg and Berger 1983; Rhodes and Farenholtz 1992; and Arvey, Landon, Nutting and Maxwell, 1992). A gap existed between the developed tests and level of physical abilities required in the police in relation to effective duty performance.
- ii. Boyce *et al* (1991) tested Physical fitness and absenteeism of the police officers. Absenteeism always leads to inefficiency in duty performance. The study did not bring out clearly whether absenting one self was always due to physical fitness capacity.
- iii. Some studies carried out investigations from the police force in general and not looking at particular requirements for each police department. These included those of Greenberg and Berger (1983), Rhodes and Farenholtz (1992), Boyce *et al* (1991) and Arvey *et al* (1992). This gives a general picture in relation to the entire police force.

- iv. Spitler *et al* (1987) carried out a study that tested all the health related fitness components. There is need to prove that the test results as got from studies in America do not differ too much from those in the African setting and more so in the Ugandan situation.

In Uganda, the police administration has not yet put in place any routine for the police personnel to follow in order to be effective in duty performance. Yet the same administration wishes to see an efficient police force. Indeed those whom they think are not efficient are being retired even when they are still young. It is therefore on this basis that this study was carried out to see how a health and efficient Police Force could be developed.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter involved a discussion of the research design, target population, sample size and sampling techniques, procedures of data collection and methods of data analysis.

3.2 Research Design

A Pre-experimental research design was used in this study. The subjects were subjected to only one test of the decided fitness variables whose results were compared to the already established norms as published by the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) 1985. This method was found to be most convenient because the subjects involved in the study were found to be a very busy group that was highly required on duty. Further more the process of assembling them more than once could not be easily availed as they came from different police stations and posts.

3.3 Target Population

Members of the Uganda Police Force from the Central Region constituted the target population of this study. The population of the members of the Uganda Police was 13,881 persons by June 2004 in the whole country (Research and statistics department Uganda Police, 2004). Of these, 1,134 were found in the Central Region. 257 police personnel were in the riot department, while 91 were in the traffic section within the central region (Research and statistics - Uganda Police 2004). Also the riot police include only 20 women while the traffic police have 42.

3.4 Sample Size and Sampling Techniques

The sample comprised of 60 subjects out of a total of 348 personnel from both the riot and traffic police departments. This was the number that was assembled by the officer in charge at the police training school Kibuli. Many Police posts and stations were reluctant to provide more subjects, citing a skeleton staff and a busy schedule as the main reason. The researcher therefore targeted 20% of the total population. The expected total number was

hence 60 subjects from both the riot and traffic police departments. It was anticipated that this sample size was representative enough to the entire study population.

Purposive sampling procedure was used in selecting the police departments involved in the study. These were; the Riot police and the Traffic police departments. The researcher purposively selected these two departments because the work of the officers entails standing for long hours, rapid response to situations, running and chasing troublemakers, among others. These tasks demand a high level of fitness if the tasks are to be executed effectively.

Of the 60 subjects used in the research, 30 were from the riot police department, while the remaining 30 subjects were from the traffic police department. Of the 30 subjects from the riot police department only three (3) were females. While from the traffic police department only six (6) were females. The age bracket of the subjects from the riot police ranges from 20 years of age to 37 years, while from the traffic police department, the age bracket ranges from 25 years to 45 years, the work experience of the subjects from the riot police department range from 1 year to 10 years; while that of the subjects from the traffic police department range from 2 years to 17 years.

3.5 Research instruments

Here below are the selected health related physical fitness components and the fitness tests that were used for each, when carrying out the research;

- Aerobic endurance – 12 minutes walk/run test
- Flexibility – Sit and reach test
- Percent body fat – Skin-fold calipers measures
- Strength endurance – Push ups test

For each physical fitness component, a fitness test was carried out in order to determine the fitness levels of the individuals. The requirements for each selected health related physical fitness components and the expected norms tables are as shown in appendices I to IV.

3.6 Piloting

Pilot study was carried out prior to the tests being administered to the subjects.

The study involved 8 members of the Uganda police force from Ngogwe police post. The purpose of the pilot study was to equip the research assistants with the administration of the research tests especially how to handle the instruments, order of testing and system of recording.

3.7 Data Collection Procedure

The researcher obtained an introduction letter from Kyambogo University, Department of Sport Science to the police. The researcher also wrote a letter to the Inspector General of police requesting for permission to carry out research in the police force. The police authority issued the researcher with an authority letter allowing him carry out research in the police force. Consent was received from the subjects before subjecting them to the tests. The researcher used research assistants to help in the administration of the tests. These research assistants under went training under an experienced fitness testing expert to enable them to handle the tests well. They included 3 Master of Science students and six (6) police instructors from Kibuli police training school. The subjects where randomly picked from the different police stations with in the central region namely; Jinja Road Police Station, Katwe Police Station, Kira Road Police Station, Central Police Station, Nateete Police Station and Kabalagala and Nsambya Police Posts. All the subjects were assembled at Kibuli Police Training School where the tests were conducted.

The order of testing was as follows;

- 1st Percentage body fat
- 2nd Aerobic endurance
- 3rd Flexibility
- 4th Strength endurance

Nine research assistants plus the Researcher conducted the tests. Each individual was assigned a maximum of six (6) subjects to handle. The preliminary arrangement included; Warm up of the subjects, providing the subjects with serial numbers, putting the subjects into groups of six and assigning the subjects to particular research assistants.

Testing Procedures

a) Aerobic Endurance

Here a 12 minutes walk/run test was administered. This was developed by Kenneth Cooper (1968). The test has a high V_{O_2} max correlation of 0.9. Under this test, the subjects ran or walked as many laps as possible around a defined course within 12 minutes. At the end of the 12 minutes, the whistle was blown and each subject stood on the spot until a research assistant put a mark on the ground. The distance covered in meters was calculated for each subject and recorded (AAPHERD 1980). This then was compared against the available norms for each age group and sex as shown in Appendix I.

b) Flexibility

The researcher used the sit and reach test. It is a test that is easy to administer and the equipment used can be got locally. The procedure was as follows:

- A ruler was placed on the edge of the bench so that the 6-inch mark is aligned with the edge. The ruler was then taped in place.
- The subject then sat with legs fully extended with the bottom of the feet against the bench and the ruler between the feet.
- Chalk or powder was put on the middle finger tip and the subject placed the hands over the ruler, one on top of the other aligning the middle fingers.
- Slowly the subject exhaled and extended the hands and arms forward as far as possible.
- The head is allowed to curl forward as one reaches forward.
- The subject stopped when he could not reach any further and tapped the ruler with the chalked middle finger tip.
- Reading of the ruler was taken at the furthest edge of the chalk mark (The scores are the inches reached by the middle finger on the ruler).
- The results were compared with the norms available in Appendix II.

c) Strength endurance

The researcher used the push-ups test. This is normally applied to measure the strength endurance of the chest, arms and shoulders. The procedure was as follows:

- The subject knelt on all fours with hands shoulder width apart.
- The legs should be extended back with weight on toes and the body in a straight line.
- One bends at the elbows, allowing the body to move as a unit until one achieves 90 degrees bent at the elbows.
- The back should be kept straight as one press to the up position.
- The action was repeated for 1 minute.
- The correct number of push-ups perform in a minute were recorded
- The results were then compared with the norms available in Appendix IV.

d) Percentage Body Fat

This estimated by measuring subcutaneous body fat with the skin fold calipers. Skin fold measures are usually taken at several anatomic sites on the strong side of one's body while standing. The procedure involved:

- A fold of skin was pinched between the thumb and forefinger, pulling the fold from the underlying muscle.
- Without releasing the skin fold, the caliper pinches were placed over the skin fold about half inch below the fingers.
- The spring lever on the calipers is then released, and within 2 seconds, the skin fold measurements were taken.
- The same process was done to all the skin fold sites.

At the end, the sum of all the skin fold sites was got and was located on the given established chart as shown in Appendix III.

3.8 Data Presentation and Analysis

The data obtained was compared with the established norms published by AAHPERD (1985) for each fitness components. It was then categorized according to the selected police departments. The data was put in frequency distribution tables and their percentages calculated. Thereafter the data was analyzed using the one way Analysis of Variance (ANOVA) method. The relationship between variables was established as statistically significant when found to be equal or less than 0.05.

CHAPTER FOUR

PRESENTATION OF FINDINGS AND DISCUSSION

4.1 Introduction

This chapter contains with a brief background of the Riot and traffic police departments within the Central Region where this study was conducted. The chapter covers the presentation of the findings along with the researcher's remarks. In addition it includes data analysis in relation to the research hypotheses using the ANOVA test at the significant level of 0.05. The chapter winds up with a detailed discussion of the findings in relation to the objectives of the study.

4.2 Age distribution of the members of the police force

Table 4.1 shows age distribution of the members of the police force from both the Riot and Traffic police departments.

Table 4.1: Age distribution

Age bracket	Frequency		Percentage	
	Riot	Traffic	Riot	Traffic
20 -29	23	15	76.7	46.7
30 – 39	7	12	23.3	43.3
40 – 49	-	3	-	10
Total	30	30	100	100

From the Table 4.1 it is shown that, 15 (46.7%) and 23 subjects (76.7%) of the total subjects from both the Traffic and riot police departments respectively were within the age bracket of 20 – 29 years. Also 12 subjects (43.3%) and 7 subjects (23.3%) of the total subjects from both the Traffic and Riot police departments respectively were within the age bracket of 30 – 39 years. 3 subjects representing 10% of the total sample from the Traffic police department were within the age bracket of 40 – 49 years.

In Uganda, one must be between 18 years and 35 years of age to meet the criteria to join the police force. The retirement age is 55 years, but one can continue to serve in the forces after

55 years on condition that such a person has other professional abilities such as, law, medicine and clerks. (Department of research and statistics, Uganda police, 2004). The trend of age distribution as indicated in both the riot and traffic police departments signify that both departments rely on the services of relatively young individuals. Age thus could be a determining factor in the duty performance of individuals in these police departments. As individuals become advanced in age, they are transferred to other less physically demanding departments of the police force (Human resource department, Uganda police, 2004).

4.3 Gender distribution in the police

Figure 4.1 is a graph representing gender distribution of the members of the police force from both the riot and traffic police departments.

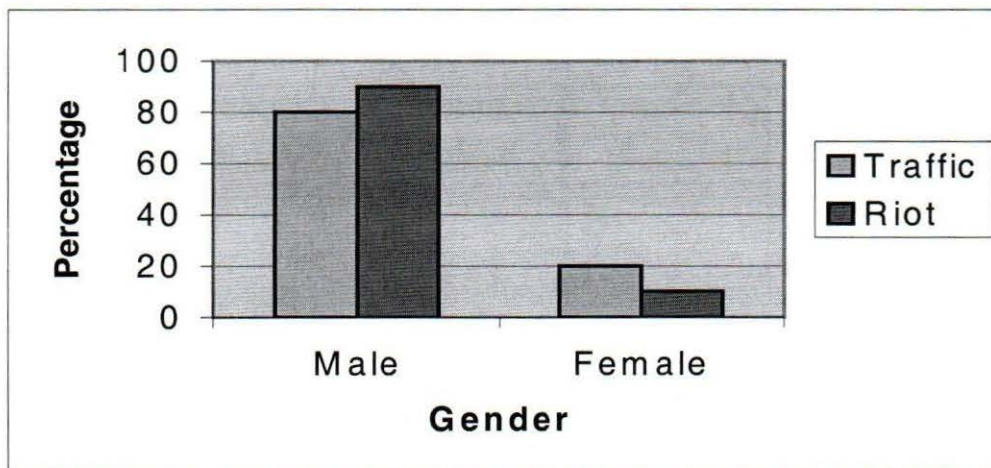


Fig. 4.1: Gender distribution in both riot and traffic police departments

The graph shows that 24 subjects representing 80% of the total sample from the traffic police department were males and 06 subjects representing 20% were females. From the riot police, 27 subjects who are 90% of the total sample were male and 3 subjects representing 10% were females.

Fewer females are enrolled in the police force. Therefore, on application of random selection, the chances of picking on a male to a female are always higher. This is more distinct in the riot police department.

Thus the graph clearly shows that in both selected police departments, there were more men than females. The duty demands in both the riot and traffic police departments call for male abilities than female, hence leading to departments' acceptance of more men than women.

4.4 Experience in the Police Force

The work experience of the subjects is shown in the table 4.2.

Table 4.2: Experience (years) in the police force.

Experience (years)	Riot Police		Traffic Police	
	Frequency (Number)	Percentage (%)	Frequency (Number)	Percentage (%)
<5	19	63.3	11	36.7
6-10	11	36.7	13	43.3
>10 years	-	-	6	20
Total	30	100	30	100

From table 4.2 there were 11 subjects (36.7%) from the traffic police department and 19 subjects (63.3%) from the riot police department whose work experience was below 5 years. The subjects whose work experience was between 6 – 10 years were 13 (43.3%) from the traffic police and 11 (36.7%) from the riot police department. 6 subjects (20%) from the traffic police had a work experience of above 10 years, while there was none from the riot police department.

More often than not, experience will relate to age of the individuals. In other words, the more years one spends in the police force, the more one becomes advanced in age.

Needless to say that physical efficiency reduces as one advances in age. Younger persons are said to be more physically stronger than older persons (McCoy, 1991). The ability of one to perform efficiently the duty demands of the riot police department largely depends on age and physical fitness. As one grows older, one's body may not respond efficiently to the duty demands of the riot police department. Much as physical ability is important, complete knowledge of the traffic laws is equally important. Therefore, the subjects whose work experience was less than 5 years might not have mastered fully the traffic laws much as they may be physically stronger. While at the time the subjects whose experience were more than 10 years, may have mastered the traffic laws but other duty demands put a lot of stress on such subjects thus rendering them ineffective.

4.5 Analysis of the selected health related fitness components

a) Aerobic Endurance

The fitness test used to test the aerobic endurance of the subjects was the 12 minutes walk/run test. The results are as shown in the tables 4.3 and 4.4:

Table 4.3: Results of the 12 minutes-walk/run tests for the riot police department

Subjects –S.N	Age (years)	Sex	Distance covered (meters)
1	27	M	1816.3
2	26	M	2282.4
3	32	M	1731.9
4	25	M	2411.0
5	26	F	1502.4
6	29	M	2505.0
7	28	M	1997.8
8	29	M	2189.5
9	26	M	2060.6
10	21	M	2037.6
11	24	M	2079.4
12	28	M	1916.8
13	30	M	2098.8
14	23	M	2016.3
15	27	M	1899.4
16	24	M	2117.3
17	29	M	1811.4
18	26	M	2018.5
19	33	M	1902.4
20	25	F	1700.2
21	28	M	1979.4
22	33	M	1853..0
23	34	M	1860.0
24	25	M	1996.4
25	24	M	2411.3
26	27	M	1987.0
27	23	F	1606.0
28	36	M	1889.5
29	27	M	1916.0
30	30	M	2115.5

The average age for the subjects from the riot police department was:

Mean = 825/30

Mean = 27.5yrs

Average distance covered for the subjects from the riot police department was:

Mean = 57897.7/30

Mean = 1929.9 meters

Table 4.4: Results of the 12 minutes walk/run test for the traffic police department

Subjects – S.N	Age (years)	Sex	Distance covered (meters)
31	27	F	1016.0
32	25	F	1098.8
33	26	F	1060.6
34	31	F	1070.4
35	23	F	1682.4
36	25	F	1160.2
37	28	M	1411.0
38	30	M	1649.4
39	32	M	1599.0
40	37	M	1414.8
41	34	M	1502.4
42	36	M	1505.0
43	38	M	1530.3
44	33	M	1567.0
45	40	M	1455.0
46	26	M	1649.4
47	2	M	1782.3
48	32	M	1731.9
49	27	M	1816.3
50	28	M	1787.0
51	35	M	1521.6
52	32	M	1634.1
53	28	M	1803.6
54	33	M	1643.0
55	41	M	1462.9
56	38	M	1576.3
57	25	M	1916.8
58	27	M	1905.3
59	43	M	1346.4
60	29	M	1787.8

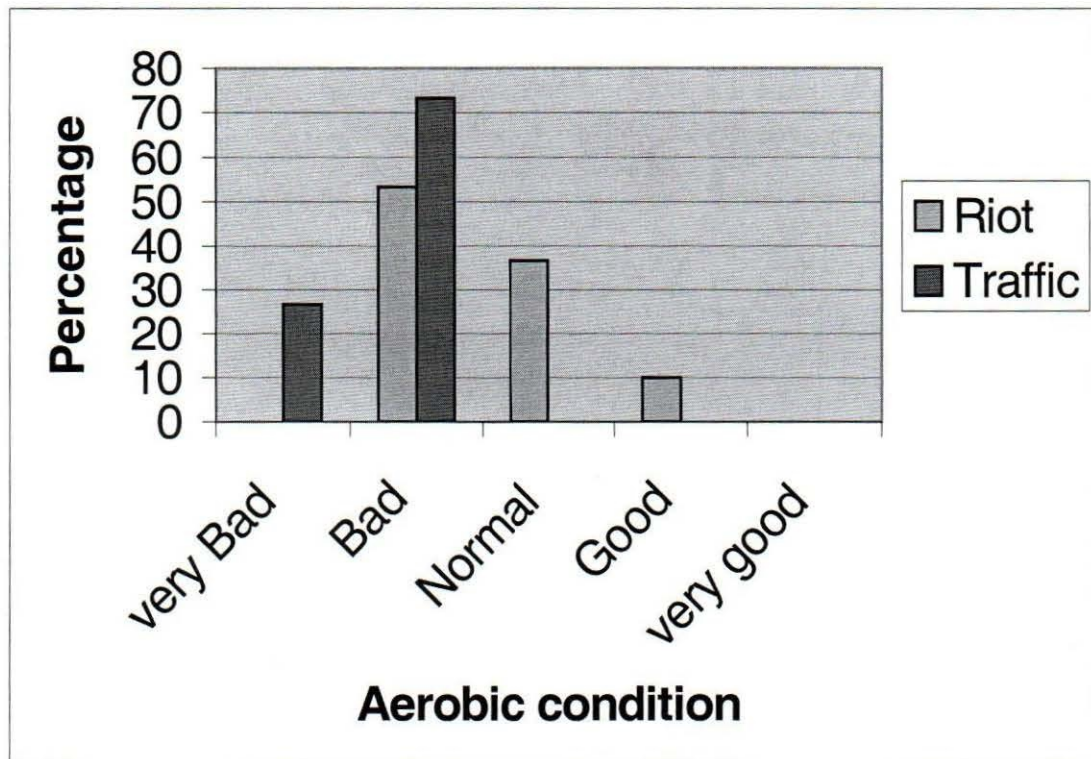
Average age for subjects from the traffic police department was; $937/30 = 31.2$ yrs

The average distance covered for subjects from the traffic police department was;

$46087/30 = 1536.2$ meters

When the result were compared with the norms in Appendix I of the 12 minutes walk/run test, the following was obtained as shown in the figure 4.2:

Fig. 4.2: Aerobic condition for both riot and traffic police departments



The results as shown from the graph indicated that 08 subjects representing 26.7% of the total sample from the traffic police department had very bad aerobic condition. Also from the same department, 22 subjects representing 73.3% of the total sample had bad aerobic condition. While from the riot police department, 16 subjects (53.3%) had bad aerobic condition, 11 subjects (36.7%) had normal condition and only 3 subjects (10%) had good aerobic condition.

The aerobic condition of an individual is very vital in determining one's ability to perform a physical task for a long period of time without necessarily getting fatigued. The results shown here indicate that a large number of members from both the riot and traffic police departments were lacking in their aerobic fitness. The results indicated that all the 30 subjects (100%) from the traffic police department were below the normal level of the

expected aerobic condition. The 11 subjects (36.7%) from the riot police department, who were rated as normal were still vulnerable as this put such individuals to the same expected aerobic condition as the regular public. Hence this still made them inefficient to handle the public in case of a riot. The 3 subjects (10%) whose aerobic condition was above average are a very small fraction.

b) Flexibility

When dealing with flexibility, the researcher used the sit and reach test. The results obtained were then put in the tables as shown in table 4.5 and 4.6 and later compared with the norms in Appendix II.

Table 4.5: Results for sit and reach flexibility test of the riot police department

Subject	Sex	Trunk flexion (cm)
1	M	9.6
2	M	7.2
3	M	8.5
4	M	14.4
5	F	16.7
6	M	6.7
7	M	13.6
8	M	7.8
9	M	10.3
10	M	9.4
11	M	12.5
12	M	3.9
13	M	8.3
14	M	16.4
15	M	14.9
16	M	10.8
17	M	10.0
18	M	7.5
19	M	11.3
20	F	15.6
21	M	11.0
22	M	4.2
23	M	9.6
24	M	11.7
25	M	10.8
26	M	8.9
27	F	12.3
28	M	16.5
29	M	7.3
30	M	12.3

The mean flexibility level for the subject from the riot police department was as shown below;

$$M = 320/30 = 10.7 \text{ cm}$$

Table 4.6: Results for the sit and reach flexibility test of traffic police department

Subject – S.N	Sex	Trunk flexion (cm)
31	F	18.5
32	F	10.4
33	F	9.2
34	F	14.7
35	F	12.7
36	F	13.6
37	M	7.1
38	M	9.3
39	M	7.4
40	M	12.4
41	M	6.9
42	M	8.3
43	M	16.4
44	M	14.9
45	M	10.8
46	M	10.0
47	M	7.5
48	M	1.3
49	M	11.0
50	M	3.2
51	M	9.1
52	M	11.0
53	M	10.2
54	M	8.7
55	M	2.1
56	M	4.3
57	M	9.6
58	M	2.0
59	M	1.4
60	M	2.3

The average flexibility level for the subjects from the traffic police department was;

Mean = $266.3/30 = 8.9\text{cm}$

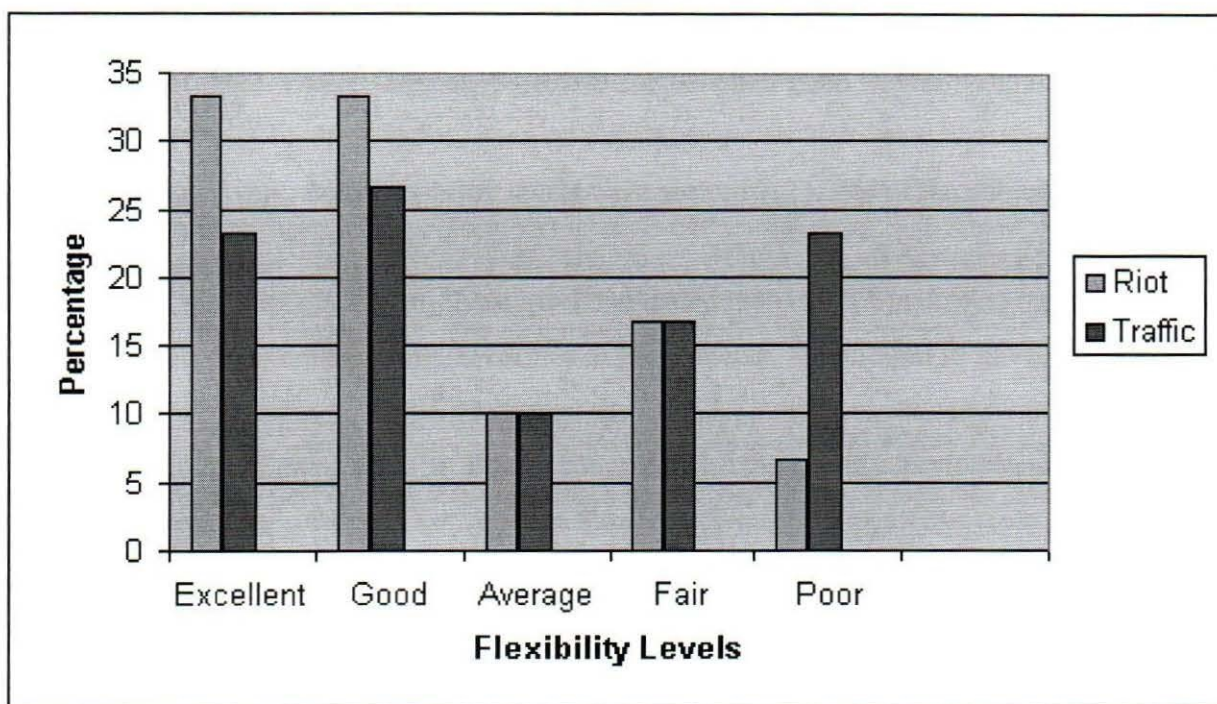


Fig 4.3: Flexibility levels for both the riot and traffic police departments

The observed results from both the riot and traffic police department were then compared with the norms in Appendix II. From the riot police department, it was clearly reflected that 10(33.3%) of the subjects, of whom 3 were females, had excellent flexibility levels. 10(33.3%) subjects, showed good flexibility levels, 3(10%) subjects had average flexibility levels and 5(16.7%) subjects had flexibility levels that were considered fair. Only 2(6.7%) subjects had poor flexibility levels.

The results therefore indicate that 20 (66.6%) subjects involved in the test from the riot police department had a flexibility level of above average. Also 8 (26.7%) subjects had their flexibility within the accepted range. However, it should be noted that in order to be efficient in the execution of the duty demands of the riot police department, one should have better fitness levels than an average person. Likewise, the 2 (6.7%) subjects, whose flexibility levels were found to be poor, could prove to be the major hindrance to effective duty performance.

For the traffic police department, 7(23.3%) of the subjects tested, had excellent flexibility levels of these 4 were females. 8(26.7%) subjects had good flexibility levels, while 3(10%) and 5(16.7%) of the subjects showed flexibility levels that were regarded as average and fair respectively. Poor flexibility levels were seen in 7(23.3%) of the subjects.

Like in the riot department, these results revealed that 15(50%) subjects had their flexibility levels above average. While 8(26.7%) of the subjects, were found to have a flexibility level within the acceptable range. However, the 7(23.3%) subjects, whose flexibility levels were regarded poor was such a significant number whose duty performance could lead to inefficiency.

c) Strength Endurance

The applied fitness test for this component was the push-up test. The subjects performed as many push-ups as they could within only one minute. The result for each individual was recorded (see tables 4.7 and 4.8) and then compared with the norms in appendix IV.

Table 4.7: Results of the 1 minute push-up test for the riot police department

Subject	Sex	Number of push-ups per minute
1	M	36
2	M	27
3	M	30
4	M	28
5	F	21
6	M	25
7	M	40
8	M	31
9	M	31
10	M	36
11	M	30
12	M	47
13	M	27
14	M	31
15	M	30
16	M	29
17	M	31
18	M	32
19	M	26
20	F	36
21	M	30
22	M	41
23	M	56
24	M	51
25	M	37
26	M	32
27	F	42
28	M	21
29	M	34
30	M	39

The mean number of push ups per minute for subjects from the riot police department was;
 $M = 1007/30 = 34$ push ups per minute.

Table 4.8: Results of 1minute push-up test for the traffic police department

Subject S.N.	Sex	Number of push-ups per minute
31	F	08
32	F	19
33	F	17
34	F	13
35	F	22
36	F	19
37	M	23
38	M	28
39	M	30
40	M	24
41	M	32
42	M	25
43	M	24
44	M	27
45	M	16
46	M	25
47	M	23
48	M	21
49	M	30
50	M	16
51	M	19
52	M	28
53	M	20
54	M	31
55	M	21
56	M	34
57	M	25
58	M	20
59	M	26
60	M	21

The mean number of push ups for subjects from the traffic police department was;

$$\text{Mean} = 687/30 = 23$$

The observed results from both the riot and traffic police departments were then compared with the norms in Appendix IV and their percentage representation calculated and represented in the figure 4.4.

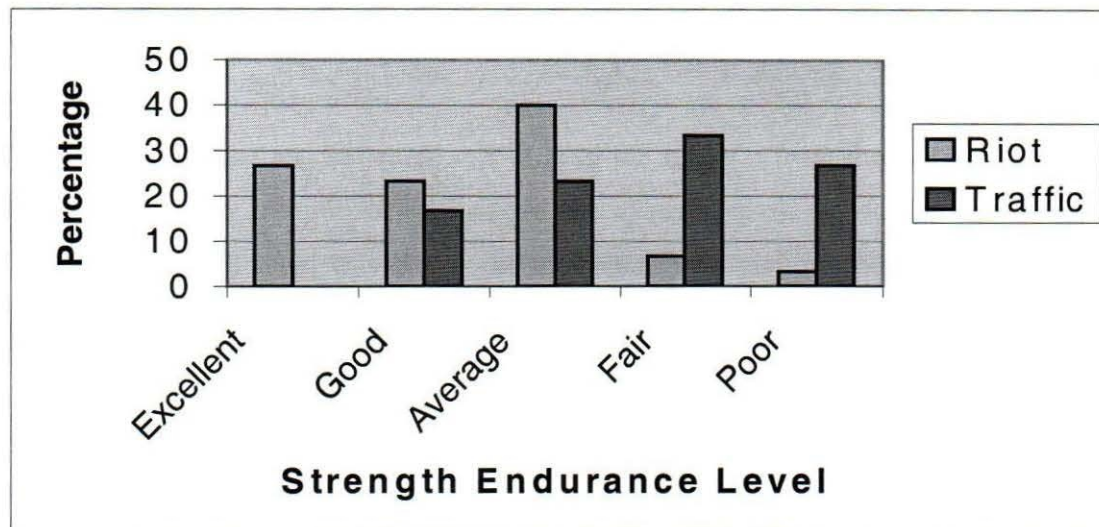


Fig 4.4: Strength endurance level for both riot and traffic police departments

The results from the test indicate that; from the riot police department, 8 subjects, who are 26.7% of the total sample, had excellent strength endurance levels. 7 subjects representing 23.3% of the sample had good strength endurance levels. 12 subjects (40%) showed average strength endurance levels, while 2 subjects (6.7%) and 1 subject (3.3%) showed fair and poor strength endurance levels respectively.

The ability of one's muscles to withstand fatigue, for a specified period of time during performance of a physical task is founded in strength endurance. The duty demands in the riot police department call for above average strength endurance levels. This is the basic way one can handle chaotic situations for a long period with out employing unnecessary force or unrealistic measures.

According to the Commissioner in charge of Human Resource Management of the Uganda police force, the police personnel in the riot police department are occasionally subjected to fatiguing physical tasks. This helps them to keep in shape to some extent. Hence if a

situation arose, they would be in position to handle it (Research and statistics department Uganda Police, 2004).

The results from the test indicated that 50% of the subjects from the riot police department had their strength endurance level above the average mark. The remaining 50% whose strength endurance level was below the expected mark may not be very effective in duty performance and therefore need to improve.

For the case of the traffic police department 5 subjects representing 16.7% of the sample had good strength endurance levels, while 7 subjects representing 23.7% of the sample had average strength endurance levels. At the same time, 10 subjects (33.3%) showed fair strength endurance levels and 8 subjects representing 26.7% of the total sample showed poor strength endurance levels.

Some of the duty requirements of the traffic police personnel include long duration of standing on the road, very fast decision making process and continuous waving of the hands while directing the traffic especially at peak (rush) hours of the day (McCoy, 1991). This therefore calls for good endurance levels in the performer's muscles. Otherwise the performer will fail to perform, which will result into confused and uncalled for traffic jam all over. The test results indicate that only 16.7% of the subjects had above average strength endurance level and 23.3% at average level. Therefore 60% of the subjects had their strength endurance level below average and this most likely could be the source of inadequacy in duty performance in the traffic police department.

d) Percentage Body Composition

The fitness test carried out gave an estimation of the percentage body fat for each individual subject. The test involved the use of the skin fold calipers to measure skin folds at particular anatomic sites on the strong side of the subjects' body while standing. Four sites were selected that include: Biceps, Iliac crest, Gastronemious and Front thigh. The sum of all the sites for each subject was recorded. The percentage body fat for each subject was got by converting the skinfold measure using the equation below:

- ◆ $\% \text{ body fat} = 0.29288 \times (\text{sum of 4}) - 0.0005 \times (\text{sum of 4})^2 + 0.15845 \times (\text{age}) - 5.76377$
for male subjects.
- ◆ $\% \text{fat} = 0.29669 \times (\text{sum of 4}) - 0.00043 \times (\text{sum of 4})^2 + 0.02963 \times (\text{age}) + 1.4072$ for
female subjects

The results were then compared with the norms in appendix III.

Table 4.9: Estimated fat composition from the riot police department

Subjects S.N	Age	Sex	Body fat at four sites of the body				Total
			Biceps	Iliac crest	Gastronemious	Thigh	
1	27	M	2.5	6.5	4.5	5.0	18.5
2	26	M	2.5	5.0	5.0	6.5	19.0
3	32	M	3.5	4.5	4.0	5.5	17.5
4	25	M	3.0	5.5	3.5	7.0	19.0
5	26	F	5.0	5.5	4.0	6.5	21.0
6	29	M	3.5	3.0	4.0	5.0	15.5
7	28	M	3.0	5.5	5.5	6.0	20.0
8	29	M	3.5	4.0	4.0	7.5	19.0
9	26	M	3.0	6.0	5.5	8.0	22.5
10	21	M	3.0	4.0	5.5	6.5	19.0
11	24	M	3.0	4.0	3.0	5.5	15.5
12	28	M	3.0	7.5	3.5	5.5	19.5
13	30	M	3.0	5.5	4.5	6.0	19.0
14	23	M	2.2	4.5	3.0	4.5	14.2
15	27	M	3.2	9.0	5.0	7.5	24.7
16	24	M	3.0	6.0	4.0	5.0	18.0
17	29	M	3.5	5.0	4.5	5.5	18.5
18	26	M	3.0	7.0	7.0	6.5	23.5
19	33	M	2.2	6.0	4.5	3.5	16.2
20	25	F	4.0	5.0	5.0	7.5	21.5
21	28	M	2.2	4.0	4.5	4.5	15.2
22	33	M	2.0	6.5	3.0	5.0	16.5
23	34	M	4.0	5.0	5.0	4.5	18.5
24	25	M	4.0	6.5	4.0	5.5	20.0
25	24	M	3.0	4.5	5.0	6.0	18.5
26	27	M	2.5	5.5	4.0	5.5	17.5
27	23	F	4.0	6.0	5.5	9.0	24.5
28	36	M	3.2	5.0	4.5	4.5	17.2
29	27	M	3.0	4.5	4.0	5.0	16.5
30	30	M	3.5	5.0	5.0	6.5	20.0

The average estimated body composition for subjects from the riot police department was;

Mean = $566/30 = 18.9$

Table 4.10: Estimated body composition from the traffic police department

Subjects (S.N)	Age	Sex	Body fat at four sites of the body				Total
			Biceps	Iliac crest	Gastronemious	Thigh	
31	27	F	4.2	6.0	5.0	7.0	22.2
32	25	F	3.0	5.5	4.0	6.5	19.0
33	26	F	3.2	9.0	5.5	6.0	23.7
34	31	F	4.5	6.5	4.5	5.5	21.0
35	23	F	3.5	5.0	4.5	4.5	17.5
36	25	F	4.0	6.5	5.5	6.5	22.5
37	28	M	4.0	7.2	5.0	6.0	22.2
38	30	M	4.2	5.5	5.5	4.5	19.7
39	32	M	2.5	6.5	5.5	4.0	18.5
40	37	M	3.5	9.0	5.0	5.5	23.0
41	34	M	4.0	6.5	5.0	6.0	21.5
42	36	M	3.5	7.0	5.5	7.5	23.5
43	38	M	3.5	8.5	6.0	5.5	23.5
44	33	M	5.0	7.5	5.0	5.5	23.0
45	40	M	4.5	7.5	5.0	6.0	23.0
46	26	M	3.0	5.5	5.0	5.5	19.0
47	2	M	4.2	5.0	5.5	6.0	20.7
48	32	M	4.0	5.5	5.0	4.5	19.0
49	27	M	3.0	7.0	6.5	6.5	23.0
50	28	M	3.4	6.5	5.5	6.0	21.4
51	35	M	3.5	5.5	4.2	5.0	18.2
52	32	M	4.2	6.5	6.0	5.0	21.7
53	28	M	5.0	5.5	5.0	6.5	22.0
54	33	M	4.0	6.0	5.0	5.5	20.5
55	41	M	4.2	9.0	6.0	5.0	24.2
56	38	M	4.0	8.5	7.0	5.5	25.0
57	25	M	4.2	7.0	4.0	4.5	19.7
58	27	M	3.5	5.5	4.5	6.0	19.5
59	43	M	4.0	7.5	7.0	5.5	24.0
60	29	M	4.5	6.0	5.5	5.0	21.0

The average estimated fat composition for subjects from the traffic police department was;

$$\text{Mean} = 603/30 = 20.1$$

The test results as indicated in the tables 4.9 and 4.10 above were then compared with the norms in Appendix III and their percentages were also calculated and the following was obtained as indicated in the graph (fig 4.5).

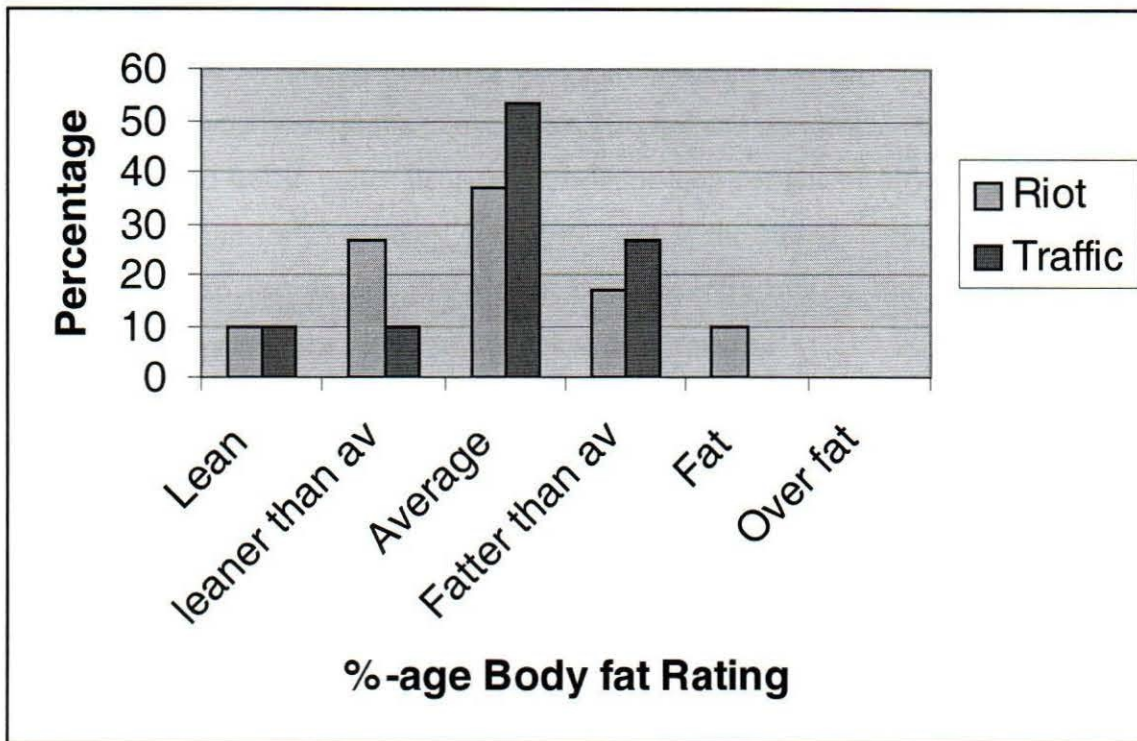


Fig 4.5: A graph showing percentage body fat ratings for both riot and traffic police departments

The test results from both the riot and Traffic police departments showed that; 3 subjects from the traffic police departments had their percentage body composition rated as lean. This represented 10% from both the riot and traffic police departments. Also 8 subjects who are 26.7% and 3 subjects who were 10% from both the riot and traffic police departments respectively, had their percentage body fat rated as leaner than average. 11 subjects (36.7%) and 16 subjects (53.3%) from both the riot and traffic police departments respectively had their percentage body fat rated as average. 5 subjects representing 16.7% of the total subjects from the riot police department were considered fatter than average while 8 subjects from the traffic police department representing 26.7% of the total subjects were in the same category. Under the fat category, there were 3 subjects from the riot police department representing 10% and none from the traffic police department. There was no over fat individual in both police departments.

These results indicate that the biggest percentage of the subjects had their percentage body fat ratings around the average. None of the subjects was excessively lean or over fat. Over fat individuals usually are prone to avoidable diseases and accidents. The duty demands for both the riot and traffic police department call for long periods of physical excursion like walking in the sun for long hours. This way most of the stored or consumed fat of these subjects is put to use. In this direction it becomes very rare to find an over fat police personnel especially in the riot or traffic police departments.

4.6 Data analysis in relation to the research hypotheses

The Researcher as shown in chapter one of this research formulated three hypotheses. These were that;-

(HO₁) There was no significant relationship between the type of work and level of fitness in terms of;

- Aerobic endurance
- Flexibility
- Percentage body fat
- Strength endurance

(HO₂) There was no significant relationship between experience in the police force and level of fitness in terms;

- Aerobic endurance
- Flexibility
- Percentage body fat
- Strength endurance.

(HO₃) There was no significant relationship between age of the members of the police force and level of fitness in terms of;

- Aerobic endurance

- Flexibility
- Percentage body fat
- Strength endurance.

Statistical package for the social sciences (SPSS) computer programme was used to analyze the data. The researcher specifically used the ANOVA test.

4.6.1 Police duty performance and selected health related fitness components

The null hypothesis stating that there was no significant relationship between duty performance in the Uganda police force and the selected health related fitness components was formulated for testing. Table 4.11 shows the results of the ANOVA test.

Table 4.11: One way analysis of variance for the relationship between Duty performance and the selected health related fitness components in the selected police departments

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Aerobic Endurance	Between Groups	3093556	1	3093556.3	53.8	0.000
	Within Groups	3335313	58	57505.4		
	Total	6428869	59			
Flexibility	Between Groups	48.1	1	48.1	3.0	0.009
	Within Groups	943.3	58	16.1		
	Total	991382	59			
Strength Endurance	Between Groups	1706.7	1	1706.7	34.5	0.000
	Within Groups	2872.1	58	49.6		
	Total	4578.7	59			
Body Composition	Between Groups	92826.7	1	92826.7	1.1	0.31
	Within Groups	505091	58	87075.7		
	Total	5143217	59			

From table 4.11, the following results were obtained;

- i. The significant level of aerobic endurance in relation to duty performance was 0.000. This implied therefore that aerobic endurance is a significant requirement for appropriate duty performance in both selected police departments.
- ii. The significant level of flexibility in relation to duty performance was 0.009. This also emphasized that flexibility plays a major role in effective duty performance in the selected police departments.
- iii. For strength endurance, in relation to duty performance, the results indicated a 0.000 significant level. Thus emphasizing the importance of strength endurance to duty performance in the selected police departments.
- iv. While the resultant significant level for body composition in regard to duty performance was 0.31. This implied therefore that body composition had no effect to duty performance in the selected police departments.

In reference to the null hypothesis, considering the fitness variables in question in relation to duty performance, the results implied that the assumptions as stated could not be fully regarded as correct. The result indicated aerobic endurance and strength endurance as very important items that should be at an elevated level for effective duty performance. Therefore in terms of aerobic endurance and strength endurance, the hypothesis was rejected. For the case of flexibility in regards to duty performance, the results indicated that flexibility was a requirement for effective duty performance. In that direction therefore, the hypothesis was rejected. However, in regards to body composition, the results indicated that it was not an important item for effective duty performance, and in that direction therefore the hypothesis was accepted.

The fitness variables that were under study in relation to duty performance showed that they contribute to effective duty performance especially where it involves physical workout. The importance of aerobic endurance and strength endurance was much emphasized. Baumgartner and Jackson (1999) out lined the importance of aerobic endurance as the most indicative measure of a person's physical condition. Aerobic

endurance is an indication of the individual's ability to perform work. A study by Boyce et al (1999) looked at the relationship between fitness and absenteeism rate of the police officers. The study proved that poor fitness level is one of the causes of absenteeism from duty in the police force. Continuous absenteeism affects duty performance as the performer cannot carry his duty when absent. Also various problems are known to come with poor fitness levels such as diabetes, hypertension, and coronary heart diseases and many others, which in turn affect effective duty performance (Jackson and Squirres, 1982 and Corbin and Lindsey, 1988).

Subjects from both riot and traffic police departments execute various duties that demand for very good strength endurance. Excellent strength endurance levels are required for one to perform continuous physical workouts without early fatiguing (McGlynn, 1999). At the same time high levels of strength endurance limit injury occurrence to the muscular skeletal system during physical work (Anderson and Plecas, 1999). Basing on this, therefore, it is imperative for the members of the police force to check their fitness condition regularly for continuous and effective duty performance. This way one will be in a good physical state with minimal injury occurrence, fewer absentees and dynamic at work hence effective duty performance.

The statistical results indicated that, of the fitness variables in question, body composition was considered the least significant to duty performance in the police force. This was because the test results of the estimated fat composition from both the riot and traffic police departments had no subject within the over fat rating. However various studies have proved that body composition has an effect to physical duty performance if not kept within the required range. The percentage of the fat component determines ones physical appearance, health status, fitness and longevity (Jackson et al, 1995). Having excess fat leads to a condition called obesity, which is one of the most known health problems confronting people today (Abraham *et al.*, 1980). Also Martin and Coe (1991) emphasized that being over fat is detrimental to performance.

Therefore, body composition though not considered important, should be kept in check with in the required zone so as not to interfere with effective duty performance.

4.6.2 Experience in the police and levels of fitness

The null hypothesis stating that there was no significant relationship between experience in the police force and level of fitness in terms of; aerobic endurance, flexibility, strength endurance and body composition was formulated for testing. Table 4.12 shows the results of the ANOVA test.

Table 4.12: One-way analysis of variance for the relationship between experience and selected health related fitness components for duty performance in both riot and traffic police departments.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Aerobic Endurance	Between Groups	50818.4	1	25409.2	0.2	0.8
	Within Groups	6378051	57	111895.6		
	Total	6428869	59			
Flexibility	Between Groups	84.4	1	42.2	2.7	0.008
	Within Groups	906.9	57	15.9		
	Total	991.4	59			
Strength Endurance	Between Groups	470.1	1	235.0	3.3	0.05
	Within Groups	4108.7	57	72.1		
	Total	4578.7	59			
Body Composition	Between Groups	130592.1	1	65296.0	0.7	0.5
	Within Groups	5012626	57	87075.8		
	Total	5143217	59			

Experience of the police force was considered in terms of years one had served as a police officer. This ranged from less than five (5) years to cover ten (10) years. From table 4.12, the following statistical results were observed;

- i. The significant level of the aerobic endurance in relation to work experience in both the selected police departments was 0.798. This implied that aerobic endurance has no relation to one's experience in the police force in relation to duty performance in the selected police departments.

- ii. The significant level of flexibility in relation to duty performance as regards to experience was 0.008. This implies that flexibility in relation to experience affects duty performance in the selected police departments.
- iii. Also the significant level of strength endurance in relation to duty performance as regards to experience of 0.05 implies that strength endurance plays a role in ones duty performance in relation to experience in the selected police departments
- iv. The significant level of body composition in relation to duty performance as regards to experience was 0.5. This still emphasizes that there is no relation between body composition and experience in regard to duty performance in the selected police departments.

With reference to the null hypothesis, putting into consideration the fitness variables in question in relation to one's experience as regards to duty performance, the statistical results implied that the hypothesis as stated could not be rejected. The results indicated that each of the fitness variables in question affected duty performance in its own way in relation to one's experience in the police force. Thus basing on the statistical results:

- Aerobic endurance showed no relation to experience in regard to duty performance in the selected police departments. Hence in this line the hypothesis was accepted.
- Body composition had no relation to experience in regard to duty performance and hence the hypothesis was accepted.
- Flexibility and strength endurance tests gave results that indicated a relationship to one's experience in regard to duty performance. Hence the hypothesis was rejected.

Experience here refers to the number of years one had served in the police force. The researcher wanted to establish a relationship between one's experience and the level of fitness in regard to duty performance. One's fitness level depends on how active one is physically. It is mainly the inactivity of an individual that leads to the deterioration in the fitness levels (Wilmore and Costil, 1994). Bonneau and Brown (1995) also emphasized that physical activity improves one's fitness level, hence reducing numerous ailments that come with poor fitness. Therefore if experience is considered in years, this will have no effect to

duty performance as long as one is either physically active or vice versa. In that direction therefore, having stayed in the police force for one year or ten years may not defer too much in duty performance as long as the fitness levels are kept in check.

However, the ability to perform police physical tasks requires not only physical ability but also knowledge, and skill. Knowledge and skill are two components that are compounded in one's experience. Having done a given police task over and over again makes one skilled about how to do it. This is only possible if one has spent more years in the force doing it than one whose experience is limited. Hence knowledge and skill always come with experience, and if compounded with the required fitness level, duty performance will become effective.

It is important to note that experience, comes with advancing in age. As one becomes older the level of fitness also goes down especially in flexibility and strength endurance. With the deterioration in the fitness components comes inefficiency in the performance of physical work. Therefore duty performance in both the riot and traffic police departments will be greatly affected if one spends over ten years in either of these departments. This is particularly if the duty being executed calls for one's physical ability. But as long as the duty requirements do not involve physical might, then the performer's performance may not be affected in the respective police departments.

4.6.3 Age and fitness levels

The null hypothesis stating that there was no significant relationship between Age of the members of the police force and level of fitness in terms of; aerobic endurance, flexibility, strength endurance and body composition was formulated for testing. Table 4.13 shows the results of the ANOVA test.

Table 4.13: One-way analysis of variance for the relationship between Age and the health related fitness components of the subjects from both riot and traffic police departments

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Aerobic Endurance	Between Groups	1373647	2	686823.5	7.7	0.00
	Within Groups	5055222	57	88688.1		
	Total	6428869	59			
Flexibility	Between Groups	48.4	2	24.2	4.5	0.24
	Within Groups	943.0	57	16.5		
	Total	991.4	59			
Strength Endurance	Between Groups	541.4	2	270.7	3.8	0.03
	Within Groups	4037.3	57	70.8		
	Total	4578.7	59			
Body Composition	Between Groups	191840.7	2	95920.4	1.1	0.34
	Within Groups	4951377	57	86866.3		
	Total	5143217	59			

Age range in the subjects selected from the two police departments involved in this research was between 20-49 years. According to the commissioner of police in charge of human resource management, recruitment in the police force caters for individuals whose age bracket is 18 – 25 years, and it can only be above 25 years in special circumstances.

Based on table 4.13, the following statistical results were observed;

- i. The significant level of aerobic endurance in relation to age as regards duty performance was 0.00. This therefore implied that there is a very big correlation between aerobic endurance and age in terms of duty performance in the selected police departments.
- ii. Flexibility showed a significant level of 0.24 in relation to age as regards to duty performance. This emphasized therefore that flexibility in relation to age, had no effect to duty performance in the selected police departments.
- iii. Strength endurance in relation to age showed a significant level of 0.03 as regards to duty performance. This thus implied that strength endurance in relation to age plays a major role in effective duty performance in the selected police departments.

- iv. The level of significance for body composition in relation to age as regards to duty performance was 0.34. This suggested therefore that there was no correlation between the variables in regard to duty performance.

From the appendices, I – IV, the expected fitness levels of all the selected fitness components reduce as one advances in age. That is to say, the fitness level requirements for an 18 years old individual are far greater than those of a 30 year old and above. This implies therefore that age relates to the fitness level requirement of each of selected fitness component for each individual. In reference to the null hypothesis, with the consideration of the fitness variables in question, in relation to age and duty performance, the following was deduced;

- Aerobic endurance in relation to age played a big role in duty performance in the selected police departments. Based on this therefore the hypothesis was rejected.
- Also the results showed that strength endurance in relation to age also affected duty performance and therefore, the hypothesis was rejected.
- As regards flexibility and body composition, the results indicated that they had no effect to duty performance. Thus along this line the hypothesis was accepted.

From table 4.1, the age distribution of the members of the police force from both the riot and traffic police departments were put into categories of age brackets; 20-29 years, 30-39 years, and 40-49 years. The percentage frequency distribution however showed that in the riot police 76.7% of the subjects were within the 20-29 years-age bracket and 23.3% were in the age bracket of 30-39 years, with none in the age bracket of 40-49 years. At the same time 46.7% of the subjects from the traffic police department were within the 20-29 years-age bracket, 43.3% in the 30-39 years-age bracket and only 10% of the subjects in the 40-49 years-age bracket.

Appendices I, III and IV indicate that the fitness requirements of individuals are categorized according to age and sex. Therefore each age bracket has its own fitness

requirements. However, it is important to note that fitness requirements become lower as one advances in age.

Statistical results as presented in table 4.13 put emphasis on aerobic endurance and strength endurance as the main fitness variables that relate to age in regard to duty performance. The implication here is that aerobic endurance and strength endurance deteriorate as one advance in age, yet these are key factors in physical performance. Therefore engagement in physical performance amongst older police officers is low. Hence older police officers may not necessarily be required in especially the riot police department where duty calls for physical might.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter covers the summary of findings, conclusions and recommendations of the study.

5.2 Summary of the Findings

The study was conducted amongst the Uganda Police Force and in particular riot police and traffic police departments by the year 2004. A total of 60 police officers were involved in the study. Of these, 30 came from the riot police department and the other 30 were from the traffic police department. A pre-experimental research design was used in the study. The following findings were established.

Age distribution

- Most subjects from both the riot and traffic police departments were in the age bracket of 20 – 29 years, followed by 30 – 39 years bracket and the 40 – 49 years age bracket had the least subjects.

Gender distribution

- The male gender constituted the highest frequency in both departments. These were 27 and 24 subjects from the riot and traffic police departments respectively.

Experience

- Majority of the subjects in the riot police had an experience of less than five (5) years while for the case of traffic police; majority had an experience of between 6 – 10 years.
- None of the subjects in the riot police had experience of above 10 years while in traffic police department this took up to 20% of the total subjects whose experience was of over 10 years.

- There was a significant relationship between aerobic endurance and strength endurance to duty performance.
- There was no significant relationship between aerobic endurance, body composition and experience in the police force.
- There was a significant relationship between age, aerobic endurance and strength endurance.
- There was a significant relationship between gender of the members of the police force and their level of fitness

5.3 Implications of the Findings

Basing on the findings of the study, the following were the implications on the selected fitness variables in relation to type of work, experience and age as regards to duty performance within the selected police departments:

- Aerobic endurance was a vital requirement for duty performance in the selected police departments. This implies that the poor aerobic endurance levels have a negative effect on duty performance of Police officers.
- Flexibility is an important fitness requirement in relation to duty performance in the selected police departments. The results of the fitness tests indicate that the majority of police officers in all the departments had a high level of flexibility. Lack of flexibility therefore was not a significant reason for ineffective duty performance among Ugandan police officers.
- Strength endurance was an important fitness variable for duty performance in the selected police departments. The fitness test results indicated 50% of the subjects from the riot police department having strength endurance of above average while 50% had their strength endurance below the average mark. From the traffic police department, 40% of the subjects were of above the average mark and 60% were below. Therefore with such large numbers of subjects whose strength endurance

levels were below the average mark, this could have a negative effect on duty performance.

- Percentage body fat for the majority of the police officers from both riot and traffic police departments was within acceptable range. However, percentage body fat was not a significant fitness variable for duty performance.

From the findings of this study, the majority of the subjects from both the riot and traffic police departments fell within the age bracket of 20 – 29. This study revealed that aerobic endurance and strength endurance relate significantly to age in the police force. The more advanced in age the police officer, the less the aerobic and strength endurance.

On the part of experience; this study found that only 20% of the subjects had an experience of above 10 years in the police force. All the subjects from the riot police had experience of 10 or less years in the police. Flexibility and strength endurance correlated highly with years of experience in the police force. There was no significant relationship between experience and factors of aerobic endurance and body composition.

In terms of gender, the two police departments were found to favor male officers more than female officers: male (80% in traffic and 90% in riot police). In all the sampled police departments, there were comparatively fewer female officers. The relationship between health related fitness components and gender was significant. Therefore gender is an important factor to be considered in recruitment, training and assignment of operational routines in the police force. Generally more males join the police force than the females.

5.4 Conclusion

On the overall, the statistical analysis of the null hypotheses formulated in the study indicated that:

1. Aerobic endurance, flexibility and strength endurance had significant statistical relationships to the type of work in regard to duty performance in the selected police departments.

2. Flexibility and strength endurance had significant statistical relationships to experience in regard to duty performance in the selected police departments.
3. Aerobic endurance and strength endurance had significant statistical relationships to age in regard to duty performance in the selected police departments.

The general implication of the findings was therefore, that regardless of type of work, age, or experience of the subjects, aerobic endurance, flexibility and strength endurance had a significant statistical relationship in regard to duty performance in the selected police departments.

5.5 Recommendations

The following recommendations were made based on the findings and conclusions of the study;

a). Policy and training

- i. There is need to educate members of the Uganda police force on the significance of physical activity to a person's fitness and the many positive implications that come with it in line with duty performance.
- ii. The Uganda police force should initiate programmes, to check on the physical fitness levels of all its personnel especially through regular physical fitness testing. Through this, standard fitness norms will be established as per the Ugandan context. This will help to establish the fitness range in which a police officer can effectively execute his / her duties.
- iii. Police training instructors should develop and adopt training programmes and practice routines that are specific in order to embrace the expected fitness levels to meet the demands of duty performance in a given police department. This should be introduced countrywide so as to expose the entire police population to the specific fitness requirements of each police department.

- iv. It should be made mandatory for all the police stations countrywide, to keep up to date fitness records of the police personnel. This will help to establish differences and will also act as a guide to evaluate duty performance in relation to fitness levels of the police officials.

b) Further Research

The following were suggested as possible areas for further research;

- There is need to carry out a nation-wide and comparative survey on fitness levels of different security organs like the Army, prisons, security firms and other police departments.
- A study should also be carried out to help establish the national physical fitness norms that will be used to countrywide.
- A study should be conducted to establish the contribution of engaging in free time activities to the health and fitness levels of the Ugandan police personnel.

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APPENDIX I

Requirements for the 12-minute walk/run test

- | | |
|-----------------|-------------------------|
| (a) Field | (f) Pegs |
| (b) Tap measure | (g) Pins (Masking tape) |
| (c) Markers | (h) Manila paper |
| (d) Stop watch | (i) Pens/pencils |
| (e) Whistle | (j) Recording sheet |

Norms for the 12-minute walk/run Test (meters per minute)

		Age Bracket			
		<30 years	30-39 years	40-49 years	> 50 years
Very bad	M	1600M	1500M	1400M	1300M
	F	1500	1400M	1200M	1100M
Bad	M	1600-2000M	1500-1900M	1400-1700M	1300-1600M
	F	1500-1800M	1400-1700M	1200-1500M	1100-1400M
Normal	M	2000-2400M	1900-2300M	1700-2100M	1600-2000M
	F	1800-2200M	1700-2000M	1500-1900M	1700-2200M
Good	M	2400-2800M	2300-2700M	2100-2500M	200-2400M
	F	2200-2700M	2000-2500M	1900-2300M	1700-2200M
Very good	M	>2800M	>2700M	>2500M	>2400M
	F	>2700M	>2500M	>2300M	2200M

Source: [http:// www.shark.com](http://www.shark.com)

APPENDIX II

Requirements for the sit and reach test

- (a) Ruler
- (b) 6-8 inches stair step or bench
- (c) Powder or chalk
- (d) Masking tape
- (e) Fitness assessment data sheet

Norms for trunk flexion (centimeters)

	Women	Men
Excellent	12+	12+
Good	11-12	9-12
Average	9-11	8-9
Fair	7-9	6-8
Poor	0-7	0-6

Source: Getchell *et al* (1998)

APPENDIX III

Requirements for percentage body fat

- (a) Skin fold calipers
- (b) Fitness assessment data sheet
- (c) Established percentage body fat charts

Norms for percent body fat in males and females

Male rating	18–26	26–35	36–45	46–55	56–65	66 ⁺
Very lean	4–7	8–12	10–14	12–16	15–18	15–18
Lean	8–10	13–15	16–18	18–20	19–21	19–21
Leaner than average	11–13	16–18	19–21	21–23	22–24	22–23
Average	14–17	19–21	22–24	24–25	24–26	24–25
Fatter than average	18–20	22–24	25–26	26–28	26–28	25–27
Fat	22–26	25–28	27–29	29–31	29–31	28–30
Over fat	28–37	30–37	30–38	32–38	32–38	31–38
Female rating						
Very lean	13–17	13–18	15–19	18–22	18–22	16–18
Lean	18–20	19–21	20–23	23–25	24–26	22–25
Leaner than average	21–23	22–23	24–26	26–28	28–30	27–29
Average	24–25	24–26	27–29	29–31	31–33	30–32
Fatter than average	26–28	27–30	30–32	32–34	34–36	33–35
Fat	29–31	31–35	33–36	36–38	36–38	36–38
Over fat	33–43	36–48	39–48	40–49	39–46	39–40

Adopted from Golding, Myers, and Sinning (1989.)

Source: Getchell *et al* (1998)

APPENDIX IV

Requirements for the push-ups (per minute)

Push-ups

- (a) Mat
- (b) Stop watch

Norms for strength endurance, push-ups (number of push-ups per minute)

Note: Full-body push-ups norms below are for males only.

RATING	Age (years)			
	20-29	30-39	40-49	50-59
EXCELLENT	>54	>44	>39	>34
GOOD	45-54	35-44	30-39	25-34
AVERAGE	35-44	24-34	20-29	15-24
FAIR	20-34	15-24	12-19	8-14
POOR	<20	<15	<12	<8

Note: Modified push-ups norms below are females only.

RATING	Age (years)			
	20-29	30-39	40-49	50-59
EXCELLENT	>48	>39	>34	>29
GOOD	34-48	25-39	20-34	15-29
AVERAGE	17-33	12-24	8-19	6-14
FAIR	6-16	4-11	3-7	2-5
POOR	<6	<4	<3	<2

Source: Howley and Franks (1997)

APPENDIX V

KYAMBOGO UNIVERSITY

Physical fitness evaluation protocol sheet.

Name: Sex:
 Age (yrs): Weight (kg): Height (cm):
 Experience (yrs):
 Department:

(a) Flexibility test

Sit and reach test

Trials (cm)			Average
1 st	2 nd	3 rd	

(b) Body composition

Skin fold measurements (mm)

BICEPS				ILIAC CREST				Gastronemious				THIGH				TOTAL
1	2	3	AV	1	2	3	AV	1	2	3	AV	1	2	3	AV	

(c) Strength endurance

Push-ups (60 sec)

Total counts _____

(d) Aerobic endurance

12 minutes run – walk test

Distance covered (m) _____

Research Assistant

Name:

Signature:

Date: