INSTRUCTIONAL CONSTRAINTS FACED BY LEARNERS WITH
DUCHENNE MUSCULAR DYSTROPHY: A CASE OF JOY TOWN SPECIAL
PRIMARY SCHOOL, THIKA, KENYA

BY
WANG’ANG’A ANNEROSE WANJIKA
E55/10890/2006

A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR
THE AWARD OF THE DEGREE OF MASTER OF EDUCATION (SPECIAL
EDUCATION) IN THE SCHOOL OF EDUCATION OF KENYATTA
UNIVERSITY

JANUARY 2010
DECLARATION

This thesis is my original work and has not been presented for a degree in any university.

Signature ___________________________  Date ___________________________

Wang’ang’a, Anne rose Wanjiku
E55/10890/2006

We confirm that the work reported in this thesis was carried out by the candidate under our supervision:

Signature ___________________________  Date ___________________________

Dr. Franciscah Wamocho
Department of Special Education
Kenyatta University

Signature___________________________  Date ___________________________

Prof. Paul G. Kioy
Department of Medical Physiology
University of Nairobi
DEDICATION

This thesis is dedicated to the late son Master Ashford Ng’ang’a who was suffering from Duchenne Muscular Dystrophy and to all those who may be affected.
ACKNOWLEDGMENT
I am grateful to Kenyatta University for according me an opportunity to pursue my Master’s degree programme. My gratitude goes to my supervisors Dr. Wamocho and Prof. Kioy who devoted a lot of their time, patience and guidance towards the completion of my study. I wish to acknowledge Prof.Njoroge of Kigali Institute of Education, Dr. Mugo, Dr. Otube and Dr.Runo for their advice. Mr. Bojana deserves special mention for his editorial input. My thanks go to my colleagues in the Department of Special Education and all the respondents for their co-operation. I also wish to thank Emma Maina for her diligent typing of this work. My deep appreciation also goes to my daughter Elizabeth Waithera and son Morris Mithamo for their unfailing support. Above all I wish to thank the Almighty God through whose grace I was able to realize this long cherished dream.
TABLE OF CONTENTS

Title ..................................................................................................................i
Declaration .................................................................................................ii
Dedication .................................................................................................iii
Acknowledgement .......................................................................................iv

Table of Contents .......................................................................................v

Abbreviation and Acronyms ......................................................................x

Abstract ....................................................................................................xi

CHAPTER 1: INTRODUCTION

1.0 Introduction ...........................................................................................1

1.1 Background to the Study ..................................................................1

1.2 Statement of the Problem .................................................................5

1.3 Purpose of the Study .........................................................................6

1.4 Objectives of the Study ......................................................................6

1.5 Research Questions ...........................................................................6

1.6 Significance of the Study ...................................................................7

1.7 Delimitations and Limitations ...........................................................7
CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction ................................................................................................................................. 13

2.1 Types of Muscular Dystrophies................................................................................................. 13

2.2 Signs and Symptoms of Duchenne Muscular Dystrophy.......................................................... 14

2.3. Causes of Duchenne Muscular Dystrophy ................................................................. 17

2.4. Treatment/Management/ Prevention of Duchenne Muscular Dystrophy ......................... 19

2.5. Academic Difficulties facing learners with Duchenne Muscular Dystrophy ................. 21

2.6. How Schools Cope with Learners Suffering from Duchenne Muscular Dystrophy........ 24

2.7. Instructional Needs of Learners with Duchenne Muscular Dystrophy.................................. 25

2.8 How Curriculum Contributes To the Academic Constraints Faced By Learners with Duchenne Muscular Dystrophy................................................................. 26

2.9 Resources and Support Services for Learners with Duchenne Muscular Dystrophy...... 28
CHAPTER THREE: METHODOLOGY

3.0. Introduction .................................................................................................................. 31

3.1. Research Design .......................................................................................................... 31

3.2. Variables ...................................................................................................................... 31

3.3. Location of the Study ................................................................................................. 32

3.4. Target Population ....................................................................................................... 32

3.5. Sampling Techniques and Sample Size .................................................................... 33

3.5.1. Sample Size ............................................................................................................ 34

3.6. Construction of Research Instruments ..................................................................... 34

3.7. Pilot Study .................................................................................................................. 35

3.7.1. Validity .................................................................................................................. 35

3.7.2. Reliability .............................................................................................................. 36

3.8. Data Collection Techniques ...................................................................................... 37

3.9. Data Analysis .............................................................................................................. 37

3.10. Logistical and Ethical Considerations ...................................................................... 38

CHAPTER FOUR: DATA PRESENTATION ANALYSIS AND DISCUSSION
4.0
Introduction ........................................................................................................................................39
4.1 Learners Responses on Academic Difficulties Facing Learners with Duchenne Muscular Dystrophy .................................................................40
4.1.2 Teachers Responses on Academic Difficulties Facing Learners with Duchenne Muscular Dystrophy ........................................................................................................42
4.2 Learners Responses on Availability of Specialized Equipment and their effectiveness .........................................................................................................................45
4.2.1 Teachers Responses on the Availability of Specialized Equipment .....................................................................................................................47
4.3 Learners Responses on Support Services they get and their effectiveness .........................................................................................................................48
4.4 Teachers Responses on the Availability of Human Resource Support Services and their Effectiveness ...........................................................................................................51
4.5 Strategies Used by the Teachers to Minimize Academic Difficulties Faced by Learners with Duchenne Muscular Dystrophy ............................................54
4.5.1 Learners Suggestions On How To Minimize Academic Difficulties .......................................................................................................................56
4.6 Teachers Suggestions on How to Minimize Academic Difficulties of Learners ....................................................................................................................58
4.7 Observation Guide ..........................................................................................................................60

CHAPTER FIVE
5.0
Introduction ........................................................................................................................................65
5.1 Summary of Findings ........................................................................65
5.2 Implications of the Findings .................................................................68
5.3 Conclusion ..............................................................................................69
5.4 Recommendations ..................................................................................69
5.5 Suggestions for Further Research .........................................................71

REFERENCES .........................................................................................72

APPENDICES ...........................................................................................75
Appendix A: Interview Guide for the Head Teacher ..................................75
Appendix B: Interview Guide for the Teachers ..........................................76
Appendix C: Interview Guide for the Learners ..........................................77
Appendix D: Interview Guide for the Teacher Aides .................................78
Appendix E: Observation Guide for the Researcher ....................................79
Appendix F: Research Permit .....................................................................80
LIST OF TABLES

Table 3.1 Sample Frame for the Target Population……………………………………..33

Table 4.1 Learners Responses on Academic Difficulties facing Learners with DMD……………………………………………………………………..40

Table 4.1.2 Teachers Responses on Academic Difficulties facing Learners with DMD…………………………………………………………………....42

Table 4.2 Learners Responses on Availability of Specialized Equipment and their effectiveness…………………………………………………………………....45

Table 4.2.1 Teachers Responses on the Availability of Specialized Equipment ………47

Table 4.3 Learners Responses on Support Services they get and their effectiveness…..48

Table 4.4 Teachers Responses on the Availability of Human Resource Support Services and their effectiveness…………………………………………………………51

Table 4.5 Strategies used by the Teachers to Minimize Academic Difficulties faced by Learners with Duchenne Muscular Dystrophy………………………54

Table 4.5.1 Learners Suggestions on how to Minimize Academic Difficulties…………………………………………………………………...56

Table 4.6 Teachers Suggestions on how to Minimize Academic Difficulties of Learners…………………………………………………………………...58

Table 4.7 Observation Guide…………………………………………………………………...60
LIST OF FIGURES

Figure 1.10 A Diagrammatic Representation of the Conceptual Framework ...........10

Figure 2.1 A Curvature of the Spine (scoliosis) ..............................................14

Figure 2.2 Pseudohypertrophy (enlarged calves) .............................................15

Figure 2.3 Gower’s Sign .......................................................................................15

Figure 2.4 Equinovarus Deformity of the Feet ....................................................16

Figure 2.5 Lordosis (Protruding Abdomen) ..........................................................16

Figure 2.6 The Genetic Inheritance Pattern .........................................................18

Figure 2.7 Luque Procedure (back surgery) ..........................................................19
ABBREVIATIONS AND ACRONYMNS

BMD  Becker Muscular Dystrophy
CMD  Congenital Muscular Dystrophy
CK   Creatine Kinase
DD   Distal Muscular Dystrophy
DMD  Duchenne Muscular Dystrophy
EDMD Emery-Dreifuss Muscular Dystrophy
EMG  Electromyogram
FSH  Facioscapulohumeral Muscular Dystrophy
IEP  Individualized Education Programme.
KISE Kenya Institute of Special Education
KU   Kenyatta University
LGMD Limb-Girdle Muscular Dystrophy
MD   Muscular Dystrophy
OPDM Oculopharyngeal Muscular Dystrophy
PE   Physical Education
PH   Physically Handicapped
SNE  Special Needs
ABSTRACT

The study is about the instructional constraints facing learners with Duchenne muscular dystrophy (DMD) at Salvation Army (SA) Joy Town special primary school, Thika Kenya. Duchenne is a type of muscular dystrophy that affects boys almost exclusively because the mutated gene is on the X chromosome and because males have only one thus there is no other X-chromosome to counteract the defective gene. Muscular dystrophy is a general term describing a number of inherited disorders which are characterized by progressive muscle weakness without there being any structural abnormality in the central nervous system. Instructional constraints in this study are the academic difficulties encountered by learners at SA Joy Town special primary school. They include: constant ill health, mobility problems, poor posture, fatigue, poor teaching methods, inappropriate curriculum, and lack of a modified environment among others. SA Joy Town was chosen because it accommodates learners with various categories of physical disabilities and has a national outlook since it admits learners from all over the country. The study adopted a descriptive design because it aims at getting a true picture of a situation, behavior or attitude of individuals and the community at large. The target population was 43 which included: 20 learners, 20 teachers, one head teacher and two teacher aides. The study population was 23 and included: 10 learners, 10 teachers, one head teacher and two teacher aides. The researcher used interviews and observation guide to collect data. Piloting was done at Dagoretti special school for the physically handicapped (PH). Content related validity was used as a measure to determine validity. Correlation of 0.05 confidence levels was used to judge the interviews guides for the learners, teachers, head teacher and teacher aides and the observation guide. A reliability of 0.97 was established for the learners’ interviews, 0.91 for the head teacher’s interview, 0.78 for the teacher aides’ interview, 0.98 for the teachers’ interviews and 0.93 for the observation guide. These were found to be good enough as they showed that the instruments were reliable. The researcher used descriptive statistics where tables of frequencies and percentages were used in analyzing data. Results revealed that there were major instructional constraints facing learners with DMD which included: an inappropriate curriculum, constant ill health, mobility problems, lack of specialized equipment, inability to manipulate reading and writing materials, slowness in completing learning tasks among others. Further research should be carried out on other types of dystrophies. Study should also be carried out on other challenges facing learners with muscular dystrophy for example emotional factors, social factors and health factors among others.
CHAPTER ONE
INTRODUCTION

This chapter presents; background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, delimitations and limitations, assumptions, theoretical and conceptual framework and operational definition of terms.

1.1 Background to the Study

Muscular dystrophy is a general term describing a number of genetically inherited disorders characterized by progressive muscle weakness and degeneration of skeletal muscles which control movement (Dubowitz, 1989). There are nine types of muscular dystrophy. They are Becker Muscular dystrophy (BMD) Congenital Muscular Dystrophy (CMD), Distal Muscular Dystrophy (DD) Duchenne Muscular Dystrophy (DMD), Emery- Dreifuss Muscular Dystrophy (EDMD) Fascioscapulohumeral Muscular Dystrophy (FSH), Limble Girdle Muscular Dystrophy (LGMD), Myotonic Dystrophy also known as steinerts disease and Oculopharyngeal Muscular Dystrophy (OPMD) (Emery, 2000).

Becker Muscular dystrophy (BMD) is an X-linked muscular dystrophy with similar clinical pattern to Duchenne type but milder with slower progression. Congenital Muscular Dystrophy (CMD) This is a rare form present from birth, symptoms usually progresses slowly and include general weakness and slow motor development. Distal Muscular Dystrophy (DD) Symptoms begin in middle age or later. It causes weakness in the muscles of the feet and hands.

Emery-Dreifuss Muscular Dystrophy (EDMD), this type begins with muscle contractures and then progresses to muscle weakness and affect the shoulder and upper arm. Fascio Scapulohumeral Muscular Dystrophy (FSH) symptoms of FSH vary greatly. They most commonly begin in the early twenties. Symptoms begin with difficulty lifting objects above the shoulders. Limb – Girdle Muscular Dystrophy (LGMD), there are two forms most commonly recognized one is the severe childhood form that is similar to DMD. The second appears in early twenties.
Myotonic Dystrophy: most sufferers are severely disabled within 20 years of the onset of symptoms, but do not require a wheel chair. Oculopharyngeal Muscular Dystrophy (OPMD) Symptoms of OPMD are confined to weakness in the muscles controlling the eyes and throat. (Dubowitz, 1989) Duchenne Muscular Dystrophy (DMD) is the most common and severe form of Muscular Dystrophy. It is caused by the absence of dystrophin a protein that maintains the integrity of muscle fibres. It affects boys almost exclusively because the mutated gene is on the X chromosome and boys have only one so there is no other X chromosome to counteract the defective gene (Tortora, 2002).

The researcher focused on DMD because it is the most common affecting school going children. The age of onset for DMD is between 2 to 6 years. DMD is named after Benjamin Amand Duchenne a French neurologist; Duchenne described a boy with the form of muscular dystrophy that now bears his name in 1861. Duchenne was also the first to undertake any type of needle biopsy. A muscle biopsy is a procedure by which a sample of tissue is removed with a needle. Duchenne designed the special needle for muscle biopsy. In the late 1985, researchers reported that it was possible to identify carriers of the Duchenne gene with 98% accuracy.

Similarly, significant progress was also being made in an effort to identify the exact location of the gene (Kolata, 1985; Amato, 1986). Xp21 was identified as the exact location of the Duchenne gene, (Dubowitz, 1989). Dystrophin gene was discovered in 1987 and by 1990; first attempts were made to treat Duchenne muscular dystrophy patients with gene therapy (Tortora, 2002).

Globally, the disease has no known cure; therefore, most effort in research as well as in practical medicine is concentrated upon its prevention (Ferri, 2005).Associations have been formed in developed countries like America, Britain, Ireland, Australia among others to combat neuromuscular disorders. For example, the Muscular Dystrophy Association was formed in 1950 in the United States of America by parents whose children had muscular dystrophy. The association established 85 outpatients clinics that provide diagnostic and follow-up services for afflicted persons (Weiner, 1973).
Doctors and teachers are specially trained to handle learners with muscular dystrophy. Doctors have specialized diagnostic equipment (Bauer, 1970). Teachers are trained on the kinds of adaptations required for learners with Duchenne muscular dystrophy (DMD) to enhance their learning. A model of adaptations is provided to the educator to select relevant adaptations to their needs. Systematic selections are made for learners suffering from DMD (Wolff, 1996). Specialized equipment used on these learners are dictated by the progressive nature of the disease, for example, some children have specially trained dogs to carry things for them like books or toys, while some are given drugs to delay muscle wastage (Alisa, 2004).

According to Bleck (1975), specialized equipment are used like the Hoyer hydraulic lifts which are valuable aids in bathing and toileting. Other specialized equipment includes auto vans, electric wheel chairs among others. Some learners are fitted with pacemakers when cardiac conduction defect occurs (Ferri, 2005). According to Dubowitz (1989), these learners are immobilized in calipers and swivel walkers after loss of ambulation. This enables them to continue with their learning instead of dropping out from school. Learners with muscular dystrophy may attend main stream schools, integrated schools, special schools or residential schools with full assessment from the professionals and parents for appropriate placement (Stopford, 1987).

South Africa has researched on the disease and has established an association known as the Muscular Foundation of South Africa. It is a non-profit organization that depends on goodwill of donors. Donations assist with research, education, support groups and administration. (Berge, 2005). In Kenya, no empirical research studies have been conducted on the disease despite having learners with muscular dystrophy in some of our schools. This was confirmed by a consultant neurologist/neurophysiologist Paul Kioy who is the current chairman of Medical Physiology Department at Chiromo Campus University of Nairobi, (personal communication, 2007).

Scarcity of information on Duchenne muscular dystrophy in the Kenyan context is regrettable because these learners diverse needs may not be taken into consideration thereby denying them equal opportunities in their education as clearly stipulated in the Universal Declaration of Human Rights (1948), Salamanca World Conference on
Special Needs (1994) among other international conventions. Ominde Report (1964) advocated for teacher training to include a component of special education to enable the teachers to meet the needs of learners with special needs. Kenya is cognizant of the need to provide training on special needs. This is evidenced by several institutions that have been set up that offers special education training. These institutions include; Kenya Institute of Special Education (KISE), Kenyatta University, among others. The question is whether and to what extent the training given in these institutions is customized to the level or to the specific type of physical disability of learners.

One of the objectives of special needs education was to add specialist facilities to existing schools (Ndurumo1993). The question is whether and to what extent these specialized equipment are existing in specialized centres like S.A Joy Town Special Primary School. Prevention of disablement through education and other measures was emphasized in Sessional Paper Number 5 of 1968 and the World Programme of Action (1983). While the purpose of the World Programme of Action was to promote effective measures for persons with disability, the question is whether and to what extent prevention of disability is addressed in our specialized institutions.

In 1984, the Ministry of Education established education assessment centres after recognizing the need of early assessment for early intervention for learners with special needs, (Ndurumo, 1993). It is, however, not clear whether there are in place measures for early interventions for learners with muscular dystrophy. Our society is still ignorant and attributes the disease to a curse and lack of payment of dowry. Cases have been reported of in-laws accusing a mother of bringing a curse to the family by giving birth to children with muscular dystrophy, (Daily Nation, 4th May 2007).

This demonstrates the low level of awareness about the disease. It is not known how the lack of awareness impacts on the level of service the learners with DMD receive in specialized centres such as Salvation Army Joy Town Special Primary School. In Kenya, learners with various disabilities like muscular dystrophy (MD) are grouped in the category of learners with physical handicap (PH) and are thus educated in special schools where it is argued that their needs will be best met. The question is whether and to what extent these special schools have appropriate equipment, adaptations and specialized trained teachers and medical personnel to handle learners with MD.
According to Ndurumo (1993), children with physical handicap are classified into three major groups; the orthopaedically impaired, the neurologically impaired and the health impaired. Muscular dystrophy is a myopathy and is classified under the neurologically impaired. According to Tortora (2002), where there is no evidence of neurological impairment as in the case of MD, the diseases are referred to as myopathies. It is not clear whether being grouped in the same category of learners whose muscles are not wasting may place these learners at a disadvantage in their learning given the same amount of time in their learning tasks as their counterparts.

Salvation Army (SA) Joy Town Special Primary School was established by the Salvation Army in 1962. It was established because the post polio and cerebral palsy children were finding it difficult to gain admission to regular schools due to society’s negative attitudes, (Ndurumo, 1993). S.A Joy Town Special Primary School admits all categories of physical handicaps. Muscles of learners with DMD progressively waste and their diverse needs may not be taken into consideration with the various groupings. There is no special school for learners with muscular dystrophy. In America, California has established a school for all categories of MD. They have all the adaptations and equipment for these learners as dictated by the progressive nature of the disease (Bleck & Nagel, 1982).

According to the headteacher of SA Joy Town Special Primary School, the current number of learners suffering from DMD is 20 and many of them die at an early age due to respiratory and cardiac problems. The background information available points to the deficient efforts and information to mainstream the needs of learners with DMD in special schools in Kenya. In this context, the quality of instruction is a factor of interest. The study sought to find out the instructional constraints faced by these learners at SA Joy Town Special Primary School.

1.2 Statement of the Problem
According to Emery (2000), Dubowitz (1989), Ferri (2005) and Muntoni (2004) learners suffering from Duchenne muscular dystrophy(DMD) face many instructional constraints that are manageable which include : slowness in completing learning tasks, inability to manipulate reading writing aids and communication difficulties .In the Kenyan context, no empirical research studies have been conducted on the
instructional constraints facing learners with DMD at Salvation Army (SA) Joy Town special primary school. This study seemed to merit investigation in the view of the fact that basic education is a right to all regardless of disability, sex, race, colour or social status. From the foregoing statement the study sought to investigate the instructional constraints facing learners suffering from DMD at SA Joy Town special primary school.

1.3 Purpose of the Study
This study investigated the instructional constraints facing learners with Duchenne muscular dystrophy at Salvation Army (SA) Joy Town Special Primary School.

1.4 Objectives of the Study
The specific objectives of the study were to:
1. To find out the academic difficulties faced by learners suffering from Duchenne Muscular dystrophy at Salvation Army Joy Town Special Primary School.
2. To find out the academic difficulties faced by teachers at Salvation Army Joy Town Special Primary School as they offer instructions to learners with Duchenne muscular dystrophy.
3. To find out the available resources and support services for learners suffering from Duchenne muscular dystrophy and establish their effectiveness.
4. To find out the strategies used at Salvation Army Joy Town Special Primary School to alleviate the academic difficulties faced by learners suffering from Duchenne muscular dystrophy.
5. To find out suggestions that can be made to minimize the academic difficulties facing learners with Duchenne muscular dystrophy.

1.5 Research Questions
1. What are the academic difficulties faced by learners suffering from Duchenne Muscular dystrophy at Salvation Army Joy Town Special Primary School?
2. What are the academic difficulties faced by teachers at Salvation Army Joy Town Special Primary School as they offer instructions to learners with Duchenne muscular dystrophy?
3. What are the available resources and support services for learners suffering from Duchenne muscular dystrophy and their effectiveness?

4. What are the strategies used at Salvation Army Joy Town Special Primary School to alleviate the academic difficulties faced by learners suffering from Duchenne muscular dystrophy?

5. What suggestions can be made to minimize the academic difficulties facing learners with Duchenne muscular dystrophy?

1.6 Significance of the Study
The findings of the study may hopefully benefit parents, teachers, learners, the members of the society, policy-makers and curriculum developers.

To the parents, they may understand the learning needs of these learners and the suitable adaptations for them. To the teachers, it may be of benefit to them because they may understand the instructional needs of these learners and the kind of adaptations required to enhance their learning.

The study may also hopefully make contributions to the curriculum developers to understand the nature of problems these learners face and may come up with the right adaptations for those afflicted with Duchenne muscular dystrophy. To the members of the society, it may be of benefit to them because they may understand the causes of muscular dystrophy and on how to prevent or control the disease. The learners’ diverse needs may be taken into consideration by all the stakeholders in education. The study may also help in sealing knowledge gaps.

1.7 Delimitation and Limitations
The study focused on the instructional constraints facing learners with MD at Salvation Army Joy Town Special Primary School in Thika. The pitfalls the researcher faced included: lack of enough time, lack of adequate information on Duchenne muscular dystrophy (DMD) and lack of enough resources like finances.

1.8 Assumptions
The study was carried out with the following assumptions:

1. That the curriculum, teaching methods and the learning environment can directly influence the academic difficulties facing learners with DMD.
2. That the learners with DMD at S.A. Joy town are facing academic difficulties in their learning due to progressive degeneration of muscles.

3. That the learners with DMD will require specialized equipment and a special diet to maximize their quality of lives.

1.9 Theoretical and Conceptual Framework

1.9.1 Theoretical Framework

The study was based on the Human Rights Model that builds upon the spirit of the Universal Declaration of Human Rights (1948) according to which all human beings are born free in rights and dignity. In 1948 United Nations General Assembly adopted and proclaimed a resolution called the Universal Declaration of Human Rights. Education was considered a human Right and was clearly stipulated in Article 26 which emphasized that everyone has a right to education. This model emphasizes on viewing persons with disabilities as subjects not objects thus locating the problem outside the disabled persons and addresses the manners in which the economic and social processes accommodate the differences of disability or not as the case may be. The Human Rights model includes disability within a paradigm of rights that has been emerging since the United Nations Universal declaration of human Rights of 1948. This declaration recognized that all people have certain civil, political, economic, social, cultural and development rights, despite differences between individuals. From this perspective, a Human Rights model of disability perceives variation in human characteristics associated with disability whether in cognitive, sensory or motor ability, as inherent to human conditions.

Such variations do not limit potential contributions to society rather diversify the range of mechanisms to ensure individual potential is realized. Thus a Human rights approach presumes that society is obliged to provide whatever mechanisms are necessary for individuals to realize their rights. Incase of people with disabilities this may involve the provision of support services and aids to enable social and economic integration, self, enjoyment of legal and social rights. The model is multifaceted in that it takes into account biological, psychological, social and spiritual aspects of function within the context of ethnic and cultural identities. The model is further consistent with client centered approach of counseling and health care grounded in a humanistic theoretical framework.
The implication of this model to the study is that by providing special education among learners with disability, the government has been striving to ensure that all school aged learners receive education which is a basic human right according to Article 26 of the Universal Declaration of Human Rights (1948). It also implies that failing to give adequate attention to the quality of education, by not availing the necessary equipment, an accessible curriculum, an accessible environment and human resources, many learners with special needs may fail to obtain meaningful schooling. They will, therefore, reap minimum benefits of education in terms of cognitive development and independence.
1.10 Conceptual Framework

Instructional Constraints facing learners with Duchenne Muscular dystrophy At SA Joy Town special primary school

Figure 1.1 A diagrammatic representation of the conceptual framework

S.A. Joy Town special primary school

Positive Response

- Modified curriculum
- Conducive environment
- Availability of adaptive aids
- Specialized trained personnel

Expected outcomes

- Will cater for the learners’ diverse needs
- Will be able to manipulate reading and writing materials and maximize the quality of their lives.
- Easy access to the classrooms, toilets among others.
- Will use the Individualized Educational Programme (IEP)

Negative Response

- Regular curriculum
- Inconducive environment
- Lack of adaptive aids
- Lack of specialized personnel

Expected outcomes

- Will not cater for the diverse needs of the learners’
- Will not be able to manipulate reading and writing materials and will not maximize the quality of their lives.
- Will not be able to access the classrooms, dining hall, toilets among others.
- Will not use the Individualized Educational Programme (IEP)

Source: Researcher’s own perception.
Explanation of the Conceptual Framework

Learners with Duchenne muscular dystrophy (DMD) face instructional constraints at Salvation Army Joy Town special primary school in Thika town, Kenya. If a modified curriculum is used for learners with DMD, then their diverse needs will be catered for. If the curriculum used for this learners’ is not modified it will not cater for their diverse needs. The modifications required should be on the teaching methods, environment and on time. The teaching methods should be the ones that can suit diverse needs of these learners for example the use of Individualized Educational Programme (IEP). The IEP helps a learner to learn at his own pace.

The environment should be modified to allow learners with DMD to access the classrooms, dining hall, toilets and the playground with ease. The time given for the completion of tasks should be enough to allow the learners with DMD to complete their learning tasks. Lack of a modified curriculum can also influence the academic constraints faced by learners with DMD. For instance they will not complete their learning tasks on time and would therefore lag behind in academic performance.

If the environment is inaccessible, these learners will not access the curriculum instructions with ease. Their environment should be barrier free and child friendly. Provision of specialized equipment to learners with DMD would widen these learners horizon, and enable them to complete their learning tasks with ease. The equipment would go along way in maximizing the quality of their lives by increasing their level of independence. Specialized personnel should be available to ensure that learners with DMD are catered according to their diverse needs since they will be trained in a manner that is customized to help minimize the health problems they face. Trained physiotherapists, nurses and occupational therapists should be increased in number at SA Joy Town to cater for diverse needs of these learners with DMD so as to improve the quality of their lives.
1.11 Operational Definition of Terms

Muscular Dystrophy: This is a term describing a number of inherited Disorders which are characterized by progressive muscle weakness and wasting without there being any other structural abnormality in the central nervous system or peripheral nerves.

Duchenne Muscular Dystrophy: This is a form of muscular dystrophy which occurs mostly in boys and rarely in girls. It is transmitted as a sex linked recessive character with a high mutation rate.

Instructional Constraints: These are the academic difficulties encountered by learners suffering from muscular dystrophy in SA Joy Town Special Primary School. These constraints may include; language, communication difficulties, poor posture, lack of adaptive aids, numeracy, poor memory, inappropriate curriculum, rigid teaching approaches, inaccessible environment and ill health among the learners suffering from DMD.

Disability: This is a defect which results in some malfunction or a restriction to perform an activity in the manner considered normal for human beings but which may not necessarily affect the individual’s normal life.

Special needs education: This is education which provides appropriate modifications in curricula, teaching methods, educational resources or the learning environment.

Learners diverse needs: Variations of abilities and differences found among any group of learners in a group.

Special needs: These are conditions or factors that hinder normal learning and development for individuals. They include disabilities, social, academic difficulties or health difficulties.
CHAPTER TWO
LITERATURE REVIEW

2.0. Introduction
This chapter reviews literature related to the study under the following subheadings:

2.1 Types of Muscular Dystrophies
Types of muscular dystrophies.
According to Emery 2000) there are nine types of muscular dystrophies. Becker muscular Dystrophy (BMD) begins at adolescence to early adulthood. Its symptoms are almost identical to Duchenne but less severe. It progresses more slowly than Duchenne. Death occurs in the middle age. It can also affect girls. Congenital Muscular Dystrophy (CMD), it starts from birth. Symptoms include general muscle weakness and possible joint deformities. The disease progresses slowly.
Distal Muscular Dystrophy (DD) symptoms begin at 40 to 60 years. It causes weakness in the muscles of the feet and the hands. It rarely leads to total incapacity.
Emery Drefuss Muscular Dystrophy (EDMD), this type of muscular Dystrophy (MD) begins in childhood to early twenties. Symptoms include wasting of shoulders and upper arm. Its progression is slow. Sudden death may occur from cardiac problems.

Fascio scapulohumeral Muscular Dystrophy (FSH) symptoms of FSH vary greatly. They begin in the early twenties to early adulthood. Symptoms include facial muscle weakness with some wasting of shoulders and upper arm. Its progression is slow. Life span may be many decades after onset. Limb Girdle muscular dystrophy (LGMD) symptoms begin to appear from late childhood to middle age. They lose the ability to walk at 20 years after the onset of symptoms. Symptoms include progressive weakness and loss of the muscles close to the trunk.
Oculopharygeal Muscular Dystrophy; symptoms begin between 40 to 70 years symptoms affect muscles of eyelids and throat causing weakness of throat muscles which in time causes inability to swallow. Progression is slow. Myotonic Muscular Dystrophy symptoms begin between 20 to 40 years. Symptoms include weakness of all muscle groups accompanied by delayed relaxation of muscles after contraction:
affects face, feet, hands, and neck first, progression is slow, some spanning at 50 to 60 years.

Duchenne Muscular Dystrophy (DMD) DMD which is the focus of the study is the most common and severe form of muscular dystrophy affecting school going children. It is caused by the absence of dystrophin (a protein that maintains the integrity of muscle fibres). It affects boys and can also affect girls in rare cases. First the legs are affected causing walking difficulties and balance problems. As the disease progresses, the calves begin to swell with fibrous tissue rather than with muscle, and feel firm and rubbery. For this reason, DMD is also known as pseudo hypertrophic muscular dystrophy (Walton, 1988).

2.2 Signs and Symptoms of DMD

The first symptoms of DMD appear during the pre-school years. This disorder affects the legs first. A boy has trouble walking and maintaining balance. As his calf muscles begin to weaken, he may change the way he walks. He places his legs further apart in order to maintain balance. Walking this way produces a waddling effect: that is characteristic of DMD contractures usually begin at about age of five or six. They affect the calf muscles most severely, pulling the foot down and back. This forces a boy to walk on his tip toes. Balance becomes more of a problem. As a result falls and broken bones become common at this age.

By the age of ten a boy with DMD might not be able to stand by himself. Most people with DMD are confined in a wheel chair by the age of 12 but may vary. Muscles in other parts of the body are weakened. When muscles in the upper body are affected, scoliosis or a curvature of spine appears see figure 2.1 below.

![Figure 2.1](image)

Adapted from a colour atlas of muscle disorders by Dubowitz. (1989)
Calf muscles usually enlarge. The enlarged muscle tissue is eventually replaced by fat and connective tissue (Pseudo hypertrophy) see figure 2.2 below

The boy has increasing difficulty in rising from the floor. The method of rising from the floor is known as the (Gowers’ sign) see figure 2.3 below

muscle weakness and skeletal deformities contribute to frequent breathing disorders.

Figure 2.3 Adapted from a colour atlas of muscle disorders by Dubowitz. (1989)
They may also develop equinovarus deformity of the feet see figure 2.4 below.

Adapted from a colour atlas of muscle disorders by Dubowitz (1989).

Learners with DMD are thought to have poor posture with a protruding abdomen and a sway back (Lordosis). The poor posture is due to early weakness of the abdominal wall (Bleck, 1975). See figure 2.5 below.

Intellectual impairment may occur but it is not inevitable and does not worsen as the disorder progresses. (Emery, 2000). DMD eventually affects all voluntary muscles and involves the heart and breathing muscles in later stages. The life expectancy can range between the late teens to the age of 35; however there have been people with Duchenne who made it to age 40 and beyond. Recent advancements in medicine are extending the lives of those afflicted. Surgery for scoliosis also extends the life of someone with illness. All people with DMD are affected differently.

The doctor may rely on the following in diagnosing DMD: Blood levels of Creatine Kinase (CK) which is an enzyme present in muscle tissue. Its production increases when muscle tissue is damaged. Muscle biopsy: A biopsy is a procedure by which a sample of tissue is removed with a needle. The sample can then be studied under a
microscope. Changes in the muscle tissue can be observed indicating the presence of a dystrophy. Electromyogram (EMG): An EMG is an electrical test to see how well muscles are functioning. If muscles do not respond normally to the test, a dystrophy may be present. Genetic testing: Blood samples are examined for mutations in the gene that produces dystrophin (a protein that maintains the integrity of muscle-fiber. Ultrasonography: High frequency sound waves are used to produce precise images of tissues. Ultra sound is a non invasive way of detecting certain muscle abnormalities, even in the early stages, (Emery, 2000).

2.3 Causes of Duchenne Muscular Dystrophy

Human beings have two sex chromosomes. In females the two sex chromosomes are both XX and are similar. In males the two sex chromosomes are different, with one being an X chromosome and the other the Y chromosome. The Y chromosome is usually genetically empty. Since a male receives his Y chromosome from his father, he cannot inherit any of his father’s sex linked traits which are found in X chromosome. A female however, receives an X chromosome from her father which she subsequently transmits to her children. A male transmits his sex linked traits to his grandchildren via his daughters; he cannot transmit them to or through his sons (Roberts, 1986).

Duchenne Muscular Dystrophy (DMD) is caused by a defective gene which is usually recessive but it can occur in people without a known family history of the condition as a result of genetic mutation. DMD is inherited in an X linked recessive pattern. Because women have two chromosomes, if one contains a normal copy of the gene, that gene will make enough of the protein (dystrophin) a protein involved in maintaining the integrity of the muscle fibre to prevent symptoms. Boys get an X chromosome from their mother and a Y from the father so if the X chromosome is defective, there is no second X to make up for it and they will develop the disease, (Bushby, 2001).
Figure 2.6  
DMD: The Genetic Inheritance Pattern

**Father has muscular dystrophy**

In the first generation, the father who is affected by Duchene Muscular Dystrophy (DMD) passes the defective X chromosome to the daughters who become carriers. All the sons are unaffected. There is a 50:50 chance of females being carriers in the first generation while there is a 50:50 chance for males not being affected.

**Mother is a carrier**

Where the mother is a carrier, there is one in two chances of the son having DMD and one in two chances of daughter being a carrier. In other words, 25% have the disease (male), 25% are carriers (female) and 50% are unaffected (male and female).

**KEY**

- **Affected**
- **Carrier**
- **Unaffected**

Adapted from Stopford (1987) on understanding disability, P.68
2.4. Treatment / Management and Prevention of Duchenne Muscular Dystrophy

There is currently no cure for any form of muscular dystrophy. Specific treatments depend upon the type of muscular dystrophy one has been diagnosed with. In 1993, researchers announced in a landmark discovery that gene therapy can help prevent muscle destruction and preserve muscle function in Duchenne Muscular Dystrophy (DMD) and Becker Muscular Dystrophy (BMD). Gene therapy promises for the first time to cure genetic illness rather than ameliorate the symptoms, (Sudbery, 2002).

Treatment of DMD is mainly directed at preventing complications of weakness, including decreased mobility and dexterity, contractures, scoliosis, heart defects and respiratory weakness. Treatment is centred on physical and occupational therapy. Symptoms can often be relieved through exercise, physical therapy, rehabilitative devices, respiratory care and surgery. Exercise and physical therapy can minimize abnormal or painful positioning of the joints and may prevent or delay curvature of the spine. Respiratory care, deep breathing and coughing exercises are often recommended.

Canes, calipers, wheelchairs, and other rehabilitative devices can help sufferers maintain mobility and independence. Surgery can sometimes relieve muscle shortening. The purpose of occupational therapy is to help patients find ways of making up for their loss of strength and dexterity. Strategies may include changes in the home environment, learning to use special utensils and dressing aids, use of a wheel chair, communication devices, adapted pens among others, (Emery, 2000).

Surgery may be necessary to correct severe symptoms of DMD. Contractures can be treated by cutting the damaged muscle. Dubowitz (1989) recommends passive stretching of the muscles. Scoliosis can be corrected by back surgery (Luque procedure). See Fig. 2.7 below

![Figure 2.7](image_url)

Adapted from A colour Atlas of Muscle disorders by Dubowitz (1989)
In this surgery, the vertebrae that make up the spine are fused together. Steel rods are then inserted and attached to the vertebrae to keep the spine in a straight, stiff position. Good lung hygiene is always necessary. Without proper care, infections of the lungs are common; such infections can lead to pneumonia and even death. Good nutrition helps to promote general health in all forms of muscular dystrophy. For DMD, the anti-inflammatory corticosteroid medication delays the progression of DMD (Alisa, 2004).

According to Ferri (2005), pace-maker placement may be necessary if cardiac problems arise. Long term ventilation has been shown to extend the lives of individuals with DMD (Emery, 2000). The researcher sought to find out whether the physiotherapy and occupational therapy was given and whether it was timetabled for effective administration.

According to Nagel & Bleck (1982), children with DMD should be given counseling to prepare the child for the eventual outcome. They should be treated and managed with an attitude of restrained optimism and continual encouragement. They should be given hope. Vigorous exercises should be avoided, which may strain the muscles. Teachers of these children should be good counselors to help them to live normal lives. They should also be good assessors who will in turn refer them to hospitals for therapeutic exercises and surgical operations in case of contractures.

For those children who become very weak to hold a pen, adaptations should be made for them according to their needs. They need to be given enough time to complete their work and other tasks related to learning. They should also be stimulated academically and socially (Terri, 2007).

At the advanced stages of the disease, they will require specialized equipment like Hoyer’s hydraulic lifts which are vital in bathing and toileting. The environment should be adaptable to cater for their diverse needs. A model for students with physical impairment is proposed to assist the educator in the selection of adaptation for this particular condition (Wolff, 1996). Management of this disease is aimed at maximizing the quality of these children’s lives. The researcher sought to find out how teachers prepare learners with muscular dystrophy for the eventual outcome and the adaptations made to cater for their diverse needs.
Prevention of disability from muscular dystrophy can be done through genetic counseling. Genetic counseling is the process by which parents or relatives at risk of an inherited disorder are advised of the consequence and nature of the disorder, the probability of developing or transmitting it, and the options open to them in management and family planning in order to prevent, avoid or ameliorate it. This complex process can be seen from diagnostic (Actual estimation of risk) and supportive aspects. Genetic counseling is usually provided by genetic counselors. Genetic counselors are present at high risk or specialty prenatal clinics that offer prenatal diagnosis, pediatric care centres and adult genetic centres (Milunsky, 1975).

The goal of genetic counseling is to provide accurate information to clients so that they can make an informed decision about having children. A person may undergo genetic counseling after the birth of a child with muscular dystrophy. While the primary strategy of counseling is to achieve understanding that leads to rational decisions, there is also the obvious hope that such decisions will indeed lead to a decrease in the incidence of serious genetic disease and will prevent the suffering of both patient and family (Milunsky, 1975).

2.5 ACADEMIC DIFFICULTIES FACING LEARNERS WITH DUCHENNE MUSCULAR DYSTROPHY (DMD)

Unlike many other learners with physical disabilities, the needs of learners with DMD will change during their time in school, as their muscle strength deteriorates. This could be very rapid, and schools need to be prepared to deal with every eventuality. A child can be mobile and active when they enter the school, but could be a wheelchair user requiring assistance in manipulating teaching and writing materials, toileting, eating and other personal care by the time they leave (UNESCO, 2001).

Learners with DMD have limited ways of expressing their feelings and could behave in an angry, frustrated, stubborn or withdrawn manner. They may experience depression and anxiety. This may be apparent in a few ways: withdrawal, irritability, lack of interest and poor academic performance. They might also experience low self esteem and a poor body image. (Emery, 2000).

Fatigue is likely to be a problem for learners with DMD. It can affect a child’s behaviour as well as their ability to concentrate, learn and access a full curriculum. The upper limbs are affected. For instance, a learner may not be able to raise their
hand to call for the teachers’ attention or respond to a question. This has an impact on a wide range of activities. He may need help with self care when getting changed for physical education (P.E) games, swimming or when putting on an outdoor clothing. To maximize hand function, table height and seating position are very important. Using a variety of pencil grips, sloping desks, and calculators will be beneficial to the student as fine motor manipulation become more difficult. (Department for education and skills, 2001).

Learners with DMD have difficulty with the volume of the written work required in a class. To assists these learners, consider introducing alternative recording methods that utilize information and communication technology and present computer-generated or photocopied worksheets where possible. Some learners with DMD may develop communication difficulties due to the weakness of the speech organ muscles. (Dubowitz, 1989).

Delayed language development is also reported in many learners with DMD (Bushby, 2001) some learners may have difficulties with struggle with retention and processing of complex spoken information learners with severe facial weakness may find it hard to smile or show emotion in the visual way. Learners with specific facial weaknesses may encounter language difficulties because of lack of strength in muscles used for articulation.

In accessible environment can pose academic challenges to learners with DMD. Areas of concern include the ramps or step lifts to provide access, handrails on both inside and outside building. Removal of uneven ground surfaces and provision of adequate circulation space and provision for adequate time for learners to get from one area of the school to another. Learners with DMD will require rearranging classroom furniture in every area for the learner to access the curriculum. Door ways should be widened. The chalkboard should not be very high or too low. This is to allow all learners to see the chalk board including those confined in a wheelchair. (Wolff, 1996).

Learners with DMD may face difficulties with accessing a curriculum if it is not designed for their needs (Bishop ,1995). They may face academic difficulties if the instructional strategies used by the teachers do not cater for their diverse needs. One way of meeting the needs of a learner with DMD is the use of an individualized education programme. (IEP). An IEP is a written statement that describes what the
teacher and other professional will do to meet the special needs of the learners. It allows a learner to accelerate at his own speed.

The research sought to find the academic difficulties facing learners with DMD at SA Joy Town Special Primary School. According to Bushby (2001), boys with Duchenne muscular dystrophy (DMD) exhibit a range of intellectual deficits which are non–progressive. They typically have general developmental delay, especially in the acquisition of language and in gross motor development. Although the intellectual abilities of boys with DMD tend to be in the low average range, some may have moderate or severe learning difficulties.

In adolescence, some boys overcome early difficulties and proceed to higher education with appropriate support. Language and communication abilities, and especially spoken language, are usually more severely impaired than visual spatial abilities and manual skills. This is an unexpected finding in a disorder that is associated with severe and progressive physical disabilities. There is also a high prevalence of specific learning difficulties, with three quarters of affected boys who are of normal intelligence having specific problems in reading, spelling or numeracy.

Deficits in memory have also been highlighted. Emotional difficulties are common, particularly anxiety and depressed mood. This is not surprising in young people with a disabling, progressive and life-threatening disorder. Affected boys are also often described as having poor relationship and being solitary and withdrawn. Some boys are also found to have learning difficulties which are non-progressive. Manual skills, design sense and imaginativeness are often excellent which is perhaps why young men with DMD become very good artists and model makers (Muntoni, 2004).

2.6 HOW SCHOOLS CAN COPE WITH LEARNERS SUFFERING FROM DUCHENNE MUSCULAR DYSTROPHY (DMD)

Once walking becomes difficult to the affected boys, many schools make special arrangements or even structural additions to make their daily activities easier. Transportation can also be arranged if it is a day school. Each child is given individualized Education Programme (IEP) to get appropriate physical and educational needs. This includes an opportunity to learn computer skills – skills that will be important for him later when his muscle weakness makes his writing difficult.
Additional government funding known as integration funding is applied by the school to ensure the learner with DMD gets assistance (teacher aid time) at school to fully access the curriculum.

The integration funding also ensures that a physiotherapist and occupational therapist can be employed by the school to assess his needs regularly and ensure that the school is accessible as his needs changes. The level of integration funding is reviewed on a yearly basis. If there are problems with verbal and communication skills then development of creative skills can be encouraged. According to Muntoni (2004) boys with DMD are very good in creative activities such as music and poetry.

Teaching pupils with DMD is a complex task. It involves implementing a teaching process and providing access to materials suited to pupil’s skills and this depends on each individual’s needs. For each pupil this entails establishing a special purpose and individualized programme of competencies from the standard programme. This is the “Curriculum adaptation”. Additionally people need to be given tools and materials adapted to their needs.

Curriculum adaptation does not focus exclusively on learning objectives and contents. It also sets out all the access alterations required for curriculum development, like the environment, materials and personal conditions that improves the teaching process. Methodology assessment as an “accessibility measure” also needs to be considered as part of the teaching learning process for amendment. The adapted curriculum is a statement of the minimum abilities and skills that a pupil should acquire, with the necessary assistance to be able to lead an autonomous life (Stahl, 2002).

According to Wolff (1996), systematic selections of adaptations are from DMD. A model of adaptations is provided to the educator to select relevant adaptations to the learners needs. The model is provided by the Department of Education. Some associations like the Muscular Dystrophy Association (MDA) assist in projects related to the Education of learners with DMD for instance they assist in making the schools accessible on the environment by constructing pathways, lifts, handrails and providing the necessary specialized equipment.
The Association also creates awareness on the disease because it has no known cure (Lewis, 2009). The muscular Dystrophy Group of Great Britain and Northern Ireland provides comprehensive support and regularly updated information to the families and carers. A patient care department is based at their head office and family care officers are based at some of the main neuromuscular centres in the Country. In addition there is a network of local support groups (Stopford, 1987). The researcher sought to find out how SA Joy Town Special Primary School copes with learners with DMD.

### 2.7 INSTRUCTIONAL NEEDS OF LEARNERS WITH DMD

According to (Stopford, 1987), most children with Duchenne muscular dystrophy cope pretty well in the local infants school. With the current emphasis on vocational, functional and social integration notably following the Education Act 1981, the number of children with severe disabilities attending mainstream schools has acceptably increased. Full assessment of each child is made with the involvement of parents, professionals and teaching staff so that most appropriate placement may be recommended, whether this be a mainstream school, a school for children with special needs or a residential school. Practical problems may prevent a child who is wheelchair bound from attending a mainstream school.

According to Wolff (1996), learners with Duchenne muscular dystrophy require systematic selection of adaptations according to their diverse needs. According to Wolff (1996), the learning room for learners with Duchenne muscular dystrophy should have two doors one in front and one at the back. Chalkboards should not be higher than 24 inches from the floor. Doors should have automatic door checks allowing the door to remain open for wheelchairs. Toilet facilities should be near the learning environment. Floor should be of the non-skid type. The researcher sought to find out the adaptations that had been made in the classes for learners with Duchenne muscular dystrophy at SA Joy Town Special Primary School.

According to Terri (2007), teachers should know that learners with Duchenne muscular dystrophy may complain of fatigue when writing clumsy or slow at times and slur words. These are health issues not behaviour issues. These learners will need extra time to finish class work or exams, but with assistance and planning they should be able to keep with their peers. The researcher sought to find out whether learners
with muscular dystrophy are given extra time to complete their learning tasks and whether the curriculum has been designed for their needs.

The teacher should also be familiar with the child’s condition from the individualized education programme (IEP). Other strategies used for these learners include: Universal design of instructions. Universal design is defined as the design of products and environment to be used by all people to the greatest extent possible, without the need for adaptation or specialized design, (Terri, 2007). The researcher sought to find out the instructional strategies used by teachers for learners with Duchenne muscular dystrophy.

2.8 HOW THE CURRICULUM CONTRIBUTES TO THE ACADEMIC CONSTRAINTS FACED BY LEARNERS SUFFERING FROM DUCHENNE MUSCULAR DYSTROPHY

Curriculum refers to subject matter that is planned to be taught by teachers and learnt by the learners at each level of education. It provides guidelines on the content, sequence of activities, teaching methods, educational resources, time schedules and evaluation procedures. The curriculum framework aims at reaching the average learners. An appropriate curriculum is vital for education to be meaningful for learners with special needs. (Savaloinen, 2000)

However, according to Koech's report (1999) the Kenyan school curriculum is inappropriate in that there is lack of clear policy guidelines and legal status on special needs education provisions. The curriculum is also inappropriate because there are inadequate educational facilities, equipment and services for learners with disabilities. There are trained teachers who use rigid teaching approaches which may only benefit the average learner. It is also inadequate because of the rigid assessment procedures based on mean standard scores which do not consider learners with special needs. The curriculum has also failed to address the specific subjects for instance for daily living (orientation/mobility among others) that would cater for special needs for life long education and teachers' inability to communicate in a media of instruction which the learner understands.
The Task Force (2005) established that the 8-4-4 curriculum does not cater for all learners with special needs (SNE); it also noted that learners with SNE have diverse needs and cannot all be expected to access the same curriculum as their peers. They noted that the regular 8-4-4 curriculum has to be differentiated in terms of time, learning resources and mode of access. The specific subjects to be taught to each learner should be dictated by the learners needs. In this case, learners with DMD will require a differentiated curriculum. A differentiated curriculum is an approach that one can use to identify the subjects in the curriculum that a learner should cover and plan for each learner according to his or her needs and ability.

To overcome the barriers of the Kenyan School curriculum for use with learners with Duchenne Muscular Dystrophy, the curriculum should be diversified to suit individual learner's need. One way is by adapting examination questions to suit the individual learner’s needs and using alternative ways of measuring the learner's competence such as oral work or direct observation as the learners work. Rigid educational approaches can influence the academic difficulties facing learners with Duchenne muscular dystrophy. Rigid educational approaches can be seen in the poor quality training in which there is lack of long term professional development. In service training for teachers is rarely required or planned for teachers in regular schools. The teacher uses methods that aim at the middle range or average learners.

The competition that is enhanced in the examinations and selection of learners for promotion to higher levels by mean score does not consider learners with special needs. (Draft policy on learners with disabilities, 2006). The Task Force (2005) noted that learners with SNE require a barrier free environment to maximize their functional potentials. They noted that the physical structures in institutions for learners with SNE were so inconducive to the learners with special needs that most of them cannot cope. The inconducive structures include inaccessible toilets, desks, chairs, tables, writing and reading materials and writing system and many others. The Task Force (2005) also established that the hydrotherapy services for learners with physical disabilities are non functional. The Task force (2005) also established that the 8-4-4 curriculum does not cater for all learners with special needs (SNE) The curriculum was noted to be rather rigid demanding and has the same expectation for all learners.
The Task force (2005) noted that this arrangement disadvantages learners with SNE since there are some learners such as the ones who are gifted and talented who can complete the curriculum in less than the specified time and others who may not be able to complete it within the specified time. The Task Force (2005) noted that many subject content areas of the 8-4-4 curriculum have neither been adapted nor a specialist curriculum prepared for the areas where they are required.

A number of other issues emerged in the area of examination for learners with SNE. The issues touched on grading, time allocation and mode of presentation of examination papers. For instances, it was established that Kenya National Examination Council (KNEC) allows candidates with SNE thirty extra minutes to complete writing their examinations. However, the Task Force (2005) noted that the extra thirty minutes does not work well with all SNE learners and in all subjects. The Task Force (2005) recommended that taped exams be given to those who require them and time allocation for learners with SNE be determined by the length of the examination paper and the nature and severity of disability.

The Task Force (2005) noted that the toilet doors used by learners with SNE are often too narrow with seats which are either too high or too low to be used comfortably by learners in wheelchairs or those moving with their forelimbs. The pathways of doorways are either very narrow or have steps that cannot accommodate wheel chair users. The chairs and desks are not adapted to the needs of individual’s children. The chalkboards are either high or low and sometimes far from the learners. All schools and public facilities have to be made barrier free disability by the ministry of education with collaboration with relevant ministries (Task Force, 2005).

Learners with physical disabilities require adapted seats, writing equipments, adapted computer therapy equipment, adapted wheelchairs, therapy ball audio visual recorders, crutches, orthoses calipers and braces, postheses, adopted functional aids such as pens and cutlery among others.

2.9 RESOURCES AND SUPPORT SERVICES FOR LEARNERS WITH
DUCHEENNE MUSCULAR DYSTROPHY

The resources used by children are dictated by the progressive nature of the disease. In America and other developed countries, patients are provided with electric wheel chairs which increase the child’s horizon. Very good electric wheel chairs with a variety of hand controls are available. They have softball games for muscular
dystrophy children including those in electric wheel chairs. Automobile vans are now available that permit greater mobility for children in electric wheelchairs with a ramp for chairs. Family outings become facile and pleasurable. For toileting and bathing, they have Hoyer Hydraulic lifts. Other resources include: swivel walkers, canvas straps or spinal braces, respirators and pace-makers among others (Bleck, 1975).

According to Alisa (2004), some children have specially trained dogs to open doors and carry stuff, like books or toys. They also use assistive devices like braces and calipers. In addition to the statutory departments, a range of voluntary organizations provide useful information and guidance to families. These include: the Disabled Living Foundation, the Invalid Children Aid Association, the Disablement Income Group and the Royal Association for Disability and Rehabilitation.

The Muscular Dystrophy Group of Great Britain and Northern Ireland provide comprehensive support and regularly updated information to families and careers. A patient care department is based at their head office, and their family care officers are based at some of the main neuro-muscular centres throughout the country. In addition, there is a network of local support groups (Stopford, 1987). Associations have been formed in developed countries like Britain, America, Ireland, and Australia. The associations were formed to educate the society on the neuro-muscular disorders, for example, the Muscular Dystrophy Association formed in 1950 in America. The researcher sought to find out the available resources and support services for learners with muscular dystrophy in SA Joy Town Special Primary School.

**Summary**

This chapter has reviewed literature on DMD generally and particularly in Kenya. The review has established that no empirical research studies have been conducted at SA Joy Town Special Primary School. Without research on this disease, it may be difficult to know the prevalence rate, challenges facing them, the causes and the interventions. The researcher therefore proposed to investigate the instructional constraints faced by learners with DMD at S.A Joy Town Special Primary School. The study sought to find out the academic difficulties facing learners with DMD at S A Joy Town special primary school. The study also sought to find out the available resources and support services and their effectiveness to the learners suffering from DMD. The study also sought to find out whether specialized equipment and adaptations were available for these learners.
CHAPTER THREE
METHODOLOGY

3.0. Introduction
This chapter highlights methodological details appropriate to the study; research design, variables, location of the study, target population, sampling techniques and sample size, construction of research instruments, pilot study, validity, reliability, data collection techniques, data analysis, logistical and ethical considerations.

3.1. Research Design
Research design is a plan to gather how and when to collect the data, and how to analyze the data obtained (Orodho, 2005). The study adopted a descriptive design. According to Gay (1973), the descriptive method of research is a process of collecting data in order to test the hypothesis or answer questions concerning the current status of the subjects in the study. According to Best and Kahn (1993:76), a descriptive study presents what is and interprets the nature of an ongoing event. It is concerned with conditions or relationship that exist, opinions that are held processes that are going on, effects that are evident, or trends that are developing.

It is primarily concerned with the present, although it often considers past events and influences as they relate to current conditions. It aims at getting a true picture of a situation, behavior or attitude of individuals and community at large. The study used grounded theory as a methodology. Grounded theory is a qualitative research method used to analyze social processes and human interactions. Ground theory is guided by theoretical sampling. Theoretical sampling is an active process in which discoveries made during data gathering, observation and literature review direct the researcher to her next area of inquiry or potential data source (Glaser, 1992).

3.2 Variables
The independent variables are the instructional constraints facing learners with muscular dystrophy. The dependent variables included availability of specialized equipment, new teaching strategies, independence, improved academic performance and improved medical services for learners with muscular dystrophy. The variables were not manipulated.
3.3. Location of the Study

The study took place at Salvation Army (SA) Joy Town Special Primary School situated in Thika district in the central province of Kenya. It is about 45 km from Nairobi, the capital city of the republic of Kenya. The school was founded in 1962 by the SA missionary officer, Colonel Cyril Woods, as a church expression of loving care to children who are disabled (Ojwando, 1996). Joy Town is a special primary school for the children who are physically disabled. It accommodates the various categories of the physically disabled.

According to Ndurumo (1993) the physically disabled are divided into three groups namely neurologically impaired, the health impaired and the orthopedically impaired. The neurologically impaired include: Cerebral paralysis, Spina bifida, spinal cord injury, muscular dystrophy and childhood muscular atrophy. The health impaired include: epilepsy, juvenile diabetes mellitus, haemophilla, sickle cell anaemia, asthma, burns, juvenile rheumatoid arthritis, heart disease, tuberculosis, schistomiasis and guinea worms.

The orthopaedic impaired include: poliomyelitis, amputations, arthrogryposis, multiplex congenital, club foot, osteogenesis imperfecta, congenital dislocation of the hips, scoliosis or curvature of the spine, leg-calves pertheses and leprosy. The location of the study was chosen because it was among the first to be established by the Salvation army in 1962 and hence has a long tradition in dealing with various categories of the physically disabled.

The school has also a national outlook because it admits pupils from different parts of the country. The school has a total of 278 pupils made of twenty learners suffering from Duchenne muscular dystrophy (DMD), 151 boys and 107 girls. There are 21 teachers including the headteacher, 1 occupational therapist, 1 matron, a physiotherapist, 1 school nurse, 2 teacher aides, 13 housemothers and 3 grounds men. The school uses the regular 8.4.4.curriculum.

3.4 Target Population

According to Orodho (2005), target population is a large population from which a sample population is selected. A sample population is a representative case from the large population. The study population is the group of participants in a study, in this
study; respondents make up the study population. In this study, the target population was 43 comprising of 20 learners, 20 teachers, 1 headteacher and 2 teacher aides. The study population was 23 comprising of 10 learners, 10 teachers, 2 teacher aides and 1 headteacher. These served a great deal in enabling collection of data on the instructional constraints faced by learners suffering from DMD at SA Joy Town Special Primary School.

Table 3.1
Study sample frame for the target population

<table>
<thead>
<tr>
<th>CLASSES</th>
<th>TOTAL NUMBER OF LEARNERS IN JOY TOWN SPECIAL SCHOOL</th>
<th>LEARNERS WITH DMD</th>
<th>TARGET POPULATION</th>
<th>SAMPLE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MALE</td>
<td>FEMALE</td>
<td>TOTAL</td>
<td>MALE</td>
</tr>
<tr>
<td>STD 1</td>
<td>19</td>
<td>14</td>
<td>33</td>
<td>3</td>
</tr>
<tr>
<td>STD 2</td>
<td>18</td>
<td>14</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>STD 3</td>
<td>18</td>
<td>13</td>
<td>31</td>
<td>1</td>
</tr>
<tr>
<td>STD 4</td>
<td>20</td>
<td>13</td>
<td>33</td>
<td>5</td>
</tr>
<tr>
<td>STD 5</td>
<td>19</td>
<td>14</td>
<td>33</td>
<td>2</td>
</tr>
<tr>
<td>STD 6</td>
<td>19</td>
<td>13</td>
<td>32</td>
<td>1</td>
</tr>
<tr>
<td>STD 7</td>
<td>19</td>
<td>13</td>
<td>32</td>
<td>3</td>
</tr>
<tr>
<td>STD 8</td>
<td>19</td>
<td>13</td>
<td>32</td>
<td>1</td>
</tr>
<tr>
<td>% of target sample</td>
<td>151</td>
<td>107</td>
<td>258</td>
<td>20</td>
</tr>
</tbody>
</table>

3.5 Sampling Techniques and Sample Size

3.5.1 Sampling Techniques

Purposive sampling was used to select teachers, teacher aides, head teacher and learners. Purposive sampling is handpicking the cases to be included in the sample on the basis of one’s judgment of their typicality (Orodho, 2005). In purposive sampling, the goal is to select cases that are likely to be “information rich” with respect to purposes of the study. The intent is to achieve an in depth understanding of selected individuals (Gall et al, 1996). Ten teachers were purposively selected on the basis of previous experience with learners suffering from Duchenne muscular dystrophy (DMD). The teachers who had more experiences were picked from both the lower and upper primary.

Four teachers were picked from the lower primary and 6 from the upper primary were picked. The 2 teacher aides were picked because they serve learners with DMD in the classes. The head teacher was purposively selected because he is the head of the
institution and in charge of school administration. He was also to provide information regarding the instructional constraints facing learners with DMD. Seven teachers had a Diploma in Special Education from Kenya Institute of Special Education (KISE) and had been working in the school for more than five years. Three teachers had a degree in Special Education from Kenyatta University. They also had been teaching in the school for more than ten years.

The head teacher has a degree from Kenyatta University. He had been working at SA Joy Town special primary school for 6 years. The teacher aides had a long experience in that school because they had served as house mothers for 15 years then promoted to teacher aides in the classrooms. The ten learners picked for this study were all confined in a wheelchair. Four learners were picked from standard four, 2 in standard 5, 1 in standard 6 and 2 in standard 7 and 1 in standard 8.

3.5.2 Sample Size
Sample size was 23 comprising of 10 learners, 10 teachers, 1 head teacher and 2 teacher aides.

3.6 Construction of Research Instruments
The researcher used interview guides and an observation guide. An interview guide is a set of questions that an interviewer asks when interviewing respondents. It makes it possible to obtain the data required to meet the specific objectives of the study (Orodho, 2005). In this study, semi-structured interviews were used to collect data from respondents. Gall et al (1996) assert that semi-structured interviews involve asking a series of questions and then probing more deeply using open form questions to obtain additional information that is quite vital in a study.

According to Cohen, Manion & Morrison (2001), an interview can produce in-depth data not possible with a questionnaire and the reason for particular responses can be determined. According to Kerlinger (1973), people are willing to communicate orally than writing and this provides data more readily. Mugenda & Mugenda (1999) observe that the interview instruments yield high responses and personal and sensitive information can be extracted. In this study, interviews were used on the head teacher, teachers, learners and teacher aides.
The key issue to be gathered was on the instructional constraints faced by learners suffering from DMD at SA Joy Town Special Primary School. An observation guide is a tool that provides data through direct observation. According to Peils (1995), an observation guide helps in gathering data concerning the status of the school facilities, equipment and in examining the general situation of the environment.

### 3.7 Pilot Study

The researcher piloted the instruments on a small representative sample with similar characteristics to the research sample. The purpose of piloting was to discover any weaknesses in the instruments, check for clarity of the questions or items and also elicit comments from respondents that assisted in the improvement and modification of the instruments. According to Wiersma (1985), piloting the instruments helps eliminate ambiguity, misunderstandings and inadequate items. Piloting also enabled the researcher to detect any flaws in the administration of the research instruments.

Before the actual data collection, the two instruments that is the interview guides for the head teacher, learners, teacher aides and observation guide were subjected to a test on their validity and reliability through a pilot study. To ascertain the effectiveness of the instruments, piloting was done at Dagoretti special primary school for the physically handicapped in Nairobi. Ten learners suffering from Duchenne Muscular Dystrophy (DMD) participated. Others who participated because they have some contact with learners suffering from DMD included: head teacher, 10 teachers and 1 teacher aide.

### 3.7.1 Validity

Validity is the extent to which a test measures what it is supposed to measure, (Gay, 1973). Content related validity was used as a measure to determine validity. Content related validity is concerned with a tests ability to include or represent all of the content of a particular construct (Donald, 2003). Content validity refers to how much a measure covers the range of meanings included within a concept (Babbie, 1999). Given that content validity is determined by expert judgment (Franklin & Thrasher, 1976), the interviews were scrutinized and approved by an expert lecturer in special education.
3.7.2 Reliability

Reliability is the degree to which approximately the same results would be obtained if the test were administered again. It is the consistency with which the test measures what it is supposed to measure. Unless a test is valid, it cannot be reliable (Salvia & Ysseldyke, 1981). The Pearson correlation was employed to compute the correlation coefficient in order to establish the extent to which the contents of the interviews and observation guide were consistent in eliciting the same responses every time the two instruments are administered. Reliability is synonymous with the consistency of a test, observations, interviews or other measuring devices.

A reliability coefficient is the statistic of choice in determining the reliability of a test. This coefficient represents a correlation which measures the intensity and direction of a relationship between two or more variables.

Using Pearson product moment formula

\[ r_{xy} = \frac{\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})}{(n - 1)s_x s_y}, \]

A correlation of 0.05 confidence level was used to judge the items in the interviews and in the observation guide. A reliability of a correlation of 0.05 level was used to judge the items and the observation guide. Reliability of 0.97 was established for the learners’ interviews, 0.91 for the head teacher’s interview, 0.78 for the teacher aides’ interview and 0.98 for the teachers’ interviews and 0.93 the observation guide. These were found to be good enough as they showed that the instruments were reliable.

3.8. Data Collection Techniques

The researcher used an interview guide and an observation guide to collect data from the respondents. Interviews were conducted with the respondents during the parents open day and games time. The interviews for teachers and teacher aides were conducted during the long break and lunch break. The head teacher was also interviewed after school. Care was taken not to interfere with the normal teaching schedules. The researcher had to create a rapport with the respondents by explaining to them the purpose of the study before proceeding to conduct the research. The
researcher had to conduct interviews with each respondent sampled and this was tedious, expensive and time consuming.

The head teacher’s interview and the teacher aides’ interviews were analyzed descriptively. The teachers’ interviews and learners’ interviews were analyzed using frequencies and percentages. The observations were made at the SA Joy Town Special primary school on the following areas: curriculum, classrooms, adaptive aids, teaching strategies, ramps, pathways, step lifts, hand rails, ground surfaces and on time given to complete learning tasks. For the diet the researcher visited the school during lunch hour to find out whether they were provided with a special diet.

3.9. Data Analysis

Descriptive statistics were mainly used in data analysis. Descriptive statistics involve tabulating, graphing and describing data (Orodho, 2005). After the actual fieldwork data collected from interviews were assembled together according to emerging themes and classified by different categories. The items that sought information on the same objective were grouped together. The responses to the items were coded. This was done by assigning symbols normally numerals to each answer which fell in a pre-determined class.

Descriptive statistics such as frequencies and percentages were employed to analyze data. The head teacher’s interview and the teacher aides’ interviews were analyzed descriptively. The teachers’ interviews and learners’ interviews were analyzed using frequencies and percentages. Qualitative data from the observation guide were also analyzed descriptively and interpreted based on the study objectives.

3.10 Logistical and Ethical Considerations

The researcher obtained a research permit from the permanent secretary (PS) Ministry of Education (MOE) through the Dean, Graduate School, Kenyatta University before administering the research instruments in the field. The researcher made preliminary visits to SA Joy Town Special Primary School where research was to be conducted in order to establish rapport with the headteacher of the institution and also to discuss the relevance of the study. Other considerations included; getting informed consent from the respondents before interviewing them, using information only for disclosed purpose, respecting their right to withdraw at any time and treating the respondents with dignity.
CHAPTER FOUR

DATA PRESENTATION ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter presents an analysis and interpretation of data that were collected during fieldwork. The analysis and interpretation have been done within the framework of the objectives that this study sought to address. The core objective of this study was to investigate the instructional constraints faced by learners suffering from Duchenne muscular dystrophy (DMD). This study was conducted at Salvation Army (SA) Joy Town Special School in Thika Town.

The study was guided by the following key research questions:

1. What are the academic difficulties faced by learners suffering from Duchenne muscular dystrophy (DMD) at SA Joy Town Special Primary School?

2. What are the academic difficulties faced by teachers at SA Joy Town Special Primary School as they offer instructions to learners with DMD?

3. What are the available resources and human support services given at SA Joy Town Special primary school for learners’ with DMD and their effectiveness?

4. What are the strategies used at SA Joy Town Special primary school to alleviate academic difficulties faced by learners with DMD?

5. What are the suggestions that can be used to minimize academic difficulties among learners with DMD?
Table 4.1 Learners responses on the academic difficulties facing them.

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequent absenteeism due to frequent ill health</td>
<td>7</td>
<td>21.9%</td>
</tr>
<tr>
<td>Time given to complete their learning tasks is not enough and communication difficulties.</td>
<td>6</td>
<td>18.8%</td>
</tr>
<tr>
<td>Some said they were poor in reading, writing, poor memory, spoken language and in mathematics</td>
<td>5</td>
<td>15.6%</td>
</tr>
<tr>
<td>Slow in completing learning tasks</td>
<td>5</td>
<td>15.6%</td>
</tr>
<tr>
<td>Not able to manipulate reading and writing materials</td>
<td>5</td>
<td>15.6%</td>
</tr>
<tr>
<td>Poor posture and fatigue</td>
<td>4</td>
<td>12.5%</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>32</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

As shown in table 4.1 above, the most reported academic difficulty faced by learners suffering from Duchenne Muscular Dystrophy (DMD) was constant illness (21.9%). This is likely that most of these learners spent most of their time in hospital leading to poor academic achievement since they were not able to catch up with the rest of the learners. In addition, 18.8% of the learners responses stated that time given for them to complete learning tasks was not enough. The Task Force (2005) noted that the extra 30 minutes given to learners with Special Needs (SNE) was not enough. They suggested that time was to be dictated by the severity of the disability. They may have communication difficulties due to weakness in speech organ muscles. They may require the services of speech therapist.

The regular curriculum poses academic difficulties to these learners because it was developed considering the average learner. The curriculum developers should diversify the regular curriculum to suit learners with DMD. In the same manner, it was reported that 15.6% of the learners were poor in reading, writing, poor memory, spoken language and in mathematics. This relates to an attribution given by Bushby (2001) who has stated that boys with DMD exhibit a range of intellectual deficit which are non-progressive. According to Bushby (2001), there is tremendous individual variation in general intellectual function across affected boys. This implies that these boys have individual differences and each boy suffering from DMD should be treated as
unique by the teachers and given appropriate interventions. For example, the uses of an individualized education programme (IEP).

An IEP is a written statement that describes what the teacher and other professionals will do to meet special needs of the learner. It allows the learner to learn at his or her own pace. It allows the bright learner to accelerate ahead and prevents the slow learner from being pushed. It is likely that the regular curriculum may not allow the teachers to effectively assist the learners because of the rigid teaching approaches which may only benefit the average learner (Koech Report, 1999).

The learners reported to be slow in completing learning tasks (15.6%). This implies that although it may be desirable to Integrate DMD with other learners their kind of disability may not allow them to cope with the pace of the rest of other learners. This if not well managed, it may lead to frustration or an aversion to the instruction.

The curriculum should be designed in such a way that it accommodates the diverse needs of these learners. Learners with DMD will require a differentiated curriculum. According to Lewis (1981), a differentiated curriculum is an approach that one can use to identify the subjects in the curriculum that a learner should cover according to his or her needs and ability. It was also revealed that the physical disabilities were the basis of a wide spectrum of instructional learning constraints faced by learners with DMD.

It is likely that as their physical condition degenerated, these learners were unable to use their hands to write and hold the teaching learning aids. This shows that a great of innovation was required to aid these children get the best within their circumstances. In other countries, corticosteroids such as Prednisone and Deflazocort are given to learners with DMD to increase energy and strength and to defer severity of symptoms (Alisa, 2004).

Another 12.5% of the responses cited fatigue. It is likely that at the advanced stages of the disease these learners were fatigued due to the degeneration of their physical condition or because of the poor posture brought about by scoliosis or a curvature of
the spine. Scoliosis is a secondary feature of muscle weakness resulting from the dysfunction of the spinal muscle.

### Table 4.1.2 Teachers responses on academic difficulties facing learners with Duchenne muscular dystrophy

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absenteeism due to frequent ill health</td>
<td>6</td>
<td>25%</td>
</tr>
<tr>
<td>Slowness in completing learning tasks</td>
<td>5</td>
<td>20.8%</td>
</tr>
<tr>
<td>Inability to manipulate teaching and reading materials</td>
<td>5</td>
<td>20.8%</td>
</tr>
<tr>
<td>Some learners have poor memory, poor spoken language, reading, spelling and mathematics</td>
<td>5</td>
<td>20.8%</td>
</tr>
<tr>
<td>Some are unhappy and uninterested</td>
<td>3</td>
<td>12.5%</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>24</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

As shown in table 4.1.2 above, the most reported academic difficulty faced by learners with Duchenne muscular dystrophy (DMD) was constant ill health (25%). This implies that these learners were missing instructions from the teachers as they spent their time in hospitals or in bed. It is likely that they could not catch up with the rest of the learners leading to poor academic achievement. At the advanced stages of the disease, teachers stopped giving attention to the learners. Although this may be logical it is to negatively affect the learners as they may feel abandoned or condemned. It is important for some other form of attention be given to these learners to keep them busy and distracted from their condition.

Spiritual nourishment is crucial at this time because it may give them consolation and enable them accept their condition. Teachers reported that learners with DMD were slow in completing learning tasks. This is likely because the voluntary muscles are all affected by the disease. A great deal of innovation has to be done for these learners to get the best within their circumstances.
For instance, in other countries, they have functional assistive devices and support services from the medical personnel who are specially trained to handle learners with DMD. Some doctors give them drugs to delay muscle wastage (Alisa, 2004). Others are given gene therapy that preserves their muscles (Sudberry, 2002). The medical personnel at SA Joy town special primary school should be specially trained to cater for the diverse needs of learners with DMD.

The teachers conceded to not using any specialized strategy like IEP to assist the learners with DMD. This is a cause of concern because all the teachers in S.A Joy town are specially trained from Kenya Institute of Special Education (KISE) and Kenyatta University (K.U). This paints a grim picture as to the kind of attention these learners can get from their teachers. At the same time, the curriculum has not been designed for their needs. According to the Task force (2005) the 8.4.4 regular curriculum is not suited for learners with special needs because it was made with the average learner in mind.

Inability to manipulate teaching and reading materials were cited by 20.8%. It is likely that at the advanced stages of the disease, muscles stopped working forcing learners not to use their hands to write and use their books. This shows that a great of innovation was required to get children get the best within the circumstances. In some other countries, these children are given drugs to delay muscle wasting and appropriate adaptive aids (Emery, 2000).

In this school there were no adapted pens for those in the upper primary. In lower primary adapted pencils were effective because learners with DMD had some muscle strength to use them. Some learners were reported to have poor memory, poor spoken language, reading, spelling and mathematics at (20.8%). This finding is true according to Dubowitz (1989) who stated that learners with DMD have mild mental retardation which varies with the individual. These learners will require interventions of the IEP which was not used by the teachers in this school.

The regular curriculum is inappropriate for use with learners with severe disabilities because of the rigid teaching approaches used by the teachers (Koech report, 1999). The teachers also reported that some learners were unhappy and uninterested in class work (12.5%). This is evidence that learners with DMD were in dire need of
systematic psychological support or counseling. The teacher aides reported that they were only two aiding all learners with physical disabilities in SA JoyTown Special Primary School.

They reported to be overworked and in effective in giving proper services to these learners. They reported that it was tiring to support learners with DMD on their necks using their hands. These shows that learners with DMD are in dire need of functional assistive devices to improve these learners posture. According to the Task Force (2005) there were no functional assistive devices in special schools. The head teacher reported that the major academic difficulties that faced learners with DMD included: absenteeism due to frequent ill health.

These learners spent most of their time in hospitals so they were not able to catch up with the learning tasks leading to poor academic achievement. He also cited that there was lack of enough adaptive aids which could alleviate academic difficulties faced by these learners. This means that a great deal of innovation was required to aid these learners get the best within the circumstances. Emery (2000) supports the use of adaptive aids such as adapted pens so to enable the learners complete their learning tasks with ease.

The head teacher reported that dropouts of learners with DMD occurred in the school. Many dropouts were reported from the upper primary section which could have been as a result of the degeneration of the physical condition of these learners. The headteacher stated that he was not aware of the systematic selections of adaptations for these learners. This is a cause or concern because their diverse needs may not be taken into consideration.

The training offered in our institutions should be customized to the level of the specific physical disability of the learners so as to enable them to handle the learners according to their specific needs. The headteacher reported slowness in completing learning tasks among learners suffering from Duchenne muscular dystrophy. Although it is desirable to integrate learners suffering from Duchenne muscular Dystrophy with the rest of the learners their pace may not allow them to cope with the rest of the learners.
Stopford (1987) envisioned the challenge and recommended that emphasis on social integration be accompanied with full assessment of each child with the involvement of parents, professionals and teaching staff so that most appropriate placement may be recommended. These learners should be integrated with other learners and provide them with appropriate intervention strategies such as a specialized aids. In other countries such as America, corticosteroids such as Prednisone and Deflazocort are given to these learners to increase energy and strength and defer severity of some symptoms of DMD (Alisa, 2004).

Table 4.2
Learners’ responses on availability of specialized equipments and their effectiveness.

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheelchairs</td>
<td>7</td>
<td>25.9%</td>
</tr>
<tr>
<td>Adapted pencils</td>
<td>6</td>
<td>22.2%</td>
</tr>
<tr>
<td>Adapted desks</td>
<td>5</td>
<td>18.5%</td>
</tr>
<tr>
<td>Adaptive toilets</td>
<td>4</td>
<td>14.8%</td>
</tr>
<tr>
<td>Rails to assist walking</td>
<td>3</td>
<td>11.1%</td>
</tr>
<tr>
<td>Pathways</td>
<td>2</td>
<td>7.4%</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>27</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

As shown in table 4.2 above, the largest proportion of learners with DMD cited the availability of wheelchairs at 25.9%. The learners said they were given wheelchairs once they were unable to walk which assisted them in mobility. However, learners with DMD also reported that they were uncomfortable and they did not have anyone to push them around. The level of wheelchairs reported at Joy Town special school were in contrast to some other countries for instance, Bleck (1975) talks about very good electric wheelchairs with variety of hand controls.

The school should be provided with specialized wheelchairs. The learners with DMD also reported the availability of adapted pencils and adapted desks at 22.2% and 18.5% respectively. The learners with DMD said that the aids only assisted them when they were in the lower primary. It is therefore likely that they stopped making
use of the adapted pencils at the upper primary due to the degeneration of the muscles. This shows that a great deal of innovation is needed to aid these learners get the best within their circumstances.

Some learners also complained that the adapted desks were uncomfortable due to poor posture brought about by their health condition. Emery (2000) recommends rehabilitative devices that can the learners with DMD use to minimize their discomfort. For example neck braces and leg braces that hold the ankle in place during sleep to defer the onset of contractures. The school should provide proper rehabilitative devices to maximize the quality of their lives. The learners with DMD also reported the availability of adapted toilet seats at 14.8% The learners complained that the adapted toilets assisted them when they were in lower primary when they were still able to walk but at the upper primary they were unable to use them since they had lost the ability to walk and were confined in their wheelchairs.

It is likely that as their health condition deteriorated they were unable to make use of the adapted toilet seats. Much is needed to be done to make the lives these learners with DMD bearable in order to achieve success in the curriculum instructions given. The learners with DMD should be provided with modified wheelchairs with toilet facilities. The learners with DMD also reported the availability of rails to assist in walking and pathways at 11.1% and 7.4% respectively.

The learners with DMD cited that the rails only assisted them at lower primary when they were able to walk while they did not assist them at upper primary since they were unable to walk. The few pathways that were available were being used by the learners with DMD while moving on their wheelchairs hence more pathways should be constructed to assist in their movement. The Task Force (2005) noted that the environment of learners with SNE at schools was incondusive because it was in accessible.

Table 4.2.1 Teachers’ responses on the availability of specialized equipment

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheelchairs</td>
<td>7</td>
<td>28%</td>
</tr>
<tr>
<td>Pathways</td>
<td>5</td>
<td>20%</td>
</tr>
<tr>
<td>--------------</td>
<td>----</td>
<td>-----</td>
</tr>
<tr>
<td>Rails to assist walking</td>
<td>4</td>
<td>16%</td>
</tr>
<tr>
<td>Adapted pencils</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>Adapted toilet seats</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>Adapted desks</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>25</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

As shown in table 4.2.1 above, the largest proportion of responses of 28% cited the availability of wheelchairs. This shows the school provided wheelchairs to aid the mobility of these children when they were no longer able to walk. Pathways and rails to assist in walking were reported to be available by 20% and 16% of the teachers’ responses respectively. Adapted toilet seats were reported by 12% of the teacher’s responses while a similar proportion of 12% reported the availability of adapted pencils and adapted desks at 12%. The level of equipment reported and observed is in contrast with those available in other countries.

For instance Bleck (1975) talks of specialized equipment used like electric wheelchairs and Hoyer hydraulic lifts which are valuable aids for bathing and toileting which widens the child’s horizon. Other specialized equipment includes auto vans, air rings, and spinal jackets among others. Some learners are fitted with pacemakers when cardiac conduction defect occurs (Ferri, 2005).

One of the objectives of special needs education was the provision of specialized equipment and facilities in our schools (Ndurumo, 1993). There is need to provide specialized equipment in this school because such equipments assist to make learners with DMD comfortable and increase the level of their independence.

The head teacher also cited the availability of adapted pencils which the learners with DMD used while they were in lower primary to complete their learning tasks while those in upper primary had not been provided with adapted pens since they were unavailable. The headteacher said that the school tried to improvise pens but they did little to improve their writing.
The head teacher also reported the availability of adapted toilet seats which aided the learners with DMD while they were in lower primary since they were able to walk. Those in upper primary were unable to use the adapted toilet seats since they had been confined in their wheelchairs and were unable to move without assistance.

The head teacher also cited the availability of rails that supported them as they walked and pathways that assisted the movement of wheelchairs. He reported that the rails only assisted learners with DMD while they were in lower primary since they could walk unlike those in upper primary since they were unable to walk. He also said they were few pathways where learners with DMD in the wheelchairs moved on. More pathways should be constructed.

**Table 4.3**

**Learners responses on support services and they get from their teachers’ and their effectiveness**

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask other learners to copy notes for them</td>
<td>7</td>
<td>35%</td>
</tr>
<tr>
<td>Asking them to go to the dorm to rest</td>
<td>5</td>
<td>25%</td>
</tr>
<tr>
<td>Empathizing and encouraging them accept their situation</td>
<td>5</td>
<td>25%</td>
</tr>
<tr>
<td>Given adaptive pencils</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>20</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

As shown in table 4.3 above, the most reported support service they get from their teachers was to ask other learners to copy notes for them (35%). The teachers played the role of empathizing and encouraging these learners to accept their situation (25%). The learners reported to be provided with adapted pencils when they were in the lower primary (15%). It is likely that the adapted pencils were only effective in the lower primary when muscles were still strong. In the upper primary they were not able to hold a pen due to the degeneration of the voluntary muscles. In other countries such as America, these learners are provided with drugs that delay muscle wastage. In other countries learners have specially trained dogs to carry books and open doors for them (Alisa, 2004).
A great deal of innovation is required to aid these learners’ get the best within the circumstances. It is clear that the teachers and the medical personnel are not prepared adequately to handle specific physical disabilities. The curriculum is also not flexible enough to accommodate the diverse needs of these learners. The head teacher reported the availability of the following human resources namely; 21 teachers, 1 occupational therapist, 1 matron, 1 school nurse, 2 teacher aides, 13 house mothers and 3 grounds men. The headteacher stated that the 21 teachers were serving the various physical disabilities in their classes.

It was likely that each teacher dealing with 33 learners per class could not cater for each learner’s diverse needs. He also emphasized that the training these teachers underwent was not customized to the level of the specific physical disability of the learners. In other countries teachers are specially trained on the systematic selection of adaptations for the DMD learners (Wolff, 1996). It is therefore likely that the teachers treated the DMD learners just like any other physically disabled child without offering the necessary specialized attention.

The head teacher also cited the availability of one occupational therapist and one physiotherapist. He reported that the occupational therapist provided served all the learners with physical disabilities in the school. It is likely that the occupational therapist in S.A Joy town special primary school could not effectively offer the necessary services to the DMD learners. He said that the services of the physiotherapist and the occupational therapist were not timetabled. Some little exercise and physical therapy can minimize abnormal or painful positioning of the joints and may prevent or delay the curvature of the spine (Ferri, 2005).

The head teacher also reported to have one nurse who serves all the learners with the various physical disabilities in the school. He pointed out that the training the nurse had was not customized to the level of the specific physical disability. The nurse was not effective in handling the diverse needs of the DMD learners. These needs include; respiratory problems, cardiac problems, contractures among others.
The head teacher stated that learners with DMD were often sent home to seek medical attention. This is a cause for concern because the Universal Declaration of human rights (1948) accords all children regardless of their disability to equal opportunities in medical, education, recreation among other necessities. In America, for instance doctors are specially trained to handle learners with muscular dystrophy and they have specialized diagnostic equipments (Bauer, 1970).

The medical personnel should be trained on how to handle myopathic diseases. Myopathic disease are the muscle wasting diseases like muscular dystrophies. The head teacher also reported to have one matron who also served as the cateress of the school. He said that the learners with DMD were not provided with a special diet in the school. The muscles of learners with DMD progressively waste so at the advanced stages will require a special diet because their mastication muscles waste irreversibly over time. There is therefore the need to create awareness of the disease to all the stakeholders in education so that the diverse needs of these learners may be taken into consideration.

Gacathi Report (1976) recommends the creation of awareness on the part of the public on the causes of disabilities with a view to facilitating the prevention. The government should specially train the human resources support staff to enable them to serve the needs of learners with DMD effectively. The head teacher also reported to have 13 housemothers. These house mothers served all the learners with physical disabilities in the school. It is likely that the house mothers were overworked as they served all the other pupils with physical disabilities in SA Joy Town special Primary School.

More house mothers should be deployed to reduce the ratio between them and all the learners. Since they were poorly paid they suggested a pay rise to motivate them as a way of appreciating the hard work they did. He also suggested the provision of specialized equipment to help the house mothers’ bath, lift and toilet the learners with DMD. According to Ferri (2005) a Hoyer Hydraulic lift is valuable aid in bathing and toileting. Specialized facilities should be provided to maximize the quality of lives of learners with DMD.
He also reported to have 3 grounds men who served all the learners with physical disabilities. Their work was to assist in pushing the wheelchair of learners with physical disabilities. It is likely that they were not serving these learners effectively because they were very few compared to all learners with various physical disabilities. More grounds men are needed to assist learners with DMD. Specialized equipments like electric wheels with good hand controls can be valuable aids that can widen the horizon of learners with DMD and maximize the quality of their lives at SA Joy Town special primary school.

Available support services

Table 4.4 Teaches responses on the availability of Human Resource support services and their effectiveness.

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trained teachers</td>
<td>5</td>
<td>25%</td>
</tr>
<tr>
<td>Occupational therapist and physiotherapist</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>Nurse</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>House mothers</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>Grounds men</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>Teacher aides</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>20</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

As shown in table 4.4 above the majority of responses (25%) cited the availability of trained teachers. These teachers were trained generally to handle all learners with physical disabilities. Their training was not customized to the level of the specific physical disabilities of the learners. Therefore they are likely to treat these learners like any other disabled learners without offering the specialized attention needed. There was reported to be a physiotherapist and occupational therapist at 15%. The physiotherapist was only one catering for all the learners with physical disabilities in SA Joy Town special primary school.

It was likely that she was overworked and could not offer her services effectively. Fifteen percent reported to have an occupational therapist. The
occupational therapist was only one who was serving all learners with physical disabilities in the school. It was likely for her to be overworked and not render the necessary services to the learners suffering from Duchenne muscular dystrophy effectively.

According to Emery (2000), physical therapy is helpful to maintain muscle strength, flexibility and function. However, it is good to note that physical exercises are beneficial but not to the point of exhaustion because the muscles of these learners gradually waste. According to Ferri (2005), mild non-jarring physical activity such as swimming is encouraged but inactivity such as bed rest can worsen the muscle disease. More occupational and physical therapists are needed to serve learners with DMD effectively. The occupational and physiotherapist at Joy Town should be given refresher courses on how to handle learners from DMD.

Availability of a nurse was cited at 15% of the teachers’ responses. The nurse was only one serving all learners with various physical disabilities. The training she underwent was not customized to the level of the specific physical disability of the learners. House mothers were cited by 15% of the teachers’ responses. The house mothers were few and served all learners with physical disabilities. It is likely that they were overworked and could not render services effectively.

Grounds men were reported by 15% of the teachers’ responses. The grounds men aided the learners suffering from Duchenne muscular dystrophy by pushing them around in their wheelchairs but they also served all the learners with physical disabilities in the school. They were likely to be overworked and not render the service effectively. More grounds men should be deployed.

Fifteen percent of the teachers’ responses also cited the availability of teacher aides who assisted the learners with DMD to support their heads in the classroom. Emery (2000) recommends the use of neck braces so as to ensure their necks are given the needed support to enable them live better quality lives. Teacher aides aided the learners with DMD in the classrooms by supporting their necks. It is likely that the teacher aides were overworked as they served all the learners with physical disabilities in the school. There is need for neck braces introduced to help the learners with DMD support their necks. Emery (2000) recommends rehabilitative devices that can help sufferers maintain mobility and independence.
The head teacher reported the availability of wheelchairs which aided the learners with DMD in mobility when they were no longer able to walk. However, he stated that they were not modified to suit the diverse needs of learners with DMD; these learners require specialized aids to assist in mobility and for some independence.

Table 4.5

| Strategies used by the teachers to minimize the academic difficulties faced by learners Duchenne Muscular dystrophy (DMD) and their effectiveness |
|---|---|---|
| Responses | Frequency | Percentages |
| Asking other learners to copy notes for them | 7 | 31.8% |
| Encouraging and empathizing with them | 6 | 27.3% |
| Using regular methods | 4 | 18.2% |
| Making use of the adapted pencils, wheelchairs | 3 | 13.6% |
| Asking learners to go for a bed rest | 2 | 9.1% |
| Total responses | 22 | 100% |

As shown in table 4.5 above, the teachers at 31.8% cited the use of other learners to assist learners with DMD in writing notes for them. The teachers played the role of empathizing and encouraging the learners with DMD to accept their condition.(27.3%). This seemed effective because it assisted them to minimize the academic difficulty in writing. Teachers dealing with learners with DMD should be co-opted as stake holders in effort to address the challenges posed by the disease. The teachers’ responses at 18.2% reported the use of regular methods in their teaching.

The teachers conceded to not using any specialized strategies such as individualized education programme which tries to cater for diverse needs of the learners with DMD. An IEP allows each learner to pursue learning at his or her own pace. It also allows the bright learner to accelerate ahead and prevent the slow learner from being pushed. The teachers should use the IEP to cater for diverse needs of learners with DMD. It is surprising to note that the teachers teaching these learners were not using the strategies they learnt in the specialized teachers training colleges.

The teachers said that were not able to cope with the many academic challenges facing the various categories of disabilities in the classroom. More teachers
should be deployed to enhance the teacher pupil ratio. This can improve the pupil teacher contact as well as the overall quality of instructional attention. The teachers also reported at 13.6% on the availabilities of adapted pencils, adapted desks and wheelchairs which were being used to minimize the academic difficulties. However, it was found out that these adapted aids were not effective as the physical condition of the learners deteriorated.

Challenges faced by learners with DMD can be minimized for example, Ferri (2005) recommends corticosteroids such as Prednisone and Deflazocort that increase energy and strength and defer severity of some symptoms such as muscle wasting. Modified wheelchairs with hand controls can be valuable aids for these learners (Dubowitz, 1989).

The teachers’ responses (9.1%) also revealed that they were asking learners to go for a bed rest when in problems. This is a cause of concern because these learners are supposed to be referred to a doctor because bed rest worsens their muscle condition. Creation of awareness on the disease is crucial to the handlers and care takers at SA Joy Town special primary school.

The head teacher reported the availability of some adapted aids to minimize the academic difficulties faced by learners with DMD. There were adapted pencils, adapted desks and adapted toilet seats that assisted in alleviating the academic difficulties facing the learners with DMD while they were in the lower primary since they were able to walk.

However, in the upper primary the adapted aids were not in a position to assist learners with DMD since their physical condition was deteriorating and they were confined in their wheelchairs. This showed that the effectiveness of these aids ceased to alleviate academic difficulties these learners as their physical condition deteriorated. The head teacher also reported the use of human resource support services to assist learners with DMD to alleviate the academic challenges they faced for instance, there was only one occupational therapist and one physiotherapist who were handling all the learners with the various physical disabilities in particular DMD.

The head teacher also cited the availability of trained teachers who were Diploma and Degree holders from Kenya Institute of Special Education (KISE) and
Kenyatta University (KU). Each teacher handled 33 learners of various physical disabilities. It was likely that the trained teachers were overworked since they were not able to offer personalized attention to each individual learner. At the same time the training they received in their training institution was not customized to the level of the specific physical disability of learners of DMD.

The head teacher also said there were two teacher aides who were assisting the trained teachers in the classroom by supporting the necks of the learners with DMD. It is likely that they were overworked as they served all learner with various physical disabilities thus may not have been effective. The head teacher also cited that there were three grounds men who assisted the learners with DMD by pushing them around in their wheelchairs. It is likely that they were overworked as they catered for all the learners regardless of their physical disability their effectiveness may have been compromised.

| Table 4.5.1 Learners suggestions on how to minimize the academic difficulties. |
|---------------------------------|----------------|---------------|
| **Responses**                  | **Frequency** | **Percentages** |
| Asked to be allowed to undertake the exams orally | 6              | 22.2%         |
| Asked teachers to be patient with them | 5              | 18.5%         |
| Be provided with comfortable wheelchairs | 5              | 18.5%         |
| Be provided with adapted pens    | 5              | 18.5%         |
| Suggested that a male be employed to bathe them | 3              | 11.1%         |
| **Total responses**             | **24**        | **100%**      |

As shown in table 4.5.1 above, the majority of learners 22.2% asked that they be allowed to undertake exams orally. According to the Draft policy on special needs (2006) taped examinations can be developed for candidates who require them. The regular curriculum does not cater for the diverse needs of learners with severe DMD. The curriculum should be diversified to cater for their diverse needs. The learners asked that their teachers be patient with them(15.8%) indeed these learners will require a flexible curriculum that will give them extra time to complete their learning tasks. They also suggested provision of comfortable wheelchairs at (18.5%).
In other countries, these learners are provided with electric wheel chairs with automatic hand controls (Bleck, 1975). Learners suggested to be provided with adapted pens (15.8%). This relates to a recommendation made by Emery (2000) on reliabilities devices that could help sufferers maintain mobility and independence. The boys were also uncomfortable being bathed by females and suggested that a man be employed to do the work. Eleven percent suggested creation of awareness that will help the other learners to understand their condition and offer any help to the learners suffering from DMD.

The head teacher suggested that teachers be given refresher courses on how to handle learners with DMD. He suggested exchange programmes with teachers from other countries to share experiences. He also suggested the formation of an association that could lobby for the rights and interests of learners suffering from DMD. He also suggested the creation of awareness on the disease. This could be done in assessment centres, in seminars and at workshops. Gacathi report (1976) emphasized on the creation of awareness on the part of the public on the causes of disabilities with a view to facilitating the prevention. It was also emphasized in sessional paper number 5 of (1968).

He also suggested the provision of specialized facilities for these learners. Indeed, the specialized facilities would go along way in maximizing the quality of lives of these learners. He also suggested a flexible curriculum for the learners suffering from Duchenne muscular dystrophy. A modified Curriculum is diversified to suit the learners’ needs. He also suggested the deployment of more medical personnel and teachers to enhance the teachers pupil ratio.

**Table 4.6 Teachers suggestions on minimizing the academic difficulties of learners with DMD.**

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision of adopted curriculum and adaptive aids</td>
<td>4</td>
<td>30.5%</td>
</tr>
<tr>
<td>Remedial time to be created for them</td>
<td>4</td>
<td>30.5%</td>
</tr>
<tr>
<td>Counseling</td>
<td>2</td>
<td>12.5%</td>
</tr>
<tr>
<td>Special diet</td>
<td>2</td>
<td>12.5%</td>
</tr>
</tbody>
</table>
As shown in Table 4.6 above, thirty point five percent proposed that learners be provided with an adaptive curriculum and adaptive aids. According to Koech Report (1999), the Kenyan school curriculum is inappropriate in that there is lack of clear policy guidelines and legal status on special needs educations provisions. An appropriate curriculum is vital for learners with DMD. The curriculum should be diversified to suit individual learners needs. Remedial time to be created for them was reported by 12.5%. These learners will require the services of an Individualized Education Programme (IEP) which teachers were not using at Joy Town Special Primary School.

An IEP is a written statement that describes what the teacher and other professionals will do to meet the special needs of the learner. It allows the bright learner to accelerate ahead and prevents the slow learners from being pushed. Counseling was suggested by 12.5% of the teacher responses. Counseling is very important because it helps the learner to accept and adjust to their condition. A special diet was suggested to be provided to learners with DMD by 12.5% of the teachers’ responses. This will help to improve their health condition because their mastication muscles are wasting irreversibly over time.

Proper rehabilitation and proper medical attention was suggested by 12.5%. Indeed teachers should therefore be co-opted as stakeholders in efforts to address the challenges posed by the disease. It is interesting to note that only one teacher mentioned mobility aids which is a major problem among the learners with DMD. This shows that the teachers are not knowledgeable on how to deal with learners suffering from DMD. Aid workers assist a great deal in supporting learners necks in their classrooms. According to the teacher aides these learners will require neck braces to support their necks in an effort to minimize their
discomfort. This shows that learners with DMD live under very difficult conditions at S.A Joy Town Special School.

Table 4.7 Observation guide.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFIC ITEM</th>
<th>CONDITION</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom</td>
<td>Adapted pens, pencils, chalkboards, desks, tables, adapted doors and neck braces etc.</td>
<td>There were no adapted pens and adapted doors. There were desks that were shortened.</td>
<td>Require adaptations in their classrooms for instance doors should be expanded to allow wheelchairs to pass through.</td>
</tr>
<tr>
<td>Toilet</td>
<td>Hoyer hydraulic lift, Adapted toilet seats, airings</td>
<td>Adapted toilet seats</td>
<td>Require a Hoyer hydraulic lift to lift, bathe and toilet learners with DMD.</td>
</tr>
<tr>
<td>Beds</td>
<td>Bed raden adapted beds, electric beds, electric wheelchairs, spinal jackets etc.</td>
<td>Beds were not adapted.</td>
<td>Require adapted beds to ensure learners with DMD sleep on their beds instead of sleeping in their wheelchairs...</td>
</tr>
<tr>
<td>Environment</td>
<td>Ramps, pathways</td>
<td>Minimal adaptations on ramps.</td>
<td>More adaptations are needed on ramps and more pathways should be constructed</td>
</tr>
<tr>
<td>Curriculum</td>
<td>Regular curriculum</td>
<td>Only P.E was not included for these learners with DMD.</td>
<td>More modifications should be made on time, methodology and resources.</td>
</tr>
<tr>
<td>Teaching</td>
<td>Normal teaching methods</td>
<td>Teachers were</td>
<td>Teachers should</td>
</tr>
<tr>
<td>methods</td>
<td>not making use of the Individualized educational programme (IEP).</td>
<td>make use of the IEP to know the condition of the learners.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Diet</td>
<td>Learners with DMD were not provided a special diet</td>
<td>These learners were not provided with a special diet. They require a special diet because their mastication muscles are wasting irreversibly over time.</td>
<td></td>
</tr>
<tr>
<td>Medical services</td>
<td>Physiotherapist, Occupational therapist, Nurse, Matron</td>
<td>Only one personnel in each category catering for needs for all physical disabilities in the school. The school requires them provision of a counselor to counsel learners with DMD. More medical personnel should be employed to cater for the various specific physical disabilities.</td>
<td></td>
</tr>
<tr>
<td>Specialized equipment</td>
<td>Electric wheelchairs, Electric beds, Hoyer hydraulic lifts, Spinal jackets, Auto vans</td>
<td>No specialized equipments available. The learners should be provided with specialized equipment to cater for the diverse needs of the learners with DMD.</td>
<td></td>
</tr>
</tbody>
</table>

As shown in table 4.7 above, the researcher observed the adaptations that had been made for learners suffering from Duchenne Muscular Dystrophy (DMD) following areas: curriculum, classrooms, teaching methods, medical services, specialized
equipments and on the environment. The classroom had adapted desks. There were adapted pencils which were mostly used when the learners were in the lower primary. In upper primary there were no adapted pens for these learners. The doors were not adapted to allow the wheelchairs to pass through. Some of these learners were forced to leave their wheelchairs outside and a teacher aide was lifting the learners up to sit on a chair in their classroom.

The doors should be expanded to allow the wheelchairs to pass through. The learning environment is not suited for learners suffering from DMD. One principle that should be followed in curriculum development is the instructional environment. This includes the schools and arrangement of resources where the curriculum will be implemented (Oluoch, 1984). In order to implement any curriculum one should have the necessary physical facilities such adapted pens, adapted doors, ramps, lifts, wide door ways corridors and accessible fittings such as light switches and motorized doors among others (Olouch, 1984). Without the necessary facilities for learners with DMD the curriculum will not be implemented effectively.

According to Wolff (1996) learners with DMD require systematic selection of adaptations as dictated by their diverse needs. He suggested that the classroom of learners with DMD should have two doors one in front and one at the back. This allows mobility with ease with their wheelchairs instead of queuing. Chalk boards should not be higher than 24 inches from the floor. This allows the learners with DMD to work out problems on the board or to write new words as instructed by their teachers. Doors have automatic door checks allowing the doors to remain open for wheelchairs.

This shows a great deal of innovation is needed to assist learners with DMD at SA Joytown Special Primary School. The toilet seats were adapted and learners with DMD could easily use them before they were confined in a wheelchair. They will require a modified wheel chair at the advanced stages of the disease. The beds were not adapted for learners suffering from DMD. This forced some learners to sleep on their wheelchairs because housemothers were finding it difficult to lift them up. They therefore require specialized equipment such as a Hoyer hydraulic lift a valuable aid in lifting, bathing and toileting.
There were minimal adaptations that had been done on the environment. There were some few rails and pathways in SA Joytown Special Primary School. More adaptations are required in this school to improve the quality of lives for learners with DMD. The headteacher said he was not aware of the necessary adaptations for these learners. This is a cause for concern because these learners’ diverse needs will not be taken into consideration if the handlers and caretakers are ignorant on the disease. This calls for awareness on the disease to all the stakeholders in SA Joy town Special Primary School. Creation of awareness can be done in seminars and workshops or though refresher courses.

The training given to teachers should be customized to the specific level of physical disability of the learners. The curriculum has not been modified to cater for learners with DMD. Learners with DMD will require curriculum differentiation. A differentiated curriculum is an approach that one may use to identify the subjects in the curriculum that a learner should cover and plan for each learner according to his/her needs and ability. In education of learners with special needs the curriculum differentiation would involve modifying the following aspects to cater for their needs. They include; time methods and resources.

Learners with DMD will require more time to complete their learning tasks. The teacher should vary their methods to suit the learners’ needs. Learners with DMD may require an individualized education programme (IEP) an IEP is a written statement that describes what the teacher and other professionals will do to meet the special needs of the learner. An IEP allows each learner to pursue learning at his or her own pace. It allows the bright learner to accelerate ahead and prevent the slow learner from being pushed.

Teachers in SA Joy Town special primary conceded to not using specialized strategies such as an IEP. This paints a grim picture at the quality of attention these learners can receive form their teachers. Learners with DMD require specialized resources such as adapted pens and pencils. They may also require specialized equipments such as electric wheelchairs, Hoyer hydraulic lift, auto vans, airings and electric beds. The
equipment helps these learners to lead better quality lives. In SA Joytown Special Primary School there are no specialized facilities.

The learners were not provided with a special diet at SA Joy Town Special Primary School. This is a cause for concern because these learners’ mastication muscles are wasting irreversibly over time. The medics included one physiotherapist one occupational therapist, a nurse and a matron. They served all learners with various physical disabilities in the school. They did not effectively offer the medical services appropriately because it was not timetabled. They also require the services of a counselor. It was reported that they were unhappy, anxious and depressed due to their deteriorating physical condition. Therefore a counselor would help the learners with DMD to accept their condition.

In conclusion, the results have revealed that learners with DMD faced many challenges. These challenges included; constant ill health, academic difficulties such poor in memory, spelling, writing, reading and mathematics, poor teaching methods inappropriate curriculum, lack of specialized equipments and inadequate medical services.

These challenges can be overcome by; modifying the curriculum to cater for the learners suffering from DMD. This can be done by modifying the time, methods and resources. Learners with DMD require more time to complete their learning tasks. Teachers should use appropriate teaching methods such as an IEP to cater for their diversities. Learners with DMD will require specialized resources or modify the existing regular resources in order for them to benefit.

They will also require proper medical services from specially trained occupational therapist, physiotherapist nurse and matron. In America for example doctors are specially trained to handle learners with DMD. They are able to provide some drugs that increase some energy and strength to these learners. These learners are also given gene therapy that preserves muscles of these learners. Others have specially trained dogs that carry books or toys for them. (Alisa, 2004).

The occupational and physiotherapist services should be timetabled so as to offer appropriate services to learners with DMD and reduce pain in their muscles due to contractures. The treatment given to these learners is aimed at maximizing the quality of lives of learners suffering from DMD. Creation of awareness on the disease should
be a priority because quality attention to DMD learners is only possible when the handlers have a good understanding about the condition that would include the best ways to take care of the learners. This can be done through seminars and workshops and in school based in service courses. The government should also provide specialized equipment to help improve the quality of lives of the learners with DMD.
CHAPTER FIVE

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction
This chapter gives a summary of the study in relations to the objectives of the study. It also presents the implication of the main findings, conclusion, recommendations and areas for further research.

5.1 Summary of Findings.
The study revealed that there were major instructional constraints facing learners with Duchene Muscular Dystrophy (DMD) at Joy Town Special Primary School. The most reported academic difficulty was constant ill health leading to frequent absenteeism. Most of these learners with DMD spent most of their time in hospitals or in bed leading to poor academic achievement since they were not able to catch up with the rest of the learners. Other academic difficulties reported were that some were poor in reading, writing, poor memory, spoken language, communication difficulties and in mathematics.

Some teachers reported that some of the learners suffering from DMD were above average in class and this implies that there is individual variation in general intellectual function across affected boys. For the boys with specific learning difficulties in reading, writing, language and mathematics, the teachers should use teaching strategies that suit the learners’ needs. For example the use of an Individualized Education Programme (IEP). An IEP tries to meet the special needs of the learner and allows the learner to learn at his own pace. It also allows the bright learner to accelerate ahead and prevents the slow learner from being pushed.

Other constraints reported were inability to manipulate teaching and writing materials. This implies that as the physical condition of learners with DMD deteriorated, they were unable to use their hands to write and hold teaching learning materials. This shows that a great deal of innovation was required to aid these learners get the best within their circumstances. In some other countries for instance the learners with DMD are given drugs like Deflazocort and prednisone to increase their energy and strength and defer severity of symptoms.
Other constraints reported were that the time given for the learners with DMD to complete learning tasks was not enough. The regular curriculum poses academic difficulties to learners with DMD because it was developed considering the average learner. The curriculum developers should diversify the regular curriculum to suit learners with DMD. This calls for curriculum differentiation that involves modifying the time, teaching methods and resources. Learners with DMD will require more time, appropriate teaching methods and specialized resources or adapted regular resources like adapted pens and adapted pencils. Other responses cited poor posture and fatigue. Poor posture is brought about scoliosis or a curvature of the spine.

Scoliosis is a secondary feature of muscle weakness resulting from the dysfunction of the spinal muscle. Fatigue is brought about by the degeneration of the physical condition at the advanced stages. Scoliosis can be prevented by a luque procedure. A luque procedure is an operation for fixing the spine to prevent further progression of scoliosis. This calls for specialized medical personnel at SA Joy Town Special Primary School who can offer the specialized medical services.

The head teacher reported dropouts among learners with DMD. The rate of dropouts increased with the degeneration of the condition of these learners. This implies that the priorities given to learners with DMD could be dictated by their health condition. They will require modifications in the curriculum to suit their needs. To minimize dropouts; these learners will require proper medical attention which can only be given by specialized trained medical personnel. Some learners were also reported to be unhappy and uninterested in class work. This is evidence that learners with DMD were in dire need of systematic psychological support or counseling.

Counseling is important because it may help the learner to deal more effectively with himself and the reality of his environment. The head teacher also reported that he was ignorant on the kind of adaptations that were necessary for these learners. This is a cause of concern because it paints a grim picture as to the quality of attention these learners can get from ignorant caretakers. This implies that teachers are inadequately trained in our specialized training institutions to handle the specific physical disabilities such as DMD.
The findings also revealed that there were no specialized equipment for handling learners with DMD at Joy Town Special Primary School. Such equipment assists to make the learners comfortable and increase the level of independence. On the availability of resources, the majority cited the availability of wheelchairs which aided the learners with DMD when they were no longer able to walk. However, the learners complained that they were uncomfortable. This calls for modified wheelchairs to make the learners comfortable in order for them to absorb pedagogical instructions with some ease.

It was reported that there were adapted pencils in the lower primary but there were no adapted pens in the upper primary. This shows that a great deal of innovations was required to aid these learners get the best within their circumstances. On the strategies used to alleviate academic difficulties the teachers stated that they asked other learners to copy notes for them. They also empathized and encouraged them to accept their condition. However the teachers conceded to not using any specialized strategies such as an IEP.

This is a cause for concern because these teachers were trained on the specialized strategies at the specialized training institutions. This implies that the regular curriculum used for these learners at SA Joy Town special primary school is not suited for learners with DMD. They will therefore require a modified curriculum that caters for their diverse needs. Learners suggested that they be allowed to undertake their exams orally in order to minimize their academic difficulties. They also asked other learners to be sensitized on the disease because when teachers and classmates are given information about a learner he is able to adjust and to make friends.

The teacher proposed an adaptive curriculum and adaptive aids to minimize academic difficulties for learners with DMD. Indeed they require a curriculum that is modified to cater for their diverse needs. They will also require adapted aids or specialized resources. These resources would increase the level of independence of these learners and will improve the quality of their lives. Counseling was also suggested by teachers as a way of minimizing the academic difficulties. Counseling is important because it may help these learners to learn to deal more effectively with themselves and the
reality of the environment. It may also help them to accept the eventual outcome of their condition. Others suggested a special diet for these learners because their mastication muscles waste irreversibly over time. Most of these learners were not eating the hard food that was provided. Food is a physiological need and if it is not catered for, it can influence the curriculum instructions of these learners because they cannot learn on an empty stomach.

According to the Children’s Rights Charter (1989), children have rights on food with nutritional value, appropriate medical care, education among others. The school should therefore provide the soft special diet. The observation guide revealed that the curriculum was lacking modifications on the time, teaching methods and resources. It also revealed that minimal adaptations had been made on the environment.

5.2 Implications of the Findings.

Learners with Duchene Muscular Dystrophy progressively become weak, so there may be a time when they will not able to do the academic work. This calls for proper medical interventions which are given in some countries such as America where doctors prescribe drugs that give strength and delay muscle wastage of the learners like prednisone and deflazocort. Gene therapy is also given that delays muscle wastage.

Communication may also become a problem due to weakness in the speech organ muscles as well as mobility due to degeneration of the limb muscles. For communications, they may require the services of a speech therapist. For mobility, they may require mobility aids such as swivel walkers, braces and calipers. They may also require specialized resources such as a Hoyer hydraulic lift which is a valuable aid in lifting, bathing and toileting. They may also require electric wheelchairs with automatic hand controls, adapted pens and adapted pencils among others.

Learners with DMD may experience gradual loss of respiratory functions and scoliosis which is a secondary feature of muscle weakness resulting from the dysfunction of the spinal muscles. The medical personnel handling these learners should be specially trained to correct the poor posture brought about by scoliosis. The learners with DMD may not be able to do some academic subjects.
Therefore they will require a differentiated curriculum. A differentiated curriculum is an approach that one may use to identify the subjects in the curriculum that a learner should cover and plan for each learner according their needs and ability. The curriculum differentiation would involve modifying the time, teaching methods and resources. Some of these learners have specific learning difficulties.

They will therefore require an individualized education programme from their teachers. Some of these learners may have very good cognitive abilities but if the curriculum is not designed for their needs, they may not perform well. This calls for all the stake holders in education to work together in order to minimize the many instructional constraints facing learners with DMD.

5.3 Conclusion
Results have shown that learners with DMD in SA Joy Town in Thika faced many instructional constraints. The handlers of these learners including teachers did not seem to have adequate information about the ailment and how to manage it. The school was also faced with constraints in specialized resources and equipment. In some instances, the equipment was improvised but this did not help much in alleviating the conditions of the learners. The study revealed that the regular curriculum that was used in SA Joy Town lacked modifications on time, methodologies and in resources. The support staff were also found to be ineffective in their services to learners suffering from DMD. The study observed that much was needed to be done to make the lives of these learners bearable in order to achieve success in the curriculum instructions given.

5.4 Recommendations
In this sub section a number of recommendations based on the findings of the study have been made. It is hoped that the Ministry of Health (MOH), Ministry of Education (MOE), Kenya Institute of Education (KIE), head teachers, teachers, parents and all the stakeholders in education including non governmental organizations (NGOs) and sponsors will find these recommendations helpful in trying to improve the lives of learners suffering from DMD in some of our schools. Following the study findings, the following recommendations have been made: The government should deploy more teachers to special schools so as to enhance the
teacher pupil ratio. This is can improve the pupil teacher contact as well as the overall quality of instructional attention.

More human resource support staff should be deployed so as to improve their services to the learners suffering form DMD. A counselor should also be deployed to offer counseling services to learners with DMD. The environment should be made more barrier free for learners with DMD.

The learners with DMD should be given close supervision and encouragement in-order to stay on the programme for as long as they can. The curriculum for learners with DMD should be flexible enough and should be inspired by the fact that the physical condition degenerates irreversibly over time. They require a differentiated curriculum. A differentiated curriculum is an approach that one may use to identify the subjects in the curriculum that a learner should cover and plan for each learner according their needs and ability. The curriculum differentiation would involve modifying the time, teaching methods and resources.

The government should provide specialized facilities for learners suffering from DMD to enhance their mobility and independence. The training offered in the specialized institutions should be customized to the level of the specific physical disabilities. Teachers should make use of specialized teaching strategies like the IEP to cater for the diverse needs of learners suffering from DMD.

Creation of awareness on DMD should be given to all the stakeholders in education so that the diverse needs of these learners may be taken into consideration. This can be done for instance in seminars or in workshops, in barazas, churches and by the media. Formation of an association in Kenya can also play a major role in educating the society on the neuromuscular disorders.

Teachers should be given refresher courses on how to handle learners with DMD. This can be done through exchange programmes with developed countries to share experiences. The medical personnel handling learners with DMD should be specially trained. The government should provide a speech therapist to assist learners with communication difficulties. Teachers dealing with learners with DMD should be co-opted as stakeholders in efforts to address the challenges posed by the disease. Learners with DMD should be provided with a special diet because their mastication muscles are wasting irreversibly over time.
5.5 **Suggestions for Further Research**

The study focused on only one type of muscular dystrophy DMD further research may be carried out in other types of dystrophies. Research may also be carried out in relation to other challenges facing learners with muscular dystrophies such as health factors, social factors, emotional factors among others. A study should also be carried out to establish the prevalence levels of DMD. This can help establish the proportion of cases that are not taken to special schools. This is because every child has a right to education regardless of their disability.
REFERENCES


Berge W, (2005) Muscular Dystrophy Research Foundation of South Africa:


Daily Nation 4th May 2007


Milunsky, A. (1975). *The Prevention of Genetic Disease and Mental Retardation*

Philadelphia: Saunders


Universal Declaration of Human Rights adopted by the General Assembly Resolution 2174(111) of December 1948.


APPENDIX A

INTERVIEW GUIDE FOR THE HEADTEACHER

This interview is part of an educational study that is being conducted by the researcher in the institution. The information will be treated as confidential during and even after the study. The researcher is therefore requesting for your co-operation and assistance. The information you give will be very important for this study.

1. What academic difficulties do learners with Duchenne Muscular Dystrophy (DMD) face in this school? How can these difficulties be minimized?
2. Are the teachers specially trained to handle learners with DMD? If not, what are your recommendations?

3. Do teachers know the adaptations required for learners with DMD? If no what are your recommendations?

4. Do these learners drop out of school, if yes why? What would you recommend to help retain them in school?

5. What adapted aides do you get from the school? are used by teachers in this school for learners with DMD? (Probe for adapted pens, adapted curriculum among others.

6. Do you have special facilities for these learners? (probe for specialized equipment like electric wheel chairs, Hoyer hydraulic lifts, spinal braces, swivel walkers, airings among others) If no, what are your recommendations?

8. How do you cope with learners suffering from DMD?

APPENDIX B

INTERVIEW GUIDE FOR THE TEACHERS

This interview is part of an educational study that is being conducted by the researcher in the institution. The information will be treated as confidential during and even after the study. The researcher is therefore requesting for your co-operation and assistance. The information you give will be very important for this study.

1. What are the academic difficulties exhibited by learners suffering from Duchenne Muscular Dystrophy? What recommendations can assist these learners to minimize their academic difficulties?
2. Is your school equipped to handle learners with Duchenne Muscular Dystrophy? If yes, what are the available resources? If no what are your suggestions?

3. What instructional strategies do you use with learners suffering from MD? Probe for individualized education programme (IEP).

4. Do you think the regular curriculum is designed for the needs of learners suffering from Duchenne muscular dystrophy? If not what are your recommendations?

5. How do you cope with learners suffering from Duchenne muscular dystrophy?

APPENDIX C

INTERVIEW GUIDE FOR THE LEARNERS.

This interview is part of an educational study that is being conducted by the researcher in the institution. The information will be treated as confidential during and even after the study. The researcher is therefore requesting for your co-operation and assistance. The information you give will be very important for this study.

1. What particular subjects are you able to perform with ease? (Probe for the subjects they have difficulties in) Are the teachers supportive? If not what are your suggestions?
2. What academic difficulties do you encounter in class? (Probe for academic difficulties resulting from their disability and how they can be minimized)
3. What support services do teachers give you?
4. Do you complete the learning tasks given to you per lesson? If not why?
5. What adaptive aids do you get from school? (Probe for their effectiveness)

APPENDIX D

INTERVIEW GUIDE FOR THE TEACHER AIDES.

This interview is part of an educational study that is being conducted by the researcher in the institution. The information will be treated as confidential during and even after the study. The researcher is therefore requesting for your co-operation and assistance. The information you give will be very important for this study.

1. How do you assist learners with Duchenne Muscular dystrophy in the class? (Probe for the difficulties they encounter as they offer their services to these learners.
2. How can the difficulties you have mentioned above be minimized?
## APPENDIX E

### OBSERVATION GUIDE

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFIC ITEM</th>
<th>CONDITION</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Curriculum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching methods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialized equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**APPENDIX F**
THIS IS TO CERTIFY THAT:

Prof./Dr./Mr./Mrs./Miss. ANN ROSE
WANJIKU WANGANG’A

KENYATTA UNIVERSITY
P.O. BOX 45844 NAIROBI

has been permitted to conduct research in:

THIKA Location,
CENTRAL District,
CENTRAL Province,
on the topic INSTITUTIONAL CONSTRAINTS FACED BY LEARNERS WITH MUSCULAR DYSTROPHY: A CASE OF JOYTOWN SPECIAL PRIMARY SCHOOL THIKA

for a period ending 30TH AUGUST, 2008

Research Permit No. MOHEST 13/001/38C 445
Date of issue 29.7.2008
Fee received SHS. 500

M.O. ONGIEKI
Applicants’ Signature

PERMANENT SECRETARY
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

FOR: Permanent Secretary
MINISTRY OF SCIENCE AND TECHNOLOGY