RELATIONSHIP BETWEEN JIGGER INFESTATION AND CHILDREN'S PARTICIPATION IN SCHOOL ACTIVITIES IN GATUNDU DISTRICT, KIAMBU COUNTY, KENYA

BY

MAKENA BEATRICE MWEBIA

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DECLARATION

This thesis is my original work and has not been presented for a degree at any other University

Signature……Date…….

Makena Beatrice Mwebia

E55/10413/06

SUPERVISOR`S DECLARATION

We confirm that the work reported in this thesis was carried out by the candidate under our supervision as university supervisors.

Signature……Date…….

Dr. Teresa B. Mwoma

Lecturer

Department of Early Childhood Studies

School of Education

Kenyatta University

Signature……Date…….

Dr. Rachel W. Kamau- Kang'ethe

Senior Lecturer

Department of Early Childhood Studies

School of Education

Kenyatta University

DEDICATION

This thesis is dedicated to our children Martin, Dorine and Dickson for their encouragement, patience and prayers during the course of the study.

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ABBREVIATIONS AND ACRONYMS

ECD	Early Childhood Development
EFA	Education for All
GOK	Government of Kenya
HIV/AIDS	Human Immunodeficiency Virus/Anti-Immune Deficiency Syndrome
KESSP	Kenya School Support Program
KIE	Kenya Institute of Education
MDGs	Millennium Development Goals
NGO	Non-Governmental Organization
PPMCC	Pearson's Product Moment Correlation Coefficient
SPSS	Statistical Package for Social Sciences
UNICEF	United Nations Children's Education Fund
UNCRC	United Nations Convention on the Rights of Children

ABSTRACT

This study intended to investigate the relationship between jigger infestation and participation at school by pre-primary school and lower primary school children. The objectives of the study were to find out the relationship between jigger infestation and children's rate of school attendance, performance in outdoor activities, academic performance and dropping out of school. The study was carried out in Gatundu District because it is one of the highly jigger infested districts in Kiambu County, Kenya. The study utilized the Ecological systems theory and it employed the descriptive survey design. The population of the study comprised of pre-primary, lower primary school children and their class teachers from all the public schools in Gatundu District. The sample size was eleven schools. Purposive sampling technique was applied to sample 44 jigger infested children in these schools. An equal number of pupils not infested were randomly sampled to be compared with those who were infested. The teachers handling pre-primary school and lower primary classes were also purposively sampled. Data was collected through the use of questionnaires for teachers, observations and document analysis. Qualitative and quantitative methods of data analysis were applied. The Statistical Package for Social Sciences (SPSS) was used to prepare and organize data for analysis. Pearson's correlation coefficient test was used to compute the relationship between the variables. Frequency distribution tables, percentages, and descriptions were utilized for data presentations. The study concluded that jiggers were a major threat to the realization of children's educational goals. The Pearson correlation coefficient indicated that jiggers significantly affected children's play in outdoor activities at r =0.306, and significantly lead to high dropout rates at r = 0.311. They also reduced school attendance at r = -0.123 and lead to slightly poor academic performance at r = -0.005.The study recommends that the school managers liaises with other stakeholders to seek for strategies of curing those infested, carry out routine checkups on children and sensitize communities on the causes, dangers and preventive measures of the jigger parasite in order to help all children realize their full educational potential in life.

CHAPTER ONE

INTRODUCTION AND CONTEXT OF THE STUDY

1.1 Introduction

This chapter summarizes the background of the study, statement of the problem, the purpose of the study and the objectives. It further presents the research questions, the significance, limitations and delimitations. Other sub topics in this chapter include assumptions, theoretical framework, conceptual framework and operational definition of terms.

1.2 Background to the Study

Health educators and health professionals worldwide have been calling for total commitment to good health as a way of life. Health is the physical, mental and social wellness of a person. According to Kelly and Lewis (1987) an individual cannot be active and productive in his/her day to day activities if they are unhealthy. UNICEF (2005) also observes that the health of children is important as it determines their physical growth and development, academic performance and participation in life activities. This is necessary because as Creswell (1993) observes, healthcare makes its greatest impact during the formative years of a child and that the possible causes of ill health among children are known to include malnutrition, childhood diseases and parasitic infections (Obade, 2007; Creswell, 1993; Oluoch, 2001).

The United Nations Convention on the Rights of Children (UNCRC) (1989), Article 24, also stipulates that every child has a right to the highest standard of health and medical

care attainable and that states shall place special emphasis on the provision of primary and preventive healthcare, public health education and the reduction of child mortality. Moreover, several countries including Kenya agreed that every child should be provided with a nurturing, caring and safe environment in order to survive, be physically healthy, mentally alert, emotionally secure and socially competent to be able to learn (Obade, 2007). The Kenya Government has also demonstrated concern for improving the well-being of young children by putting in place initiatives such as the Kenya Educational Support Program (KESSP) whose aim is to improve the learning facilities of Kenyan Schools and by extension help school going children in realizing their full potential in life. This is in line with the National Early Childhood Development Policy Framework (KIE, 2006) which stipulates that for children to realize their full potential in life, they require quality healthcare, nutrition, protection, early stimulation and training services.

According to the Kenya Health Policy (2012-2030), the New Constitution of Kenya is a major milestone towards the improvement of health standards, alleviating poverty and addressing inequalities in health and education among other issues. According to the policy, every Kenyan citizen has a right to the highest attainable standard of health including reasonable standards of sanitation and the right to a clean heath environment but many segments of the population have minimal access to high-quality healthcare and social services.

Studies on health have mainly focused on malnutrition and childhood diseases. The underlying causes of malnutrition and in turn ill-health, in the sub-Saharan Africa have been said to be mainly extreme poverty, inadequate caring practices, low levels of education of parents and poor access to health services (UNICEF, 2005). Studies indicate

that malnutrition and childhood diseases adversely affect the growth and development of children by contributing to infant and children morbidity, mortality and stunted growth especially in the developing countries (Chesire, 2007; Kameta 2005; Waswa 2005; Obade 2007; Odanga 2003). Mburia (1999) did a study on the ecology of human development in Machakos and found that poor health in pre-primary school and lower primary school children is the main cause of poor school enrolment, absenteeism, early school dropout, repetition of classes and poor academic achievement.

Another threat to children's health in Africa is parasitic infections (Oluoch, 2001). Malaria, for example, is an infection caused by a parasite known as the anopheles mosquito. The mosquito bites children, invades their red blood cells making them feel weak, develop fever, have headaches and fatigue. Studies on malaria (Oluoch 2001; Othoro 1996; Karah & Rahim 1995) have established that it mostly affects children below the age of five and that it can cause disability and death among the children. The studies were carried out on children who had either mild or severe malaria in order to establish the most effective way of controlling or curing the infections. These studies did not establish whether poor health is a determinant of pre-school entry since children start attending pre-school education by the age of three years. These studies did not also focus on jiggers or the effects of parasites on children's rate of school attendance, participation and drop out.

Studies on intestinal infections caused by worms revealed that they cause malnutrition anemia and retarded growth in children depending on the severity of the infection (Echoka, 2007; Otula, 2005; Muchiri 2001; Mburia, 1999 & Magambo 1998). Furthermore, chronic attack by these parasites leads to physical and mental illness and

increased susceptibility to other infections (Mburia, 1999). The consequence of this state of intestinal infestation makes the child experience fever, abdominal pains, diarrhea, vomiting and sometimes convulsions. This condition of poor health may interfere with the children's involvement in school activities and hence poor academic performance.

Jigger is a parasite that has not been confirmed to have adverse effects on children's health. Jigger is the common name for Tungiasis, also known as Chigoe flea, bicho de pie, sad flea, bug of the foot and Tunga Penetrans (Akwe, 2008). According to Heukelbach, Frank & Feildmeier (2004), jiggers are found among communities with limited resources in several countries within America, Asia and Africa. In some of these communities, jiggers attack a substantial number of children. Mutahi (2009) for example, quoted a journal known as `e-medicine' which reported that 51% of children from Trinidad and 42% from Nigeria were jigger infested. Mutahi also reported that infection rates among native inhabitants of developing countries are much higher than those of developed countries and that some regions often seem to be more prone to jigger infestations than others. The report however, did not give the effects of the infestation on children's school attendance or performance in their evaluation tests. It did not also reveal any challenges faced by the infested children in participating in school activities.

In addition, a cross sectional study carried out in Cameroon found out that jigger prevalence was highest among school-going children and then it decreased in adults and increased again among the elderly (Collins, 2009). The reason given for the prevalence

in children was that the culture and the traditions of the people placed children at a higher risk. For example, they wore sandals or damaged shoes and played in dry and dusty areas.

The study aimed at ascertaining the prevalence of Tungiasis (jiggers) among the inhabitants, assessing the impact of the infestation and identifying preventive measures in a number of rural settings in the North West county of Cameroon. The study concluded that the infestation was an important health problem which seemed to have been neglected. It suggested that the problem be addressed by medical health officers, community, educationists and sufferers themselves since it is a serious threat to health.

Jigger infestations have also been experienced in Kenya. According to the Director of Ahadi Kenya, 1.2 million children were jigger infested (Daily Nation, Oct. 5th 2010). Mutahi (2009) on the other hand puts the jigger prevalence in children in Kenya at 1.6 million. Despite the discrepancy, the statistics point to a considerable number of children who are infested with jiggers. These Kenyan reports, however, do not specify the number of school going children who have been infested and whose learning process may be threatened. Thus, the above figures suggest that the number of children infested with jiggers is large enough to raise concern.

In an African newsletter, Oroko (2009) expressed concern that jigger-infested children risked contracting the dreaded HIV/AIDS scourge due to sharing of unsterilized equipment used to remove jiggers from different children while at school and at home. This signifies that children who are infested with jiggers may also suffer from other secondary diseases related to jigger, like the tetanus and hence worsen their health status. Consequently, they may fail to go to school due to the pain they experience. They may also be limited in carrying out activities that requires vigor and enthusiasm. In the long

run, children suffering from these health complications may gradually leave school prematurely.

Available studies therefore suggest that jigger infestation affects people of all ages and that it has a negative impact on their health (Collins, 2009) but the relationship between jigger infestation and children's participation in formal learning programs seems not to have been given attention. Thus, there was need to conduct an empirical study to find out whether such a relationship existed.

1.3 Statement of the Problem

As shown in the background, studies by have revealed that parasites, including jiggers have adverse effects on children's health (Otula, 2005; Oluoch, 2001; Collins et al 2009). Researches on intestinal and malaria parasites have also established a relationship between infestation and children's participation in school (Otula; 2005; Magambo 1998; Oluoch 2001; Othoro 2006; Muchiri 1996; Collins et al 2009 and Mburia, 1999). Unfortunately, little has been done about jiggers and their effects on children's participation in school activities despite a substantial number of between 1.2 and 1.6 million children in Kenya suffering from jigger infestation. Much has also been said about jiggers in daily newspapers (Daily standard, November 27 2009; Daily Nation, October 5 2009) and website reports (Ahadi Kenya Activities 2009 and 2010; Mutahi, 2009; Oroko 2009, Kamau 2009) but scientifically documented evidence is lacking. Hence, this study intended to determine the relationship between jigger infestation and children's participation in school activities in Gatundu District, Kiambu County.

1.4 Purpose of Study

The purpose of this study was to establish the relationship between jigger infestation and children's rate of school attendance, participation in outdoor activities, performance in evaluation tests and dropout rates in Gatundu District.

1.5 Objectives of the Study

The objectives of this study were to:

1. Determine the relationship between jigger-infestation and children's school attendance.
2. Identify the relationship between jigger-infestation and children's activity level in outdoor events.
3. Find out the relationship between jigger infestation and children's performance in evaluation tests.
4. Find out the relationship between jigger infestation and children's dropout rates from school.

1.6 Research Questions

1. Is there any relationship between jigger-infestation and children's school attendance?
2. Is there any relationship between jigger-infestation and children's activity level in outdoor activities?

3. Is there any relationship between jigger-infestation and children`s performance in evaluation tests?

4. Is there any relationship between jigger-infestation and children's school dropout rates?

1.7 Research Hypotheses (Alternative)

The following are the alternative research hypotheses:

H.1. There is a significant relationship between children's school attendance rates and jigger infestation.

H.2. There is a significant relationship between children`s participation in outdoor activities and jigger infestation.

H.3. There is significant relationships between children`s performance in evaluation tests and jigger infestation

H.4. There is significant relationships between children's rate of school dropout and jigger infestation.

1.8 Research Hypothesis (Null)

The following are the null research hypotheses:

$H_0 1$ There is no significant relationship between children's school attendance rates and jigger infestation.

$H_0 2$There is no significant relationship between children`s participation in outdoor activities and jigger infestation.

$H_0 3$ There is no significant relationships between children`s performance in evaluation tests and jigger infestation

$H_0 4$ There is no significant relationships between children's rate of school dropout and jigger infestation.

1.9 Assumptions of the Study

The study was based on the assumption that the respondents would give correct information in the questionnaires and the secondary data instrument. This study also assumed that all sampled schools were keeping up to date registers, progress records and termly report forms that would be used as a good index of children's attendance and achievement rates respectively.

1.10 Limitations of the Study

The study was only done in Gatundu District. The distance to be covered from one school to another was a big challenge due to the poor roads, valleys and ridges within Gatundu district. In order to counter these limitations, the data was collected during the dry weather period. Some respondents also withheld information about the parasite since it seemed shameful for them to unfold the truth. However, the pupil's professional documents which were under the custody of their class teachers revealed their details.

1. 11 Delimitations

There are various types of parasitic infestation which affects children but this study concentrated only on the jigger parasite and its effects on children's participation in school activities. The study considered children between the age of five and eight years who are at school because they are more vulnerable to the jigger parasite. The findings of this study may only be generalized to children who are infested with jiggers in areas with similar characteristics as Gatundu District.

1.12 Significance of the Study

The study has provided statistical data which may inform the Ministry of Education on the extent to which education has been affected by jigger infestation, so that they can devise ways of assisting the infested children. The findings of the study may be useful to the teachers in that they act as reference guides to sensitize parents and other stakeholders on the effects of the jigger parasite. The public health officers may use the findings of this study in determining the current effects of jigger infestation on children's health so as to come up with some intervention measures. The school managers may also find the study useful in that they can use it to advise parents on the negative effects of jiggers to children`s education. In addition, those willing to carry out further research in jiggers may use the findings of this study as a stepping stone.

1.13 The Theoretical Framework

This study was based on the Ecological Systems Theory by Urie Bronfebrenner (Berk, 2001). Ecological theory states that child development is linked to the environmental settings in which the child operates. His model consists of five types of sub systems whose Centre is the child. The child's physical and biological make up is based on

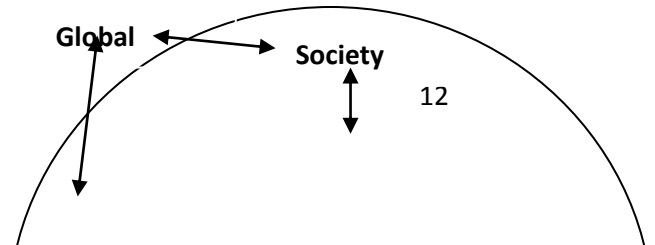
inherited factors which continue to be influenced by the immediate social and physical environments. These environments contain roles, norms and rules that shape development. Their quality and context either helps or hinders continued development (Berk, 2001).

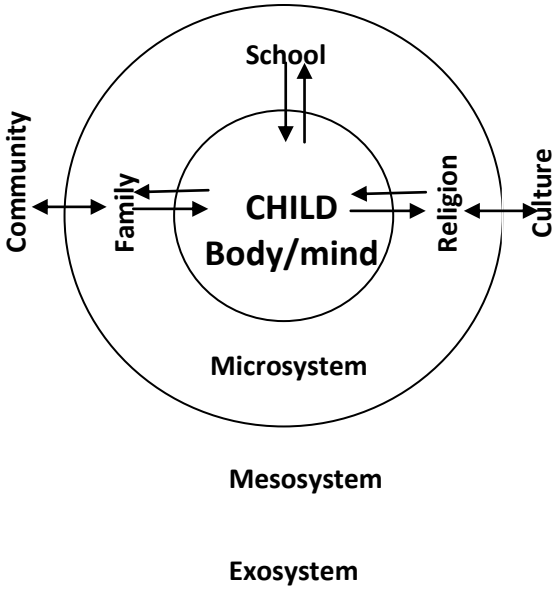
The first and immediate setting or system in which the individual operates is in known as the micro system. This context includes the individual's family, school, peers and neighborhood. The most direct interactions take place in these contests with social agents like parents, siblings, peers and teachers. The child depends on these social agents for care and support. Inadequate health care for example, by parents, siblings, guardians or teachers, may lead to jiggers thrive in poor environmental conditions. Once the child is infested, they experience irritation and pain on the affected areas. If the pain is too much the child may fail to attend school. Furthermore, failure to attend school due to ill-health makes the child rage behind their peers in attainment of concepts. This lowers their self-esteem and might lead to poor involvement in school activities and hence poor academic performance. This poor performance causes much stigma to the child and may finally become a contributing factor for the child to drop out of school. On the other hand, if the social agents are supportive, they help in promoting healthy development of children which may help them to overcome jigger infestation and its adverse effects on their participation in school.

In this theory, Bronfebrenner considers the body as part of the Microsystems. The body is considered as the life support system, mobility system and that which we perceive and

interact. The general health of the body is one of the many characteristics that can influence development. A person's health is determined by how effectively the various subsystems in the body function and the influences of environmental factors during the course of growth (Berk, 2001). At times the body is assaulted by countless external threats like diseases and conditions like jigger infestation. A jigger infested child has deformed feet which cannot allow the child to walk effectively. Healthy children are vigorous in carrying out school activities. In order to maintain good health one has to observe proper persona and environmental hygiene. Jiggers have been known to thrive in dusty areas or where domestic animals are kept together with people. A child whose body is not functioning well due to ill health may be limited in the way they participate in activities and also in the way they attend school.

Figure 1.1 Diagrammatic Representation of the Relationship between the Various Ecological Systems





Source: ***Adopted and modified from Berk (2001)***

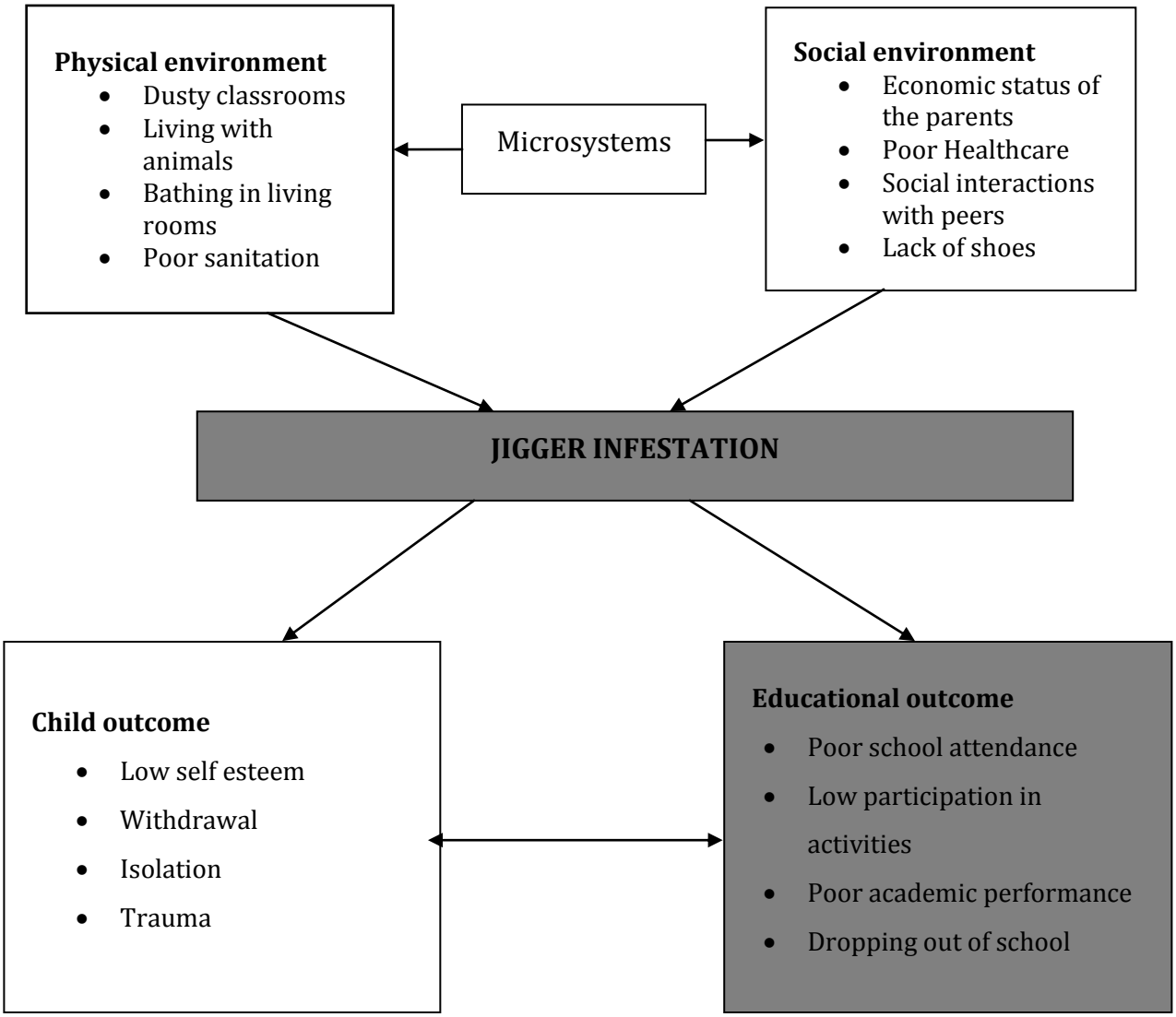
The child operates in two types of environments namely social and physical. The social systems include the parents, siblings, peers and other caregivers whereas they physical environment includes the classrooms, the playground and objects that can be used by the child. As the child interacts with these environments their development is either enhanced or hindered depending on the quality of the contexts. This is because the child wholly depends on the two contexts for survival and development. If the physical context has poor sanitation, dusty floors, no bathing rooms, domestic animals that harbor parasites like jiggers, then the child may suffer from jiggers. Social factors include poor personal hygiene, lack of shoes and interaction with others who may be infected during play. Once a child is infested they experience pain from the jigger bites on the affected areas. If the jigger is not removed in good time, it multiplies within the body causing the child's body to become weak and lessen in its functioning ability. The end result may be stigma and low self-esteem, poor involvement in school activities due to the pain experienced and

most probably poor performance in evaluation tests due to under involvement in class activities.

1.14 The Conceptual Framework

The child operates in two types of environments namely social and physical. The social systems include the parents, siblings, peers and other caregivers whereas they physical environment includes the classrooms, the playground and objects that can be used by the child. As the child interacts with these environments their development is either enhanced or hindered depending on the quality of the contexts. This is because the child wholly depends on the two contexts for survival and development. If the physical context has poor sanitation, dusty floors, no bathing rooms, domestic animals that harbor parasites like jiggers, then the child may suffer from jiggers. Social factors include poor personal hygiene, lack of shoes and interaction with others who may be infected during play. Once a child is infested they experience pain from the jigger bites on the affected areas. If the jigger is not removed in good time, it multiplies within the body causing the child's body to become weak and lessen in its functioning ability. The end result may be stigma and low self-esteem, poor involvement in school activities due to the pain experienced and most probably poor performance in evaluation tests due to under involvement in class activities.

Figure 1.2: Conceptual Framework on the Relationship between Jigger Infestation and Children's Participation at School



Source: Researcher's own construction

KEY not under study under study

1.15 Operational Definition of Key Terms

Children's Performance – Refers to children`s scores in a given activity while at School. For example marks attained in a test.

School Attendance – this refers to the act of going to school daily during the official School days.

Child – whereas the term 'child' refers to a person below the age of 18, this study will focus on pupils from pre-primary school to standard three with the assumption that they are beyond age five. A child will therefore be anybody aged between 5 – 8 years.

School Dropout – Pre-mature termination to attend school by the child for a period of one term or more

Jigger infestation – An attack of the jigger parasite in large numbers limiting the child's ability to carry out activities that require use of the hands and feet.

Jigger – A parasite that attacks children's feet and hands, sucks their blood, causes pain and intense irritation on the affected parts.

Outdoor activity – an activity carried out by the child outside the classroom during the outdoor lesson. These activities include throwing and catching a ball, rolling of tyres and racing, skipping with rope and building blocks.

Eco-system- the physical and social environments in which a child grows up.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter discusses the literature related to the jigger parasite and its effects on education. The chapter is divided into sections under the following subtopics; parasitic infections; jigger infestation and children's school attendance rates, jigger infestation and children's participation in outdoor activities. Other sub-topics include the effects of jiggers on children's performance in evaluations tests and on children's dropout rates.

2.2 Jigger Infestation

Human beings are hosts to many parasites which live inside the body or on the skin. Those that live within our bodies include hookworms, threadworms and roundworms among others. Studies done on intestinal infections caused by these worms indicate that they suck blood, leaving the person very weak (Echoka, 2007). They also cause malnutrition and retarded growth (Otula, 2005). The child's state of poor health caused by these infections interferes with their involvement in school activities (Mburia, 1999).

The jigger, also known as Tunga Penetrans, Chigoe, Tungiasis or sand flea, look a lot like other fleas except that it is very small about 1 millimeter long (Akwe, 2008). The jigger requires a warm blooded host to reproduce; reservoir hosts include humans, cattle, horses, sheep, mules, rats, mice, dogs, pigs and other wild animals. The jigger parasite is not known to transmit diseases to humans, but it is a nuisance once it enters the skin. It causes irritation and severe sores (Akwe, 2008). The female flea penetrates the skin and makes her home beneath the surface. She remains under the skin to feed and produce

eggs. The embedded flea causes a painful inflamed swollen lesion on the infected skin. It also causes a lot of itching and irritation. If there are many fleas embedded, the health consequences of the individual can be serious, ranging from local infection through loss of digits or limbs to death (Akwe, 2008). For those with access to medical care, surgical removal of the jigger fleas and cleansing of the wound bring the jigger irritation to a halt (Heukelbach et al, 2004).

According to UNICEF (2005), Children are exposed to serious health risks from environmental hazards; which are a result of poor environmental conditions. These conditions are a product of adverse social and economic situations, particularly poverty and malnutrition. Children are more susceptible to environmental risks, and therefore action needs to be taken to allow them to grow up and develop in good health, and to contribute to economic and social development. Poor environmental conditions are likely to harbor parasites like jiggers which may hinder children from participating effectively in school activities.

Heukelbach et al (2004) established the main cause of the jigger parasite to be poverty. He argues that the jigger is found among communities with limited resources in several countries within America, Asia and Africa. Akwe (2008) reported that the jigger parasite is found in warm, dry soil, sand benches and stock farms in America. She adds that people who visit the said regions without shoes face the danger of getting infected with this parasite. The jigger parasite is said to thrive in dusty areas and mud floors where water is inadequate (Collins et al, 2009). In Kenya, districts like Gatundu are said to be in pockets of poverty and are likely to harbor the jigger parasite.

2.3 Jigger Infestation and Children's School Attendance

The United Nations Convention on the Rights of Children (1989), Article 29, stipulates that the education of the child shall be directed to the development of the child's personality, talents, mental and physical abilities to their fullest potential (United Nations, 1989). This can only be done through regular school attendance and participation. Attending school regularly is also important to the child's future in that it helps them to achieve the goal of academic excellence, stimulate their brain and promote their social experiences. These experiences set the course for intellectual development (Winter, 2007). In her study, Ndani (2008) observed that community participation was important in assisting children to attend school. It involves being supportive to children's learning through taking part in their activities, providing physical facilities and offering services that promote healthy early childhood development. In her study, Mueni (1994) also analyzed some factors which contribute to pupil absenteeism from school and found out that extended illness, family problems and school phobia were among the leading causes. She adds that children who come from poor environmental conditions tend to suffer from illnesses brought about by parasites which live in those environments.

Other studies by Gakii (2003) and Ngasike (2004) have shown that most Early Childhood and Development (ECD) centers lack necessary facilities, equipment and materials that would promote holistic development of children. These studies established that most public centers have rough mud walls and floors. They are also congested. The dusty conditions may be a fertile breeding place for the jiggers. In addition, Mugo (2005) found out that several factors inhibited access to effective pre-school education by the children. These factors included insufficient financing by parents, transport problems due to

inaccessible roads, and lack of necessary facilities at school. A study by Othoro (1996) also revealed that parasitic infestations like malaria caused disability and death among children. In his study, Mburia (1999) found that most persistent absentees show withdrawal, irritability and aggressive behavior. Moreover, he added that poor health was a cause of poor school attendance and high repetition of classes. According to Gitonga (1997), Unhealthy children also exhibit depression, anxiety and low self-esteem. Subsequently, these children do not acquire quality basic education and skills hence the government's aim of achieving Education for All (EFA) and the Millennium Developmental Goals by 2015 is slowed down (Ngunjiri, 2009). Whereas several studies have shown causes of absenteeism from schools and their effects, very little has been done on parasitic infestations and their effects on education and especially the jigger parasite which is also a health issue.

2.4 Jigger Infestation and Children's Participation in Outdoor Play Activity

Play is the child's language. It is as important to human happiness and wellbeing as love and work. Waithaka (2009) defined play as the work of children. Play theorists like Aristotle and Plato described fun, enjoyable activity that elevates an individual's spirit. Play expands self-expression, self-knowledge, creative thinking and exploration. Children's Learning and development are best fostered through play. Outdoor play activity is very important to children because it enhances the development of gross and fine motor skills. Children are naturally active and energetic. During physical activity, this energy is released to build muscle strength and flexibility. Pupils also play games which stimulates all aspects of child growth and development (KIE, 2006). Large motor skills are developed in activities like jumping, racing, throwing, kicking and catching a

ball. These outdoor play activities are meant to enhance the child's physical fitness. Some of the activities that help in the development of fine motor skills include drawing pictures, scribbling, coloring and painting among many others. These activities may be done inside or outside the classroom. Play also promotes social interaction among peers. A child infested with jiggers may be unable to carry out these outdoor activities because jiggers mostly affect the feet. This implies that the child`s growth and rate of interaction with others may be limited.

Marie (2002) highlights that increased levels of physical fitness are associated with higher achievement in school. Children who are unhealthy may lack the strength to carry out the outdoor activities and thus have poor body muscle development. Marie also observed that physical health affects learning and that the school has a role to play in developing lifelong habits of physical fitness. This means that, there is need to find out whether the jigger, which causes irritation, pain and itching, may hinder effective participation by children in the outdoor play activity. It is also evidenced that jiggers mostly affect the feet since they have poor jumping ability (Heukelbach, 2004). Jigger infested pupils may therefore, have limitations to effectively participate in activities that require physical vigor like jumping, throwing, catching the ball and skipping among many others. Unhealthy children also experience low motivation and low self-esteem during participation in school activities. There is need to provide children with proper health care in order for them to develop an outlet for self-expression, creativity and discovery. This will help them to fit comfortably in the current world of competition. Since co-curriculum activities are part of the formal school curriculum, it is yet to be

established whether children who are jigger infested have any severe limitations in carrying out outdoor play activities.

2.5 Jigger Infestation and Children's Performance in Evaluation Tests

Evaluation tests are used by teachers to determine the performance of a child. They help to identify children with special education needs, in planning for individual children and in measuring the child's progress in school. There is no single test that can be used to determine the child's performance. Formal and informal testes, observations, parental information and other measures help to evaluate children's performance. Formal tests measure a child's ability by scoring the child's responses to a set of questions or tasks.

Evaluation can also be done through observations of medical reports and child's functioning in schools. Some of the programs associated with underperformance include lack of motivation, learning difficulties, anxiety and depression (Mburia, 1999). Unconfirmed reports have indicated that in Busia and Teso districts, jiggers have been suspected to deprive the children of their academic performance. Pupils experiencing the blunt of jiggers took a form of isolation, rejection and neglect. They feel unloved and unwanted (Ahadi, 2010). This in turn affected their school performance. According to a newsletter observation by Mutahi (2009), infested children cannot concentrate in class because they are often dull and slow in action. However, there is no empirical data to show the association between jiggers and children's academic performance. This study therefore sought to unveil that association.

2.6 Jigger infestation and Children's School Dropout Rates

Dropping out of school is a setback on the Government's policy to achieve Education for All (EFA) by 2015. In his study, Gitonga (1997) argues that absenteeism from school has profound effects on educational attainment which includes repetition of classes and dropping out of school. A cross-sectional study done in Cameroon revealed that children infested with jiggers have low self-concept associated with the inability to walk properly, hence poor school attendance (Collins, 2009). In a newsletter report by Oroko (2009), stigmatization and discrimination of children infested with jiggers in Kisii District had forced several children to drop out of schools.

Oroko further reported that the affected children were orphans and vulnerable children left under the care of elderly grandparents. The grandparents were living in extreme poverty and could not afford to take the children for medical treatment in hospitals. The Area District Public Health Officer (Kisii District) expressed fear that the jigger-infested children risked contacting HIV/AIDS due to sharing of unsterilized equipment that was used to remove jiggers from different children. Once infested by the jiggers, they withdraw from school due to stigma and low self-esteem (Gitonga, 1997). Ngunjiri (May 17, 2008) also observed that jiggers are a threat to Free Primary Education (FPE) because pupils drop out of school due to mockery by others. Although the jigger infestations may not be the only cause of children dropping out of school, there is need to establish its effects on children, so as to take the necessary precautions and curb the rate at which children drop out of school due to jiggers. According to a report by Ahadi Kenya (2010), the infested children are unable to walk to school, write properly or even participate in learning activities to the same level as their un-infested peers. In addition, a cross-

sectional study carried out by Njau (2009) in Murang'a South District rated the problem of walking at 53% among other symptoms.

2.7 Summary of the Reviewed Literature

The available literature that has been reviewed has shown that the jigger parasite exists all over the world. It is more common in America, Africa and Asia. The literature has also shown that the jigger parasite attacks people of all ages and interferes with their health. School going children are more vulnerable to the parasite because they are exposed to different environments and they have limited immunity. They also engage in play in dusty and muddy places which could be suitable environments for jiggers. This implies that jiggers can have a negative effect on the Kenyan government's idea of introducing free primary education for the benefit of all children. Several factors have hindered this initiative. These include malnutrition, childhood diseases and parasitic infections. The jigger parasite had, however, not been considered as a major health issue in the past. Its effects on education had also not attracted the attention of many researchers, since the available theses and dissertations show that researchers concentrated on other parasites. However, several reports indicate that the jigger parasite have adverse effects on the children's health. The parasite has also infested quite a substantial number of school going children. This designates the need to determine the relationship between jigger infestation and children's participation at school so as to help in achieving the government's goal of Education for All (EFA) by 2015 and the second Millennium Development Goal (MDG) which is aimed at achieving universal primary education.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter presents the methodology of the research. It describes the research design that was used, the independent and dependent variables, location of the study and the target population. The sample, sampling techniques, research instruments, data collection methods and data analysis methods have also been discussed.

3.2 Research Design and Locale

This study adopted the descriptive survey research design. Descriptive survey was suitable in this study because data was collected on a wide range of subjects who were infested with jiggers and an equal number of those who were not infested from several schools in Gatundu District. Information was collected from their class teachers and an analysis of their personal records was done. According to Orodho (2005) a survey study gathers data at a particular time on order to describe the existing conditions and determine the relationship that exists between specific events. Descriptive Survey design according to Mertens and McLaughlin (2004) has the advantage of collecting information from a large number of people. The information can be collected from the participants themselves, from other people or by examining records.

This study was carried out in Gatundu District. The district is within Kiambu County. It is also referred to as Gatundu south constituency. Gatundu district is a rural highland, about 50kms north of the capital city, Nairobi. Local people are mainly the Agikuyu. The

main economic activity in Gatundu town is business. The neighbouring villages are agricultural productive and therefore feeds the market with agricultural commodities. The area is characterised by ranges, valleys and poor road network. Most roads are dry weather roads which are impassable during rainy seasons.

The district is divided into three educational zones namely Kiganjo, Ng'enda and Ndarugu. Gatundu District is among the highly jigger infested districts in central Kenya. Ahadi (2010) notes that poverty and lack of proper hygiene was evident in the area. In addition, the district is reportedly characterized by low school participation in national events and exams. It has high levels of pupil absenteeism. According to an annual learning assessment report by Uwezo Kenya (2011), only 64% of children aged 3-5 years are attending pre-primary school, with an average of 40% children in lower primary missing school on any given day in Gatundu District. The report also revealed that 76% girls and 75% boys aged 6-16 years from Kiambu County cannot do std. 2 work. Child absenteeism from school was given as the major reason for the underscoring of the children. These statistics raise concern and point to a need for an investigation on the possible causes of high absenteeism from school in the district, one of which might be jigger infestation.

3.3 Target Population

This study targeted pre-school and lower primary school children from all the public primary schools, and their class teachers. There were 55 public primary schools with pre-schools attached to them. The main aim of targeting these schools was because they cater

for children of all backgrounds and especially those from impoverished families. In Kenya, public primary schools are offered free education since the year 2003.

3.4 Sampling Techniques and sample size

The researcher used purposeful and simple random sample procedures to arrive at the research sample.

3.4.1 Sampling Techniques

Gatundu District was selected because of its high jigger prevalence among other districts in central Kenya. The District has also been performing poorly in the Kenya Certificate of Primary Education (KCPE) as compared to other districts in the Central County of Kenya (KCPE analysis, 2010). This study combined Simple Random sampling and Purposive sampling. Simple random sampling was applied on the public schools whereas purposive sampling was used to sample pre-primary school and lower primary school teachers from the schools which had been sampled. However, in cases of two streams per class, simple random sampling was still administered to identify one of the teachers to be included in the sample.

3.4.2 Sample size

The sample size constituted eleven schools. This was a 20% of the total fifty-five public schools in the district. According to Orodho (2005), 10-30% of the population is an adequate sample. However, all children infested with jiggers in pre-school and lower primary schools from the sampled schools were included in the sample. These children were forty-four (44) in number by the time of this study. An equal number of children who were not jigger infested from every class were randomly selected to be compared to

those who were jigger infested. In addition, all teachers manning the pre-school and lower primary classes were included in the sample. Only one teacher was sampled from the schools with more than one stream. Therefore, the total number of teachers was four per school from the eleven schools hence giving a total of 44 teachers. Table 3.1 gives a summary of the sample size.

Table 3.1: Sample Size

Class	Schools sampled	No of Children with jiggers	Children without jiggers	Class teachers
Pre-school	10	5	5	10
Class 1	11	11	11	11
Class 2	11	10	10	11
class 3	11	16	16	11
Special Unit	1	2	2	1
Total	**11**	**44**	**44**	**44**

3.5 Research Instruments

The study utilized a questionnaire for ECD and lower primary school teachers, and two observation schedules for data collection. The questionnaires were used by the teachers to provide data on jigger infestation on children. Observation schedules on the other hand, were utilized to gather direct data from the jigger victims, and the school documents analysis was used to gather information on children`s school attendance rates and performance rates. According to Mugenda and Mugenda (2003) questionnaires are commonly used to obtain important information about a population within a short duration while observation schedules gather direct information from the respondents and their environment.

3.5.1 Questionnaire for Teachers

The questionnaire consisted of items that addressed all the objectives of the study. The questionnaire collected both qualitative and quantitative data as per the objectives. The closed ended questions attracted specific answers while the open ended questions required the respondents to give their opinions about the jigger. The teachers were requested to fill the questionnaires and return them to the researcher within the same day.(See appendix 1). Although much time was spent, the teachers were able to fill in all sections of the questionnaire depending on their classes and handed them in the same day. However, the researcher was only able to visit a school per day. The first section of the questionnaire gathered demographic information about the name of the particular school where study was being done, the teacher's designation and the class he/she was in charge of. The second section of the questionnaire comprised of items which gathered information about the jiggered and non-jiggered rate of school attendance, performance in outdoor activities, performance in evaluation tests as evidenced by teachers' records and the rate at which children dropped out of school.

3.5.2 Document Analysis

Secondary data was collected by studying the progress records, the attendance registers and the end term report forms. The pupil's positions in the class evaluation tests and marks that were attained by every child were recorded. The number of days that they had been out of school were also checked and recorded to assist in data analysis.

3.5.3 Observation Checklist

This was used by the researcher to gather data that could be observed directly from the subjects as they took part in the outdoor play activities. It captured data on the frequency of participation at which the activities were carried out. If the child changed from one activity to another within duration of five minutes or below, it was considered a frequent change and the child was awarded 5 marks, moderate change of activity was that of duration of five to ten minutes and was awarded 3 marks. Children who did not change from one activity to another for ten or more minutes were considered to have a rare change and were awarded 1 mark each.

3.5.4 Scoring the Instruments

The responses from the questionnaires and observations were scored according to the questions. Those with choices were scored 4 marks for strongly agree, 3 scores for just agree, 2 points for disagree and 1 point for strongly disagree. Those with YES or NO options were awarded 2 points for YES and 1 point for NO choice. The total marks obtained were computed to determine whether there is any relationship using the Pearson's moment order correlation coefficient. Questions that attracted qualitative answers were discussed thematically.

3.5.5 Variables

i. Jigger infestation in children was the independent variable. It was measured by the infested child's ability to carry out daily activities as compared to those who were not infested. For a child to be considered jigger infested, jiggers should be

heavily concentrated on the hands and feet to an extent of interfering with their walking and writing.

ii. Dependent variables included;

a) **School attendance**; School attendance was rated in terms of the total number of days in which children infested with jiggers attend school in a term as compared to the total number of days that they were supposed to attend school. The fewer the number of absent days by the subject the better the attendance. If a child attended school for 90-100% of the total days, it was considered good attendance, 80- 90% of the total days was considered fair and 79% and below was termed poor attendance.

b) **Participation in outdoor activities**; This was measured in terms of how often (frequency) the jigger infested and the non-jigger infested children changed from one activity to the other and the type of activity they were engaged in. The more often they changed from one activity to the other the more marks they attained because children are active, energetic and lovers of play. They also have limited concentration ability and therefore they cannot dwell on one activity for long.

c) **Performance in evaluation tests on the other hand**, was measured by recording the total number of marks achieved by the children (with and without jiggers) in comparison to the expected total marks. The marks were got from their report forms which were kept by their teachers.

d) **Dropout rates;** these were measured by recording and comparing the number of children (with and without jiggers) who had prematurely stopped attending school for at least one term. Attendance registers were used to give this information.

3.5.6 Pilot study

Pilot study was carried out in order to validate the research instruments and to identify the major problems that would be encountered during the actual research study. The pilot study was carried out in three schools which were among those within the population but the three schools were not included in the actual study sample to avoid bias. The pilot data was used to validate the instruments for the purpose of improvement. According to Orodho (2003), the purpose of piloting is to check whether the questions are well understood by the respondents and whether there could be ambiguous ones.

3.5.7 Reliability

The test-retest technique was used to measure the degree to which the research instruments yield consistent results. The questionnaires were administered and after two weeks the same set of questionnaire were filled again by the same subjects. The findings were compared to check whether they yielded consistent results. Spearman's rank order co-relation was used to compute the correlation coefficient in order to establish the extent to which the contents of the questionnaires were consistent in giving similar responses every time the instrument was administered. The results showed a correlation coefficient

of 0.93 confidence level. This shows that the questionnaire was reliable. Creswell (2005) states that a positive correlation of 0.8 and above shows that the instrument is reliable.

3.5.8 Validity

Content validity was checked through item analysis. To ensure content validity, the researcher made sure that the items on the instruments covered all the objectives of the study. Every item was then checked against the responses given by the respondent. Most of the responses given (98%) corresponded to the laid down objectives. The instruments were therefore considered valid. Orodho (2005) asserts that validity is the degree to which results obtained actually represent the phenomenon under investigation.

3.6 Data Collection

Before going to the field to collect data, the researcher got a letter of approval to collect data from Graduate School, Kenyatta University. This letter was presented to the Ministry of Education to apply for the permit. The copies of the permit were issued to the DEO and the area chiefs, who then allowed the researcher to visit the sampled schools and to distribute the questionnaires to the teachers' in-charge of pre-school and lower primary classes in every school. The respondents were requested to fill the questionnaires and give them back to the researcher the same day. After distributing the questionnaires to the teachers, the researcher left them to fill. The researcher then made observations on the participation of children infested with jiggers in outdoor activities and recorded the findings. A different day was set for analyzing the documents like the attendance register, the progress records and any other evaluation records in the same school.

3.7 Data Analysis

The data collected in this study was analyzed through qualitative and quantitative methods. The Qualitative method involved coding of the data, organizing data according to themes, describing and explaining the organized data from the questionnaires and the documents. The Statistical Package for Social Sciences (SPSS) was used to organize data for analysis. The Pearson Product Moment Correlation test was used to find the relationship between variables at 0.05significance level. The following statistical hypotheses were tested;

a) There is no significant relationship between children's school attendance rates and jigger infestation.
b) There is no significant relationship between children`s participation in outdoor activities and jigger infestation.
c) There is no significant relationship between children`s performance in evaluation tests and jigger infestation
d) There is no significant relationship between children's rate of school dropout and jigger infestation.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION OF FINDINGS AND DISCUSSIONS

4.1 Introduction

In this chapter, results have been presented and discussed based on the research objectives. The study sought to;

i. Determine the relationship between jigger-infestation and children's school attendance.

ii. Identify the relationship between jigger-infestation and children's activity level in outdoor events.

iii. Find out the relationship between jigger infestation and children's performance in evaluation tests.

iv. Find out the relationship between jigger infestation and children's dropout rates from school.

Demographic and inferential information is presented in this chapter, followed by discussions of the findings.

4.2 Demographic Information of the Respondents

Eleven public schools were sampled in this study. Teachers who were in charge of pre-school to standard three participated in this study by filling in all the questionnaires. Table 4.1 presents the total number of respondents per class;

Table 4.2.1: Number of Respondents per Class

Class	**Teachers per class(frequency)**	**Percent**
Pre-school	10	22.73
Class one	11	25
Class two	11	25
Class three	**11**	**25**
Special class	**01**	**2.27**
Total	**44**	**100**

Table 4.2.1 indicates that there were 10 (22.73%) respondents from pre-schools, 11(25%) respondents from class one, two, three and one respondent (2.27%), from a special unit.

4.3 Jigger Infestation and the Rate of School Attendance

The first objective of this study sought to establish the relationship between jigger infestation and the rate at which children attended school. The respondents compared the rate of attendance between children who were jigger infested and those who were not. The results are presented in table 4.2.1;

Table 4.3.1 Responses to Jigger Infestation and the Rate of School Attendance

	Strongly Agree		Agree		Disagree		Strongly Disagree		Total	
Statement	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	%
Jigger infestation affects the rate of school attendance	23	52.3	18	40.9	3	6.8	0	0	44	100
children who are infested with jiggers absentee themselves from school more than those who are not	21	47.7	21	47.7	1	2.3	1	2.3	44	100
Children who are not infested with jiggers absentee themselves more than those who are infested	1	2.3	2	4.5	24	54.5	17	38.6	44	100
The rate of absenteeism is the same for those infested and to those who are not	8	18.2	18	40.9	0	0	18	40.9	44	100

Table 4.3.1 presents findings on the rate of school attendance. The findings indicated that 41 out of 44 (93.3%) either agreed or strongly agreed that jigger infestation limits children`s school attendance. The findings also indicated that 42 out of 44 (95.4%) of the children with jiggers were absent from school more times as compared to those who were not. The results also indicated that 26 out of 44 (59.1%) respondents agreed that the rate of absenteeism is the same for children who are infested and to those who are not.

Information sourced from the class attendance registers in custody of class teachers showed the exact days that both groups attended school as shown in table 4.3.2;

Table 4.3.2 Records Source: Class Attendance Register

Range in days children were absent	**No. of children with jiggers**	**%age**	**No. of children without jiggers**	**%age**
0-4	4	9.1%	35	79.6%
5-9	7	15.9%	3	6.8%
10-14	14	31.8%	6	13.6
15-19	3	6.8%	-	-
20-70	16	36.4%	-	-
Total children	44	100%	44	100%

Table 4.3.2 shows that most of the children infested with jiggers (36.4%) failed to attend school regularly as compared to their fellow pupils. Data obtained from the class registers showed that they were absent for twenty or more days during the term which had a total of seventy days. About 80% of the children without jiggers also failed to attend school for few days (5-9) during the term. The results above were used to test the null hypothesis that stated;

a) H_{01}: *There is no significant relationship between children's school attendance rates and jigger infestation.*

A Pearson Product-Moment Correlation Coefficient was computed to assess the relationship between the school attendance by children infested with jiggers and those not infested. Table 4.3.3 presents the findings on this hypothesis:

Table 4.3.3: Relationship between Jigger Infestation and Children's Rate of School Attendance

		Infested	Not Infested
Infested	Pearson Correlation	1	-.123*
	Sig. (2-tailed)		.426
	N	44	44
Not Infested	Pearson Correlation	-.123*	1
	Sig. (2-tailed)	.426	
	N	44	44

Table 4.3.3 indicates that there was a weak negative correlation in school attendance between children who were infested with jiggers and those who were not, where r = -0.123, p=0.426 and N=44. The results imply that there is a negative correlation between jigger infestation and attendance rates. A negative correlation means that an increase in one variable leads to a decrease in the other variable. In this case, an increase in jigger infestation would lead to a decrease in school attendance. However, the sig 2-tailed, which is the p-value, is greater than 0.05. (p=0.426>0.05). This implies that statistically, there is no significant relationship between the jigger infestation and school attendance rates. This could have been attributed to the fact that even those without jiggers also failed to attend school on some days. The null hypothesis is therefore *accepted.*

The above findings are consistent with reports given by Ahadi (2009) who said that jiggers had deformed children's limbs to an extent that they can't walk or write, and with those of Uwezo Kenya (2011), who found out that absenteeism by pupils, lead to underscoring at school. The findings are also in agreement with those of Mburia (1999)

who found out that poor health was a cause of poor school attendance and high repetition of classes.

4.4 Jigger Infestation and children's Performance in Outdoor Activities

The second objective sought to establish whether jigger infestation influences children's activity level in outdoor activities. Information for this objective was captured by items on section B of the questionnaire and the observation checklist. Table 4.3.1 presents findings to this objective;

Table 4.4.1: Responses to Jigger Infestation and Children's Performance in Outdoor Activities

	Strongly Agree		**Agree**		**Disagree**		**Strongly disagree**	
Statement	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Jigger infestation affects children's performance in outdoor activities	31	70.5	12	27.3	1	2.3	0	0
Children infested with jiggers perform worse in outdoor activities than those who are not	28	63.6	15	34.1	1	2.3	0	0
Children who are not infested perform worse than those who are infested	2	4.5	0	0	21	47.7	21	47.7
The rate of performance in outdoor activities is the same to those who are infested and to those who are not	1	2.3	3	6.8	17	38.6	23	52.3

Table 4.4.1 above indicates that 43 out of 44 (97.8%) respondents agreed that jigger greatly affected children's level of participation in outdoor activities.43 respondents (97.9%) respondents also reported that children infested with jiggers performed worse in outdoor activities as compared to those who are not. This high percentage of respondents is an indicator that jiggers are detrimental to the proper growth and development of the children. If children do not engage in play, it means their holistic development is at risk because play enhances development of fine and gross muscles as well as acquisition of labor-intensive skills in all the individuals' developmental aspects. Through play children also socialize with each other and learn to control their emotions.

Table 4.4.2 Performance in Outdoor Activities from the Observation Checklist;

Activity	**Frequent**		**Moderate**		**Rare**	
	Children with jiggers who participated	Children without jiggers	Children with jiggers	Children without jiggers	Children with jiggers	Children without jiggers
Throwing a ball	2	4	1	6	0	0
Catching a ball	1	5	0	8	2	5
Rope skipping	0	5	3	12	0	9
Building blocks	2	6	0	10	1	8
Tyre rolling	2	12	2	3	2	8
Racing with tyres	1	15	3	4	0	5

Table 4.4.2 indicates the frequency in which children changed from one activity to the other. This is because children are energetic and vigorous in outdoor activities. When supplied with materials they tend to change from one activity to the other very frequently so that they can make good use of all the available materials. Children cannot also concentrate on one task for a long period of time. Three children who were jigger infested participated in throwing the ball, as compared with ten children who were not infested. Those infested did not participate in skipping or racing with car tyres at all as compared to fourteen of those not infested It was generally observed that there was minimal participation by all children infested with jiggers in all the selected activities.

Findings from the observation checklist indicated the frequency in which children changed from one activity to the other. This was considered through the amount of time taken in that specific activity. Changing from one activity to the other within a range of one to three minutes was considered frequent and was awarded 5 points, changing from an activity between three to five minutes was considered moderate and was awarded 3 points whereas taking beyond five minutes in a single activity by the children was considered a rare change of activity and was awarded 1 mark.

The total scores attained by children with and without jiggers who participated in the given activities in the observation checklist were correlated to determine the relationship between jigger infestation and children's performance in outdoor activities. The following null hypothesis was tested;

H_{02}: *There is no significant relationship between children`s participation in outdoor activities and jigger infestation.*

Pearson Product Moment Correlation Coefficient was utilized to test this hypothesis. The Correlation was tested at 0.05 significant levels. Table 4.5 presents findings for this hypothesis;

Table 4.4.3 Relationship between Jigger Infestation and Performance in Outdoor Activities

		Infested	**Not Infested**
Infested	Pearson Correlation	1	.306*
	Sig. (2-tailed)		.043
	N	44	44
Not infested	Pearson Correlation	.306*	1
	Sig. (2-tailed)	.043	
	N	44	44

Table 4.4.3 indicates that there was a positive correlation between the two variables where r = 0.306, p = 0.043, n = 44. There was therefore a positive correlation between jigger infestation and children's participation in outdoor activities. The results also revealed that the p-value was 0.043, which is less than 0.05 (p=0.043<0.05).This implies that statistically there is a significant relationship between the two variables. It also means that an increase in jigger infestation significantly relates to an increase in poor outdoor performance. The null hypothesis was therefore *rejected.*

This finding was consistent with that of Ngunjiri (2009) and Ahadi Kenya (2010) who found that jiggers caused difficulties in walking due to the pain and itching that is experienced by those infested. This finding also agrees with Akwe (2008) who stated that

jiggers mostly affect the feet because they have poor jumping ability and that those infested experience irritation and pain. This suggests why the jigger infested children can hardly participate in outdoor activities.

4.5 Jigger Infestation and Performance in Evaluation Tests

The third objective of this study was to establish the relationship between jigger infestation and children's performance in evaluation tests. Section 2(c) of the questionnaire sought information for this objective. Table 4.4.1 presents the results;

Table 4.5.1 Responses to Jigger Infestation and Performance in Evaluation Tests

	Strongly agree		**Agree**		**Disagree**		**Strongly disagree**	
Statement	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Jigger infestation affects performance in evaluation tests	16	36.4	20	45.5	8	18.2	0	0
Children that are infested with jiggers perform better than those who are not in evaluation tests	0	0	8	18.2	23	52.3	13	29.5
Children who are not infested with jiggers perform better in evaluation tests than those who are	11	25.0	19	43.2	14	31.8	0	0
The performance in evaluation tests by those infested is the same as the performance by those not infested.	0	0	3	6.8	31	70.5	10	22.7

Table 4.5.1 reveals that the total number of respondents who strongly agreed that jiggers affected performance in evaluation tests was 36 out of 44 (81.9%). This is because 8 out of the 44 (18.1%) children were average in performance. They scored between 45% and 50% of the total marks. This implies that some children could be jigger infested and yet perform well in evaluation tests. This means that jigger infestation *per se* may not be

related to poor performance. There may be other underlying factors leading to poor performance of children in their schools. Table 4.4.2 shows the findings of children's performance from the report forms;

Table 4.5.2 Records Source: Children's Report Forms

Range in marks (%)	No. of children with jiggers	%age of children	No. of children without jiggers	%age of children
0-24	35	79.5%	0	0
25-50	7	15.9%	21	47.7%
51-75	2	4.5	15	34.1%
76-100	-	-	8	18.2%
Total no. of children	**44**	**100**	**44**	**100**

Data sourced from children's report forms and class progress records also indicated that there was a variation in the way children perform. Table 4.5.2 indicates that two (4.5%) children were very good performers even with the infestation, whereas 42 out of 44 (95%) of those infested were below the average mark. The highest score of the children infested with jiggers was 75% of the total mark in all testable subjects while the lowest mark was zero. At the same time, the highest score of those not infested in all subjects was 92% of the total mark and the lowest mark was 30% of the total mark. All the same, there was evidence of non-consistence of performance among the jigger infested children. This non-consistency may be attributed to their innate intelligence levels. The results were used to test the null hypothesis which stated that;

H_{03}: *There is no significant relationship between children`s performance in evaluation tests and jigger infestation.*

Pearson Product Moment Correlation Coefficient was computed to assess the relationship between performance in evaluation tests by children infested with jiggers and those not infested. The Correlation was significant at the level of 0.05 (2-tailed). Table 4.5.3 presents the results;

Table 4.5.3: Relationship between Jigger Infestation and Children's Performance in Evaluation Tests

		Infested	**Not Infested**
Infested	Pearson Correlation	1	-.005*
	Sig. (2-tailed)		.977
	N	44	44
Not Infested	Pearson Correlation	-.005*	1
	Sig. (2-tailed)	.977	
	N	44	44

Table 4.5.3 shows that there is a negative correlation between jigger infestation and children's performance in evaluation tests (r = - 0.005). This means that an increase in jigger infestation will lead to a decrease in performance, but the probability value (p), is 0.977 which is greater than 0.05. This implies that statistically, there is no significant relationship between jigger infestation and performance in evaluation tests. The null hypothesis was therefore *accepted*.

This finding is not consistence with Ahadi Kenya (2010) report that jiggers had denied most young people from achieving in academics. According to Ahadi Kenya (2010) any child who is jigger infested cannot perform well in class, but this study found out that some children may be infested and yet perform well in their evaluation tests. This could may as a result of other school and family factors.

4.6 Jigger Infestation and Dropout Rates

The fourth objective in this study was to investigate whether jigger infestation is related to children's school dropout rates. Section 2 (d) of the questionnaire sought information for this objective. Table 4.6.1 presents the results;

Table 4.6.1: Responses to Jigger infestation and Dropout Rates

	Strongly agree		**Agree**		**Disagree**		**Strongly disagree**	
Statement	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Jigger infestation affects the rate at which children drop out of school	7	15.9	26	59.1	9	20.5	2	4.5
Children that are infested drop out of school more than those who are not	5	11.4	22	50.0	14	31.8	3	6.8
Children who are not jigger infested drop out of school more than those who are infested	1	2.3	3	6.8	30	68.2	10	22.7
The rate of drop out is the same to those infested and to those who are not	3	6.8	4	9.1	26	59.1	11	25.0

Results revealed that jiggers can make children drop out of school. This is because 75% of the respondents supported the statement that jigger infestation affects the rate at which children drop out of school, whereas the remaining 25% argued that there are other factors that can lead to a child dropping out of school. The results also indicate that only

61.4% of the respondents agreed that the children infested drop out of school more than those who are not. On the other hand, 91% of the respondents disagreed with the statement that children not infested with jiggers dropped out of school more than those who are infested. It was noted that dropout rate in all schools was generally low. Table 4.6.2 shows the rate of drop out from the class attendance registers;

4.6.2: Records Source: Class Attendance Register;

Total dropouts	**No. of children with jiggers who have dropped out**	**No. of children without jiggers who have dropped out**	**%age of children infested with jiggers who have dropped out**
16	11	5	68.75

Table 4.6.2 indicates that 16 children who dropped out of school were those infested with jiggers. Those without jiggers who had dropped out due to other factors were five, whereas those infested with jiggers were eleven. This implies that about 69% of the total children who dropped out of school were infested with jiggers. This means that cure for jiggers can improve the school attendance rates and decrease the number of those dropping out of school. The relationship between children infested with jiggers and those not infested who had dropped out of school was tested for significance to test the null hypothesis that stated:

H_{04}: *There is no significant relationship between children's school dropout rates and jigger infestation.*

Pearson Product Moment Correlation Coefficient was utilized to test this hypothesis. The Correlation was at 0.05 significant levels. Table 4.6.3 presents the findings;

Table 4.6.3: Relationship between Jigger Infestation and School Dropout Rates

		Infested	**Not Infested**
Infested	Pearson Correlation	1	.311*
	Sig. (2-tailed)		.353
	N	11	11
Not Infested	Pearson Correlation	1	.311*
	Sig. (2-tailed)		.353
	N	11	11

Table 4.6.3 indicates that there was a positive correlation between jigger infestation and school dropout rates. This positive correlation of r= 0.311 means that an increase in jigger infestation may lead to an increase in the rate in which children dropout from school. On the other hand, the probability value (p), which was 0.353, is greater than 0.005 (p=0.353>0.005).This implies that the correlation between the variables is not statistically significant. Consequently, the null hypothesis is *accepted*. These findings are not consistent with Ahadi Kenya's reports in Murang'a (2010) which stated that all primary schools had consistently recorded several dropout cases due to jiggers. The lack of a significant relationship could be attributed to the few number of jigger cases who had dropped out of school during the time of this study.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings, the conclusions that have been derived from the study and recommendations of what should be done to assist the current situation. The chapter also suggests some recommendations for further study.

5.2 Summary of the findings

Findings of this study have shown that jiggers are detrimental to children's participation in school activities. They have negatively affected school attendance, outdoor activities, academic performance and the rate at which children are dropping out of school. Children who are infested need to be provided with proper medical care so that they can recover from the infestation and continue with their education. Jigger infestation translates to unsuccessful schooling and failure to achieve educational goals, which in turn contributes to poor productivity of the children to their communities and the nation at large. As a result, the rate of development will decrease, and the governments' effort of achieving Education for All and Vision 2030 may not be realized.

The results indicate that the null hypothesis on participation in outdoor activities was rejected. This implies that participation in outdoor activities was very poorly done by the infested pupils such that it was statistically significant. This is because pupils were mostly affected on the feet and the hands.

5.3 Conclusions

Findings in this research revealed that jigger parasite is a threat to the children's education and health. Jigger infestation limits children's school attendance. Consequently, the children are not likely to cover the content they are supposed to cover by the end of the year. This may translate to poor results and the need by the child to repeat the work the following year. These children may also lag behind their peers in the development of social skills. It was also found that the jiggers adversely affected children's play. Their participation in outdoor play activities was minimal. Play enhances the child's creativity, logical thinking and development of problem solving skills. It also promotes development of fine and gross body muscles. Children who do not effectively take part in play may have poor body posture, poor co-ordination of muscles and limited interpersonal skills.

Findings indicated that jigger infestation influenced children's performance in evaluation tests. Most of those who were infested performed poorly in the school evaluation tests. This may lead children to repeating classes or gradually dropping out of school. Jigger infestation also increased the rate at which children dropped out of school. The more infested they were, the more they dropped out of school. This implies that transition rates from one class to another are also lowered. It also implies that schools with high number of children infested with jiggers may be performing poorly and may be posing lower enrollment as compared to the others. The government's efforts of providing free education to pupils in these primary schools may therefore be compromised.

5.4 Recommendations

The study proposes the following recommendations:

5.4.1 Policy Recommendations

The findings of this study have revealed a number of issues that have led to the following recommendations.

- Findings of this study have shown that jiggers inhibited children from attending school effectively. In order for them to be able to attend school regularly, the school administrators should come up with strategies for curing those already infested and implement other programs aimed at eradicating the jigger parasite among the school going children. They may liaise with the Ministry of Health to have the children treated at the hospital and to get some fumigants which can be used to spray jiggers at school.
- Jiggers were also found to negatively influence children's performance in both outdoor and in evaluation tests. To improve on their performance, it is recommended that school children be taken care of to ascertain that they are free from these parasites that cause them discomfort during the period of study. Class teachers should liaise with the children's parents' in order to advise them on the needs of every child and in return improve the health status of the children whether it is at school or at home.
- Findings of this study indicated that most of the children who drop out of school were jigger infested. There is need therefore, for school managers to come up with strategies of assisting those already infested as well as those who are not so that they can achieve their dreams in life. Such strategies would include guidance and counseling on self-help skills and to

hold joint meetings with parents to discuss challenges facing the learning of the children and how they can be curbed.

- Since the number of children infested with jiggers was high, the Government should come up with a deliberate policy to supply fumigants to all schools and infested families.

5.4.2 Recommendations for Further Research

- This study focused on the effects of the jigger on children's participation at school. There is therefore need for a research to be carried out to explore other health related factors that may be contributing to poor school attendance, performance and dropouts among school going children.
- This research study majored on children at school and investigated only school factors that affect children's participation while at school. Since these children were not boarders, there is need to carry out another study on the home factors that might be affecting children's school attendance, participation and performance.
- Studies on jigger infestation need to be carried out in other parts of the country to determine whether the same results will be observed. There is also need to find out the causes, effects, and preventive measures of the jigger parasite both at school and at home where the children come from.

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APPENDICES

APPENDIX I

QUESTIONNAIRE FOR TEACHERS

This questionnaire is aimed at gathering information about "The jigger parasite and its effects on children participation at school". You are requested to answer all the questions honestly. You response below will be of great assistance to this study. The information you will give will be treated with confidentiality.

Please tick (√) in the appropriate box or fill as appropriate.

SECTION 1

1. Name of school.....
2. Position in school (Headteacher/classteacher/teacher).....
3. The class you are in charge of (Pre-school, Std 1 Std 2 and Std 3)

SECTION 2

1. The statements listed below describe the relationship between jigger infestation and various aspects related to schooling for children. There is no right or wrong answer. You are asked to express your feelings about each statement by indicating whether you (A) Strongly agree, (B) Agree (c) Disagree, or Strongly Disagree. Please indicate your opinion by marking the column which corresponds to the alternative which best describes your knowledge of the question. Please respond to every item.

a) Jigger infection and rate of school attendance

	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
1. Jigger infection affects the rate of school attendance				
2. Children who are infested with jiggers absentee themselves from school more than those who are infested.				
3. Children who are not infested with jiggers absentee themselves more than those who are infested.				
4. The rate of absenteeism is the same to those infested and those are not.				

b) Jigger infections and children's activity level in outdoor activities.

	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
1. Jigger infestation affects children's performance in outdoor activities				
2. Children who are not infested perform better than those who are.				
3. Children who are not infested perform worse than those who are				
4. The rate of performance in outdoor activities is the same to those who are infested and to those who are not.				

c) Jigger infection and children's performance in evaluation tests

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. Jigger infection affects performance in evaluation tests.				
2. Children that are infested with jiggers perform better than those who are not in evaluation tests				
3. Children who are not infested with jiggers perform better in evolution tests than those who are.				

d) Jiggers infestation and school dropout rate

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. Jigger infestation affects the rate at which children drop out of school.				
2. Children that are jigger infested drop out of school more than those who are not.				
3. Children that are not jigger infested drop out of school more than those who are infested.				
4. The rate of drop out is the same to those infested and to those who are not				

Thanks for your contribution.

APPENDIX II
DOCUMENT ANALYSIS

This instrument will assist the researcher in obtaining information that can be directly sourced from records of pupils as kept by the class teachers in school. It will therefore not apply to all the objectives; rather it will only assist in the objectives that relate records.

a) Jigger infestation and rate school attendance

Records source: Attendance register in custody of class teachers

total number of days in the term were 70

Subject	**No. of days child infested with jiggers was absent**	**No. of days child without jiggers was absent**	**Remarks**
1			
2			
3			
4			
5...			
Total			

b) Jigger infestation and children's performance in evaluation tests

Records source: Class performance records with individual teachers.

Subject	**Marks attained by children with jiggers**	**Marks attained by children without jiggers**	**Remarks**
1			
2			
3...			
Total			

Jigger infestation and rate of school drop out

Records sources: School attendance register

Subject	No. of children with jiggers who have dropped out	No. of children without jiggers who have dropped out	remarks
1			
2			
3			
Total			

APPENDIX III

OBSERVATION CHECKLIST

Direct observation will be carried out on pupil's participation in outdoor activities in relation to frequency and effectiveness.

Q1. Listening and paying attention to teacher's instructions

YES [ ] NO [ ]

Q2 Changing from one activity to the other

Activity	**FREQUENTLY 5min**		**MODERATELY (8-12min)**		**RARELY**	
	With jiggers	Without jiggers	With jiggers	Without jiggers	With jiggers	Without jiggers
Throwing a ball						
Catching a ball						
Skipping with a rope						
Building blocks						
Tyre rolling						
Racing with tyres						
Other activities						

APPENDIX IV: BUDGET

ITEM	UNIT	COST/UNIT	TOTAL COST
Proposal writing	20 realms	300	6000
Proposal typing	10 copies	2000	20000
Proposal printing	10 copies	2000	20000
Questionnaire typing	25 copies	100	2500
Questionnaire printing	25 copies	100	2500
Proposal binding	5 copies	100	500
Travel expenses	17 schools	5x500	42500
Thesis typing	10 copies	1500	15000
Thesis printing	10 copies	1500	15000
Thesis binding	5 copies	500	2500
TOTAL			**126,500**

APPENDIX V

WORK PLAN

TIME	**ACTIVITY**
March 2011	Defense of the proposal
April-December 2011	Proposal corrections
January 2012	Piloting and validating the instruments
February-March 2012	Data collection
March-July 2012	Data analysis
August-December 2012	Thesis writing
January 2013	Thesis corrections
March 2013	Defense of thesis
June 2013	Graduation

LIST OF SCHOOLS INCLUDED IN THE STUDY

- KIMUNYU
- KAMUNYU
- GACHIKA
- KIAWANDIGA
- KAHUGUINI
- GICHERU
- KIGANJO
- MUTOMO
- GIKURE
- MUTUNGURU
- GITWE