THE DETERMINANTS AND EXTENT OF HOME ACCIDENTS IN CHILDREN UNDER FIVE YEARS IN KISUMU DISTRICT, KENYA

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DECLARATION

I hereby declare that this thesis is my own original work and has not been presented for a degree in any other university.

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DEDICATION

This work is dedicated to:

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ABBREVIATIONS

CRC	Child resistant closure.
INSERM (French)	Institut National de la Santé et de la Recherche Medicale. …..(The French National Institute of Health and Medical Research).
MCH	Maternal and Child Health.
TBSA	Total body surface area.
BSA	Body surface area.
WHO	World Health Organization.
RTA	Road Traffic Accidents.
NEISS	National Electronic Injury Surveillance System (America).
n	Sample size
SD	Standard Deviation

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EXECUTIVE SUMMARY

A cross sectional survey was carried out in Kisumu Municipality, Kenya to measure the extent and determinants of Home Accidents in 1465 children under the age of five years who were obtained from a total of 774 households. The objectives of the study were:

a) To determine the prevalence of Home Accidents in children under five years, and the extent of the injuries resulting from these accidents with emphasis on the three most common ones; namely burns, poisoning and falls.

b) To determine and compare the socio-demographic and environmental determinants of accidents in these children.

c) To determine the types of injury, severity of injury, the immediate intervention and the outcome status of the victim following the occurrence at home, of an accident.

d) To identify and recommend preventive measures that are feasible within the household and its environment aimed at reducing the 0-5 years morbidity and mortality due to accidents.

The sample was obtained randomly using multistage sampling procedure and the data was collected over a period of one month from the sampled clusters (villages and town estates). The child under five was the sampling unit. The main tool of the study was a semi structured questionnaire administered by trained enumerators, fluent in the local dialect (Dholuo), Kiswahili and English. Data analysis was done using the SPSSPC computer program.

The study sample was found to have a male:female ratio of 1:1.04 and a population distribution not different from the national one. Judging from the parents education and

occupation status, as well as the housing, they were mainly of low to middle socio-economic standing. Mothers were leading (80%) as the caretakers of children. The main caretaker other than parents was the maid (11%), followed by the grandparents (4%). The maids were of primary level of education and mainly aged 13-18 years.

This was a predominantly urban (63%) population, 22% were in the peri-urban and slum areas while 15% were in the rural area.

Observation of risk factors, revealed that 59% of households used unprotected or open fire places; 58.1% homes had children under five years playing without routinely being supervised; 29.4% homes had custody of medicines and potentially harmful chemicals within easy reach of the children; Sharp instruments were within easy reach of the children in 36.1% of the homes; litter was scattered around the compound in 31% of homes; 36.6% of the households were assessed as crowded and only 15% had homes being used as work place such as workshops. These risks pose unknown danger and contribute to the occurrence of accidents such as burns and scalds, poisoning, falls, and others.

A total of 456 children were reported to have suffered accidents within one year giving a prevalence rate of 32.1%. The most commonly occurring accident was due to falls (42%), followed by burns (31%), and poisoning (10%). The other accidents such as cuts, drowning and suffocation altogether formed 17%. About half of the injuries were of moderate severity while 32% were mild and 18% severe. The severe injuries were contributed to mainly by burns/scalds and falls in equal proportion and totalling 80%. The other 20% were due to

poisoning and other accidents.

Of all the accidents, mothers thought that 55% were preventable, 34%, not preventable while 11% did not know.

The most important factors significantly associated with accidents occurrence were: the age of a child; gender or sex was not found to predict one's risk of getting an accident (33.6% and 30.8% for boys and girls respectively).

The none educated mothers, unemployed mothers and the house wives were associated with lowest accident rates (29%) because they took direct care of their children as compared to the mothers with secondary or higher education who were more likely to leave their children in other people's hands when they went to work in formal or professional jobs (35%).

The leading accident rates were found in those staying in semi-permanent houses, and in those staying in peri-urban and slum areas (42%) as compared to the urban (32%) and the rural with 22% ($p=0.0000$). Accidents occurring within the house structure predominated (51%), whereas those occurring in the compound were 49%. The kitchen was found to be the place of accidents for the majority of accidents mainly burns (50%) and poisoning (39%). It was found that the accident rates were slightly higher in those homes with observed risks as open fire places and where children played without supervision although this was not statistically significant. Most of the accidents were found in households using hurricane lamps (55%) and the open flame lamp (30%). The highest accident occurrence

rates were observed in those using firewood (35%), then those using gas (33%), charcoal (32.5%), lastly kerosene (28%) and electricity (28%).

The course of action following accidents was found to be appropriate as 88% of them were acted upon within two hours (or 30 minutes in the case of poisoning). Of all the accidents, 25.5% resulted in admissions to health care institutions; 38.5% treated as out-patients; 31.5% were given home remedy; 2.5% were given other treatments such as prayers; and 2% were not acted upon. Most of the admissions were due to burns and scalds (46%), then falls formed 21%; and lastly poisoning (15%).

It was noted that of the accidents that led to admissions and outpatient treatments, burns/scalds and falls were the leading; those that were treated as out patients, burns were still leading together with poisoning. This shows the seriousness of these accidents as compared to falls which are leading in the treatments given at home and those that were not treated at all. It then follows that poisoning, burns and scalds have the most implications on the health system in general. These were all statistically significant findings.

The outcome of injuries due to home accidents was satisfactory. Many (85.7%) resulted in recovery; while 12.2% had residual damages and chronic problems and 2% resulted in death.

Burns and scalds and falls contributed the most to residual damages and scarring. These meant a certain amount of chronic problems and therefore additional burden after the

initial recovery or partial recovery.

The deaths occurred due to poisoning (67%) and falls (11%) and others (22%). The highest fatality rate was found in the category of poisoning (13%); followed by others (accidents other than burns and scalds, poisoning and falls) (5%); and falls (0.5%). There were no deaths reported with burns.

From this research it is recommended that more commitment and research is still needed in Kenya in the area of accidents prevention and particularly on the specific contributory factors. In order to curb childhood accident mortality and morbidity therefore, children should be given more supervision which is age specific and appropriate as well as be encouraged to play out of the house in deliberately made safer environment and specifically not be allowed in the kitchen. There should also be laws that ensure protection of fireplaces, safe keeping of medicines and harmful substances, which can be monitored by health workers at the grassroots level, advocacy for repeated education of caretakers such as maids and accident prevention programs with active parental participation.

CHAPTER ONE

INTRODUCTION

INTRODUCTION

1.1 GENERAL INTRODUCTION

There are a number of factors that give accidents a prominent position among public health problems. Analysis shows that there are few countries where accidents do not appear among the five leading causes of death. In the american region in particular, accidents are among the five leading causes of death in all countries, whatever their level of development[1].

The consequences for health are tremendous and greatly underestimated by the public and even by the top-level decision-makers. Indeed, accidents are a major cause of demands on the health system, whether at the primary health care level or at the hospital level. On average in the industrialized countries, and also in many developing countries, one hospital bed in ten is occupied by an accident victim[1].

Accidents as a public health problem have been ignored world-wide as far as allocation of funds is concerned. This can be seen in the USA (United States of America) where although accidents are responsible for the loss of more years of productive life (YPL) than cardiovascular diseases and cancers together, federal expenditure on accident research is only one-tenth of the research expenditure on cancer and less than one-fifth of research expenditure on diseases of the circulatory system[2]. Contrary to many preconceived ideas, accidents and their sequelae can be prevented if approached practically.

Accidents are responsible for significant mortality among young people. Moreover there

is excess male mortality from accidents, a characteristic that appears right from the first year of life[2]. Accidents also often cause disability.

In the public welfare hospitals in Paris for example, road accidents, occupational accidents, domestic and sports accidents and suicides or other forms of physical violence are responsible for over 10% of all admissions of children, and injuries represent the third most common cause of admission, immediately after infectious diseases and malformations[3].

Despite the amount of theoretical knowledge about the circumstances in which the accidents occur as well as on the precautions that should be taken in order to reduce the risk knowledge is still lacking on how much should be done towards accidents. There is also lack of prioritisation of the real problems. The result is that nothing has been done, especially in the developing countries, by way of deliberate plans to reduce home accidents in children.

WHO (World Health Organisation) has recognized this need and indeed is participating actively in promoting specific research on accidents as well as the formation of programs such as the injury prevention program. The Child/Adolescent component of the WHO's Injury Prevention Program has two main objectives;

- To promote epidemiological research on accidents in young people, particularly where such research is negligible, in order to collect sufficient information on the nature and the extent of the problem to establish prevention policies.

- To evaluate these policies periodically and make the evaluations available to the member states of WHO so as to provide them with useful information on various national experiences and thus assist them in formulating their own policy and defining their priorities.

The socio-economic cost of the problem must also be taken into account when determining priorities. Accidents are expensive, certainly much more expensive than their prevention, even though the cost of prevention is greatly underestimated. But a large number of preventive and educational activities have been developed in various parts of the world without ever being evaluated, and it is to be feared that much money has been spent in programmes of doubtful efficacy[4].

CHAPTER TWO

LITERATURE REVIEW

LITERATURE REVIEW

2.1. HOME ACCIDENTS IN GENERAL

The problem of accidents in children and adolescents has been documented by WHO in fifty countries including some developing countries unfortunately Kenya was not included. In Egypt, among boys 5-14 years old, accidents accounted for 7.6% of all deaths from 1975-1979[5].

In a WHO study, accidents were found to be the leading cause of death in different age groups with different frequencies in various developing countries: In the 1-4 years age-group, it was found to be the leading cause of death in two developing countries; In the 5-9 years age-group, it was leading in seven out of eight countries; In 10-14 years in 6 out of 9 countries[6].

Rivara FP reviewed the recent literature on childhood injuries using a conceptual framework for injury prevention and loss reduction. The framework applies the epidemiologic factors of host, agent, and environment to the study of the events leading to an injury and the injury itself. The role of energy transfer as the etiologic agent for injury was examined. He found that there is a need for further research involving the characteristics of the host, identification and modification of injury vectors, and changes in both the physical and sociocultural environments[7].

In an attempt to test the assumption that health education directed at parents and children can reduce childhood accidents, a controlled study was carried out in Ely , one area of

Cardiff, using conventional health education techniques, the campaign was carried out in June and July 1981 and monitored by the numbers of injured children attending the local Accident and Emergency Department. Comparison of accident numbers in Ely between 1980 and 1981 and between Ely and the whole of Cardiff in 1981 showed no significant change. A slight increase in trivial injuries suggested an increased willingness to attend hospital. There was no change in the age distribution of victims. The benefits of health education and alternative methods of accident prevention are discussed and the need for further research is emphasized[8].

The following are the results of a controlled clinical trial conducted to evaluate the implementation of a health education program intended to reduce the risk of childhood household injuries. The study population was randomly assigned into two demographically comparable groups. Only the experimental group mothers received an educational intervention consisting of a tutorial, home safety-proofing assignments, and follow-up. The homes of the two groups were later assessed for hazards during an unannounced visit by an interviewer who did not know to which group each home belonged. A home safety score mean for the two groups was almost identical. The program stimulated heightened interest and stated intent to improve, but did not result in actual reduction of household hazards. Active health education, as used and evaluated in this study, appears to have limited effectiveness when applied to home safety. Approaches such as "passive" measures may offer greater potential for household injury reduction. Injuries claim the lives of more children each year than the next six leading paediatric disorders combined, and produce injuries that require medical attention for one in three

children. In the pre-school age group, 91 per cent of these accidents and over one-half the resultant fatalities occur in the home[9].

There was a case control study done where parents of 171 children coming to the Yale-New Haven Hospital Primary Care Centre for their 6-month check-up were randomised into an intervention group and a control group. Parents in the intervention group received a three-part individualised course in child safety that required active parental participation. Parts 1, 2, and 3 were given at the 6-month, 9-month, and 12-month well-child visits, respectively. Parents in the control group received routine safety education as provided at well-child visits. A total of 109 home visits (55 for the intervention group and 54 for the control group) were made out of the families who completed the educational phase of the study. Safety knowledge, number of hazards in the home, and reported accidents were assessed by a "blinded" community health worker approximately 1 month after the 12-month well-child visit: Parental safety knowledge was assessed based upon pictorial hazard recognition. Of 13 possible hazards, the mean number of hazards recognised by the intervention group parents was 9.4 versus 8.4 by the control group parents. A hazard score was determined for each family based on nine possible hazards observed at the home visit. The mean hazard score for the intervention group was 2.4 versus 3.0 for the control group. Parentally reported accidents and accidents reported in hospital records were similar for both groups. Results of this study suggest that age-appropriate safety education that is repetitive and individualised and that requires active parental participation results in an increase in parental knowledge and an improvement in certain safety practices[10].

In a different study, the causes of serious domestic scald injuries in Birmingham were studied for one year. Seventy-eight people sustained such scalds, 11 adults and 67 children. Only 51 of the patients received satisfactory first aid. Most accidents could have been avoided and the severity of the injury would have been less if appropriate first aid had been given[11].

Another survey which was a prospective one, was carried out over a three month period to assess the incidence of accidental poisoning in children. The survey also examined the role of child resistant closures (CRC) and other form of packaging in the prevention of poisoning. Two hundred and six children with suspected poisoning attended the casualty departments of the three Dublin children's hospitals surveyed. Ninety three percent of the children were less than five years old. Medications were thought to have been ingested by 65%, household or gardening products by 34% and plants by 1%. Most children had no symptoms and received no treatment except emesis or oral fluid and demulcents. Twenty five percent required admission to hospital. There were no fatalities during the study period. Only 8.5% of the medications involved had been in containers with CRC's. Twenty percent were in blister packs or strips. A substantial number of poisonings occurred at a time when medicines were not in their normal place although in most cases they were still in the original container. The author proposed a two-phase approach to poisoning prevention, more widespread use of CRC's and public education on safe storage of medicines[12].

More than 153,000 Americans die annually as a result of accidental injuries-nearly half of

them from motor vehicle accidents, the rest from falls, burns, poisoning, and other causes. Injuries are the leading cause of death between ages 1 and 44, and account for approximately 55 percent of fatalities for those aged 15 to 24. Further, it is estimated that in 1979, 70 million people suffered non-fatal accidental injuries requiring medical treatment. In 1980, the damage, injury, and lost productivity resulting from accidents cost the Nation an estimated +83.2 billion. Accident victims are not distributed evenly throughout the population. Teenagers and young adults have the highest motor vehicle death rate; fatal falls, which occur primarily in the home, disproportionately affect the population aged 75 and over; and children 10 years and younger are a high risk population for burns. Accident prevention programs should be based on epidemiological documentation of injury problem areas at the State and local levels. Prevention measures include public education, skill development, safety engineering, environmental modification, legislation, regulation, and enforcement[13].

An Asian study describes the statistical analysis of 629 burn patients treated between January 1989 and August 1990. The analysed data include age, sex, cause of burn and mortality in relation to age, cause and extent of burn injuries. Additional information with regard to socio-economic status, marital status, place of burn, family size, type of burn, time of accident and time between injury and hospital admission was obtained from analysis of 271 of the 629 patients admitted between January 1990 and August 1990. In this series, adolescent and young adults (11-40 years) comprised 64.8 per cent of the patients. Males formed 54 per cent and females 46 per cent of the total burns. 82.65 per cent of the patients received their burns at home. Most of the patients belonged to the low

or lower middle socio-economic strata and had large families. 95.5 per cent of the burns were accidental in nature. Flame burns comprised 67.9% and scalds comprised 16.4% of the total burns. The overall mortality rate was 48.3%. The mortality rate was comparatively low in children (20.1%). Flame burns resulted in maximum deaths (62.1%). In patients with over 40 per cent burns, the mortality was about 80%. There were no survivors in patients with over 70% TBSA burns in the series[14].

Bunk beds are commonly used in American households, but no studies have been done to determine if they are safe. Selbst S.M. et al, prospectively studied the incidence, epidemiology, and outcome of injuries related to bunk beds. They interviewed all patients with such injuries who presented to the emergency department between February 1987 and February 1988. A control group of children who use bunk beds but who came to the emergency department for another reason were also interviewed. There were 68 injured children and 54 controls during the 1-year study period. There were 47 injured children (70% of this group) and 26 control children (48% of this group) younger than 6 years, which is below the age recommended by the Consumer Product Safety Commission for bunk bed use. Carpeted floors were significantly more common in the control group, 67% (36 children) versus 42% (26 children). Injuries occurred most often when the child fell from the top bed (38 children [58%]), fell off the ladder (7 children [11%]), or fell off the bottom bed (8 children [12%]). Injuries occurred during sleep (19 children [29%]), getting in or out of the bunk bed (13 children [20%]), or playing in or near the beds (28 children [43%]). Of those injured while asleep, 13 of 19 children were younger than 6 years. Head injuries accounted for half the trauma (35 children [52%]), and extremities were involved

in 16 patients [24%]. The most common injuries were lacerations (27 children [40%]) and contusions (19 children [28%]), but 8 children (12%) had concussions and 7 children (10%) had fractures. Six children (9%) required admission to the hospital. Head and face injuries were significantly more likely if the top bed had no side rails. These data suggest injuries could be prevented if side rails were mandatory for all top beds, young children were not permitted to sleep in bunk beds, and all children were encouraged not to use the beds for play[15].

Inadvertent aspiration or ingestion of products in children is a reportable problem. The National Electronic Injury Surveillance System (NEISS) in America, monitors 119 hospitals for product (nonfood) hazards through a network of emergency room physicians. Coins (52%) remain the most frequently ingested object (1988-1989). Pins, including nails and bolts, are second in rank. Spheres (e.g., balls) are the most common cause of death. Most deaths (97%) occur in the home. Younger children (13.4 versus 22.7 months) are more at risk for death. This analysis suggests that shape, as well as availability, is important in children's injuries and deaths. Accurate reporting to NEISS of all aspirated objects remains essential so that product safety and the public's health can be improved. Food product injuries, however, are not reported to NEISS[16].

The primary audience of poison prevention programs is the parent(s) of children less than 6 years of age. Literature review reveals few references assessing other caretakers as risk factors in childhood poisoning. The frequency and severity of calls to the poison centre by nonparental caretakers was studied. A total of 4,205 poisoning cases involving children

under 6 years of age were analyzed. In 11.9% of the cases the caretaker at the time of exposure was someone other than the parents and the site of the exposure was other than the child's home. Of the 3,702 cases where the exposure occurred while the child was supervised by the parents in their home, 90.2% were treated in the home and 72.4% required dilution only. Grandparents represented 39.6% of caretakers other than the parents. In these cases 44.6% required treatment beyond dilution, indicating more serious exposures in this group. Ingestion of cardiovascular drugs occurred in 12.3% of calls from grandparents as opposed to 0.7% of calls initiated by parents. Poisoning exposures involving children under six years of age, where the caretaker is other than the parents, and the site is other than the child's home, are often more serious. Poison prevention information programs are needed to reduce the risk factors among this group[17].

In order to know the importance and epidemiology of childhood accidents, a prospective study was made in a Spanish region. Subsequently, the information was coded and analyzed at the Murcia University. This study was founded in death certificates and 3,344 questionnaires from children under 7 years old, accidented in 1986 and attended in emergency departments in that region. Accidents were the main cause of death in children aged over one year, and a common cause of consultation in emergency departments. Its characteristics are common to most countries, but the author found some differences in that region. He also recommended more effort in the study and prevention of childhood accidents[18].

Among calls put through to the Mobile Emergency Unit of a Paris urban area district for a

paediatric problem over a five-year period (n = 630), 19% were for a household injury (with or without physical injury) and 22% (n = 712) were for a physical injury outside the home. Thus, injuries were the reason for over 40% of paediatric calls and half of these injuries occurred in the child's home. Household injuries were serious, with a pre-hospital mortality rate of nearly 5% and intensive care treatment in one-third of cases. Fifty-five per cent (60% in boys) of household injuries occurred in pre-school-age children. Half these injuries (burns excluded) were physical injuries (66% in boys). Forty per cent of household injuries (n = 251) were caused by a fall, from over one meter in half the cases. Most of these injuries occurred around meal times (75% of the cases). As compared with out-of-home childhood injuries, pre-hospital mortality rate was significantly higher and single injuries significantly more prevalent in household physical injuries. Prevalence of lesions of the face, head and neck, chest and abdomen, and pelvis were comparable for out-of-home and at-home physical injuries; conversely, lesions of the upper limbs were more common in household injuries, whereas lesions of the lower limbs were more prevalent in out-of-home trauma. Lastly, household physical injuries occurred mainly in children under five, whereas out-of-home childhood injuries were more common after five years of age[19].

In Sweden, a total of 1,590 product-related accidents in the home in children (0-15 years), presented at two hospitals, were registered in a well defined geographical area to analyse injury mechanisms, injury panorama and potential risk products. This was done over a one year period prospectively . The incidence of accidents in children was 279 per 10,000 inhabitants per year. A tendency of a smaller incidence with age and a significant higher

incidence in boys were found. The most common localisation of lesion was the upper extremities (41%) and face and skull (30%). Household furniture and constructional features of the house caused most accidents and an alarming high number of burns were registered[20].

Sweden has the lowest childhood injury rate of any country in the world due to a combination of factors including the special characteristics of Swedish society and an energetic 35-year campaign. Contributing societal characteristics are a small, relatively homogenous, health conscious, law-abiding population that values children. Key factors in the campaign have been support of trauma surveillance systems and injury prevention research, ensuring safer environments and products through legislation and regulation, and a broad-based safety education campaign using coalitions of existing groups and a strong factor of community participation. Emulating the strategies used in the Swedish campaign would markedly reduce the number of children killed, injured, and disabled from trauma[21].

Five hundred and eighty-three children (0-18 years old), consisting of 33.4 per cent of all burn inpatients, were admitted to the University of Alberta Hospitals over an 11-year period (January 1978 to December 1988). Demographic and outcome variables, in addition to aetiological factors, were examined. 48.4 per cent of burns occurred in children less than 4 years of age, with males predominating in every age group. Children had smaller burns, a higher incidence of scalds, less inhalation injuries and a lower mortality compared to adult burn patients admitted over the same time period. There was

a low incidence of confirmed child abuse by burns (1.4 per cent). High-risk environments identified were the home (74.6 per cent of burns) and recreational settings (12.4 per cent of burns), mainly occurring around campfires. Native children were overrepresented in the burn population compared to the general population by a factor of approximately 10:1. Scald prevention, high-risk environments (home and recreational), high-risk populations (male and natives) and unsafe practices with flammable liquids (petrol in particular) should be emphasized in paediatric burn prevention programmes[22].

A prospective study of 394 burned children (in-patients) up to the age of 12 years old was carried out for the period from January 1984 to December 1986. They were categorized into three age groups, the infants and toddlers 0-2 years, early childhood 3-6 years and late childhood 7-12 years. In the first two groups scalding was the predominant cause of injury, while in late childhood there were many more flame burns. Ninety-five per cent of the accidents occurred at home and the majority happened in the presence of parents. The presence of parents was not a deterrent to the accident but ensured speedy transport to the hospital. In this review 3 per cent of patients sustained more than 50 per cent BSA burns, there were 12 deaths with a mortality rate of 3 per cent. An intense campaign to make parents aware of the risk factors and their avoidance is required to reduce the number of burn accidents[23].

In a study done in North Staffordshire, in the U.K, sixty-nine children aged under 15 years were identified from coroners' records as having died as a result of an accident between 1980 and 1989. Road traffic accidents (RTAs) accounted for the majority of cases (n = 38; 55% of total) and in almost all of these, the unsafe behaviour of the child was

considered to be at fault. Most fatal accidents occurred between 15.00 and 21.00 hrs and within 2 km of the child's home; the majority of children killed were not supervised by an adult at the time of the accident. Considerable variation in mortality within the district was observed with several areas having a rate significantly higher than the district as a whole. Head injury was the most commonly recorded cause of death (n = 37, 53%) confirming the importance of head injury as a cause of childhood mortality. Road safety educational and engineering measures as well as adequate adult supervision and awareness could have prevented the vast majority of these accidental deaths. Coroners records are a vital and often poorly utilized source of locally relevant information regarding childhood accidents which should be of use to all interested agencies including child accident prevention groups[24].

Within a population-based register of childhood injuries(in a another study in Britain), 641 home accidents to children aged under 2 years were recorded in six hospitals. The annual rate was higher in children over 1 year (6.6 per 100) than infants (2.7 per 100). A male predominance was observed only after the first birthday. Most injuries were related to physical trauma (mainly falls), but burns and poisonings were frequent in the second year. Most lesions were benign, except in the case of falls from a height (from a window or baby furniture). Nineteen per cent of the children were admitted to hospital. There were 15 skull fractures, two fatal cases and two severe sequelae. Child abuse was seldom suspected and the reasons for this are discussed. The study of the circumstances in which accidents occur leads to the conclusion that the main aspect of prevention should be passive protection ensured by the creation of a safe environment (compulsory safety

standards for baby furniture, child resistant packaging), but that parents' information and education should also be developed, with emphasis on knowledge of children's normal psychological and motor development and abilities[25].

In Britain, a study was done in an effort to prevent childhood injuries, whereby the Hennepin County Burn Centre began a joint venture with a public health agency to reduce home hazards for children less than 6 years of age who were treated at the burn centre. Children were referred to a public health nurse for a home safety assessment. During the initial visit, child hazards were identified and recommendations were made for reducing injury risk. Parental compliance with recommendations was evaluated during a second home visit approximately 1 month later. Home safety assessments were completed in 21 homes, and a total of 131 recommendations were made, Burn prevention recommendations accounted for 43.5% of the total recommendations, poison control recommendations accounted for 36.6%, and other injury control recommendations accounted for 19.9%. Parents complied with 43.5% of the total 131 recommendations. Burn prevention recommendations had a compliance rate of 19%. The program had a positive effect on reducing home hazards. It was an appropriate response by practitioners already involved in the care of children, many of whom are at risk of injury[26].

2.2. HOME ACCIDENTS IN DEVELOPING COUNTRIES

It was long believed, and is still believed by some, that accidents occur only in developed countries, being the price that has to be paid for industrialisation, technology, urbanization, and motorization. On the contrary, in the developing countries, accidents are perhaps just as common, and their consequences are even more serious making the accident mortality higher in the developing countries. This is due to the differences in living conditions i.e. rural settings, where there are many dangers associated with an ill-controlled and frequently hostile environment, in addition to the greater difficulty in obtaining good medical treatment. These dangers include, unprotected and uncontrolled dumping of chemical wastes, solid wastes (such as broken bottles, sharp metals among other things), uncovered holes, thorns, trees to climb and so on. The health care system is inadequate, thus morbidity is prolonged and mortality increased.

This phenomenon applies similarly in the rapidly expanding slum areas within which the so called urban poor live. They are particularly threatened by inadequacy of social services, poor environmental sanitation, poor housing and overcrowding.

In a study done in Marigat, Baringo district, Kenya, Oloo found an incidence rate of 7.04% in the under 20 years age-group. This same study showed that burns and scalds from fire and boiling fluids e.g. open fire, water, porridge, tea, fat and oil; poisoning from kerosene, medicines, chemicals; falls from pit latrines, ditches and play grounds form some of the most common injuries among young children. Others are thorn pricks, insect, snake, or animal bites. In this Baringo study, 58.6% of the accidents occurred at home

and 41.4% outside the home. It was found that the commonest injuries were falls (27%) followed by burns (26.1%), and that most of these were in the 0-5 years age-group. Of the accident victims, only 45% attended health facilities, 88% of them were treated with or without follow up and 6% of them had no treatment. 81% of the victims recovered completely without any residual disability and, deformities were caused by accidents due to falls, snake-bites and burns (extensive scars). Others suffered chronicity e.g. chronic ulcers from thorn pricks[27].

In a study done in MCH rural centre of Kombole in Senegal, in 1978 by Sonakho, 88% of the accidents occurred at home and, 33% attended health facilities and 20% of the accident victims were found to have residual disability in the form of lasting physical damage[28].

In Turkey Bertan and Muftir found an incidence of 21.6% overall in those under 15 years and a fatality rate of 6/1000 was found [28].

CHAPTER THREE

RESEARCH PROBLEM

RESEARCH PROBLEM

Accidents are a common cause of illness, loss of life or disabilities. Government Health information statistics support this observation and show that children are commonly involved. It is also not uncommon to read in our local news about children who have perished in various forms of home accidents. The current attitude is fatalistic, regarding such events as inevitable and disregarding the role of people in accident prevention, and the fact that most accidents are preventable.

In spite of increasing numbers of injuries, disabilities, and deaths caused by accidents, there is scanty information on the involvement of persons by age and sex-groups, the place of occurrence and, the outcome particularly among children.

Accidents have been found to account for about half of all deaths in the 10-19 years age group and have left many maimed and disabled[29]. Physical environments, exposure to hazards and psychosocial stresses including overt child abuse also explain why some children have recurrent injuries[30].

The Daily Nation newspapers revealed that by the end of one year, approximately eighty children are reported in the news to have died following house fire accidents, and other shocking and mostly preventable incidents . Fewer numbers are reported to have perished in the accidents such as injury due to falls, poisoning, drowning, suffocation, animal or snake bites and so on[31]. It is to be remembered that there is some degree of under-reporting due to a variety of reasons and therefore these records cannot be used for

scientific purposes but as a general overview of the extent of the problem.

The information obtained from New Nyanza Provincial General hospital is non specific and not very helpful due to the fact that patients presenting to the hospital with any form of accidents are lumped together and neither the age nor age-groups as well as types are indicated. There is also the inability to access to all the records on accidents in children under five due to the data omitted by some of the health staff when managing the patients. This makes analysis very shallow. The closest analysis showed that within a period of 3 months, about 24 children under five were admitted with various forms of accidents 3 of which were victims of RTA (Road Traffic Accident)[32].

However, in the Kisumu district hospital, analysis showed that the number of children under five years admitted with burns poisoning and falls with injuries in the months of April, May, June and July in 1992, were approximately 40. In the same period, 19 children under five were treated in the outpatient department with burns. This does not give the whole picture of the problem because other hospitals and health centres as well as clinics do not keep any useful records.

The available records showed that most of children who suffered the accidental injuries e.g. burns, were left in the house alone when their parents went to fetch either water, firewood or other commodities. Others were playing alone in the compound e.g climbing trees when they fell and got fractured bones.

Whatever the type of injury, the final severity, would to a substantial extent, be determined by the speed and the efficiency of the treatment. The children get extensive injuries and scaring especially from burns. Other forms of accidents result in disfigurement and gross disability. The cost of treatment is also a great burden to these families.

There are many cases that do not reach the health centres because they are treated at the primary level, some of which should not have reached health centres end up doing so due to complications resulting from inappropriate treatment.

Death rate due to accidents is just a tip of the iceberg, as for every accidental death there are several accidental injuries. Most of these are slight but requiring action by health services, some are severe and likely to leave permanent after-effects. One child in every 5 to 10 sustains an accidental injury each year[33].

3.1. JUSTIFICATION OF THE STUDY

Children are less able than adults to recognize hazardous environments and negotiate risks. This could be due to their underdeveloped reasoning and psychomotor systems combined with the fact that they are also curious, exploring and, testing their skills. The under five years age-group are particularly a priority group as they are the most at risk.

Children in the 0-5 years age-group spend most of their time around their homes and

therefore this is where most injuries would take place, as compared to the older children who go to school, play further away from home and engage in several out-of-home activities[25].

In view of the foregoing, there is evidently a need to prevent home accidents as it has been well observed that one aspect that singles them out is that many of them are preventable by individuals through simple changes in behaviour which, according to Bull's studies, may be inculcated in places such as school, and promotion of use of safety equipment[34]. Methods of prevention of home accidents or domestic injuries follow logically from knowledge of their cause.

Approaches to accident prevention fall into three categories:

a) Education which involves the increase in knowledge of the problem and its solution, a change in attitude towards it and an actual change in behaviour,
b) Engineering, the design, manufacture and marketing of safer products and the design and planning of the environment in which they are used;
c) Enforcement, the role of legislation, regulations and standards in accidents prevention.

Accidental injury is one of the most important epidemics in the whole world today, and is especially important as a cause of death and disability in childhood. Many environmental factors are important causes of accidents, but there is no organisation within which health personnel, industries and voluntary agencies, can pool their experience and co-ordinate their efforts to reduce these environmental risks. A joint committee on childhood

accident prevention should be formed in this country similar to that which exists in Sweden[26].

This study aims at establishing some facts about home accidents as a public health problem and to advocate for safe environment and promotion of education for prevention and intervention in the occurrence of home accidents in the community. It should also contribute towards formulation of specific and appropriate as well as feasible control programmes for our Kenyan set-up. The best form of accidents control is the preventative approach and there is need for most people to discard the popular beliefs and myths that accidents are inevitable and are an act of God or witchcraft[23].

With the changing cultural and socio-economic trends, women who have been at most home managers, are gradually taking multiple roles in their families, either busy in the farm or are employed in other jobs to supplement the family income. This then leaves the children without the optimum parental care hence they become more likely to have accidents especially within the more disadvantaged groups such as the urban poor community who have poor housing and sanitation among other socio-economic problems.

3.2 BROAD OBJECTIVE

To find out the extent and determinants of the common home accidents in children under five years of age and identify the possible preventive measures against these accidents.

3.2.1 SPECIFIC OBJECTIVES

1. To determine the prevalence of injuries due to home accidents with emphasis on the three most common ones i.e. burns, poisoning and, falls in the under fives.
2. To determine and compare the socio-demographic, environmental health circumstances of home accidents in children under five years.
3. To determine the types of injury, severity of injury, the immediate intervention, and the outcome-status of the victim following the occurrence at home, of an accident.
4. To identify and recommend preventive measures that are feasible within the household and its environment aimed at reducing the 0-5 year. morbidity and mortality due to accidents.

3.3 STUDY HYPOTHESES

1. The prevalence of home accidents in children 0-5 years is directly related to the socio-demographic and, physical environmental safety of the home.
2. The type and severity of injury, each in itself is correlated with the socio-demographic and physical environmental safety of the home.

CHAPTER FOUR

STUDY AREA

STUDY AREA

The study was carried out in Winam Division in Kisumu Municipality, Kisumu District. This area was chosen by the investigator for the simple reasons that there is no record of a similar study having been carried out in the area which comprises a variety of socio-economic groups. The investigator had good knowledge of the area to enable easy accessibility without much difficulty.

4.1. KISUMU DISTRICT-ADMINISTRATIVE UNITS AND BOUNDARIES

Kisumu municipality is located in Winam and Maseno Divisions of Kisumu District in Nyanza Province of Kenya. Kisumu District is divided into eight administrative divisions, fifty one locations and one hundred and fifty eight sub-locations. The divisions are Winam, Maseno, Nyando/Kadibo, Muhoroni/Miwani, Lower Nyakach and Upper Nyakach. Each division is administered by a District Officer (DO), who is also the chairman of the Divisional Development Committee (DDC). The divisional headquarters are fairly accessible in terms of telecommunications and the road network *(Source: Kisumu District Development Plan 1993-1996).*

Its strategic location at the focal point of a communication network makes it the regional centre for Western Kenya as well as a provincial and district headquarters.

Kisumu District lies within longitudes 33^0 20'E and 35^0 20'E and latitudes 0^0 20'S and 0^0 50'S, and covers a total area of 2,660 sq. km., of which 567 are under water . It is the second largest of the four districts that form Nyanza Province. To the South-West is

Homa-Bay District; to the South is Kisii District; to the north East is Nandi District; to the east is Kericho District; to the North-West is Vihiga District; and finally to the West is Siaya District.

4.2. ADMINISTRATIVE DIVISIONS OF KISUMU MUNICIPALITY

Administratively, the municipality straddles Maseno and Winam Divisions. In 1971, the urban area's boundary was extended adding nearly 400 sq.km. to make a total area of 417 sq. km. of which about 157 is water and approximately 260 sq. km. is land divided into eight locations (*see table 4.1*).

Kisumu municipality is the dominant administrative, commercial and industrial centre for the region and serves a hinterland of about 31,000 sq.km. occupied by over seven million people.

Table 4.1. ADMINISTRATIVE SECTIONS OF WINAM DIVISION IN KISUMU MUNICIPALITY AND NUMBER OF HOUSE HOLDS WITHIN THE SUB-LOCATIONS.

LOCATION	Sub-location	No. H/Holds
Kajulu East	Kadero	591
	Okok	851
	Got Nyabondo	562
Kajulu West	Konya	1,531
	Wathorego	1,052
East Kisumu	Swahili (Mkendwa)	123
	Dago	710
	Kanyakwar	3,787
	Kogony	2,693
Central Kisumu	Bar	1,169
	Nyahera	1,497
	Korando	2,765
South West Kisumu	Ojola	1,109
	Kanyawegi	1,954
Township	Southern Kisumu (Milimani)	2,456
	Northern Kisumu (Kibuye)	6,632
Kolwa West	Nyalenda "B"	4,844
	Nyalenda "A"	5,958
	Manyatta "A"	9,791
	Manyatta "B"	3,986
Kolwa East	Mayenya	379
	Buoye	665
	Nyalunya	1,483
	Kasule	1,111
	Chiga	1.461
	TOTAL	59,160

4.3. HEALTH FACILITIES

Health services within the municipality are provided by the following institutions:

- Four hospitals, namely the New and Old Nyanza General Hospitals the Aga Khan Hospital and Jalaram Hospital all of which provide a full range of medical services;
- one health centre (Lumumba), which provides services to the population residing in the old town and the peri-urban areas;
- five sub-health centres (Nyambogo, Chiga, Ojola, Ober Kamoth and Migosi) whose main three dispensaries (Mosque, the Airport and Nyalenda) offer services complementary to those provided by health and sub-health centres; and
- the Town Hall clinic and a mobile clinic which provide services similar to those of dispensaries for Municipal Council staff and the population in the town centre.

While the hospitals are administered by the Government's Medical Officer of Health and private doctors, the other health facilities are operated by the Municipal council of Kisumu staff.

In general, the health facilities and services provided by Kisumu Municipality and those provided by the district are not adequate to cater for the needs of the population. The existing facilities are also being patronised by considerable numbers of people living outside the provincial and district boundaries[35].

4.4. CLIMATE

Kisumu experiences a warm to hot and generally humid climate. Mean annual maximum temperatures range from 25^0C to 30^0 and mean annual minimum ranges from 9^0C to 18^0C, resulting in a mean annual temperature of 23.1^0C for the town. Altitude varies from 1,144 meters on the Kano plains to 1,525 meters in the Maseno area and South Nyakach.

Mean annual rainfall is influenced by elevation and varies from 1,630 mm per year in Maseno and 1,525 mm per year in Kibos to 1,280 mm per year in Kisumu Town and 1,620 mm per year in Ahero. Rainfall reliability follows a generally similar pattern.

CHAPTER FIVE

METHODOLOGY OF THE STUDY

METHODOLOGY OF THE STUDY

5.1 STUDY DESIGN

This was a cross-sectional survey. The possible predictor variables and outcome variables were determined at the same time. Data was collected over a period of one month within the homes sampled as clusters of households.

5.2. STUDY POPULATION

Children under the age of five years within the municipality form the study population. According to 1989 survey the general population comprised of 229,418 of the Kisumu residents. The number of children of 0-5 years is estimated to be 20%, i.e. 45,884 children in total.

The population within the Kisumu Municipality locations comprised of a cross-section of people with different demographic and social characteristics. The majority of them however, speak the same language of Dholuo and are culturally similar.

The Kisumu District Development Plan, 1993/96, in its analysis of 1989 Population Census data, concluded that the population figures reflected a relatively stable population, rather than one characterised by high recent migration. This is may be the case in the rural parts of the municipality and the old town but the rapid growth of peri-urban squatter areas indicate the opposite.

A significant number of people from the surrounding rural areas have joined the municipal peri-urban community, either as urban informal sector workers or as urban unemployed.

5.2.1. SAMPLE SIZE

Using the statistical formula for cross-sectional studies[36] to determine the sample size (n)

$$n = \frac{P(100-P) \times f(1-\alpha)}{\delta^2}$$

Where, P= Prevalence of childhood accidents from a previous local study by Oloo[27] =10%

δ=5, f(1-α) is a function of the level of significance.

f(1-α) = 3.842 (constant from standard statistical tables).

$$\frac{10(100-10) \times 3.842}{25}$$

= 138 ≙ 140 children.

Taking into account that the number of children under five years on average is probably 2, this means that the average household number to be visited was 140/2 = 70.

5.2.2 SAMPLING PROCEDURE

The sample was obtained using multistage sampling.procedure A random listing of all the Locations and Sublocations of Winam Division was made and used to obtain the sample required *(see table 5.1).*

The next level to the administrative locations was the sub-locations. From the sublocation, the index house for the survey was chosen randomly as the kth house from the local sub-chief's house (k being any random number from one upto ten). From here

the next nearest house was then visited and the occupants interviewed accordingly until the required sample size was achieved.

The sampling frame was made of all children 0-5 years within the municipality and was obtained from all the households in the following manner.

A total of 30 clusters, were chosen proportionately and randomly from the population as follows: Since there were 59,160 households; the first cluster to be chosen was where the cumulative total of 59,160/30 = 1972, fell. In this list this was in the sublocation of Got Nyabondo (see table 5.1). Then the next one was where the total of (2x1972 = 3934) fell i.e. in Wathorego and so on. Some sublocations had 2, 3 or 5 clusters chosen from them depending on its total number of households.

Since the number of households to be visited was targeted at 700, a cluster then comprised of 700/30 = 24 households approximately or a total of 47 children under five years per cluster.

TABLE 5.1: DISTRIBUTION OF CLUSTERS BY SUBLOCATION

LOCATION	SUBLOCATION	TOTAL H/HOLDS	SAMPLED CLUSTERS	CUM. H/H
Kajulu East	Kadero	591		591
	Okok	851		1442
	Got Nyabondo	562	1	2004
Kajulu West	Konya	1,531		3535
	Wathorego	1,052	1	4587
East Kisumu	Swahili (Mkendwa)	123		4710
	Dago	710		5420
	Kanyakwar	3,787	2	9209
	Kogony	2,693	2	11900
Central Kisumu	Bar	1,169		13069
	Nyahera	1,497	1	14566
	Korando	2,765	1	17331
South West Kisumu	Ojola	1,109	1	18440
	Kanyawegi	1,954	1	20394
Township	Southern Kisumu (Milimani)	2,456	1	22850
	Northern Kisumu (Kibuye)	6,632	3	29482
Kolwa West	Nyalenda "B"	4,844	3	34326
	Nyalenda "A"	5,958	3	40284
	Manyatta "A"	9,791	5	50075
	Manyatta "B"	3,986	2	54061
Kolwa East	Mayenya	379		54440
	Buoye	665		55105
	Nyalunya	1,483	1	56588
	Kasule	1,111	1	57699
	Chiga	1,461	1	59160
	T O T A L S	59,160	30	

A household was defined as a person or persons living together and eating from the same cooking arrangement.

5.3. INCLUSION /EXCLUSION CRITERIA

5.3.1. Inclusion Criteria

Children were included in the study if they had the following characteristics:

- Age 0-5 years at the time of the accident.
- Resident within the municipality.
- Willingness of the parents/guardian to participate

5.3.2. Exclusion criteria

- If there was no consent on the part of the parents to participate in the study and also if the children were more than five years old.

5.4. ETHICAL CONSIDERATIONS

1. The research was carried out with permission from the Office of the President and that of the local authorities i.e. the District heads, Municipal head, the Locational and Sub-locational chiefs.
2. The Department of Community Health ethical committee gave the permission to proceed on with the field work once the research proposal was passed.
3. An informed consent was obtained from all respondents.
4. Children were assessed and those found with any kind of illnesses were referred for appropriate medical attention.

5. Feedback is to be given to the community under study and recommendations made through the District headquarters for subsequent action when the final report is ready.

5.5. DEFINITIONS

5.5.1. ACCIDENT

For the purposes of the study, an accident was defined as an unpremeditated event that is potentially harmful, which may be of abrupt occurrence, affecting a child, and may produce recognisable injury. In addition, the accident, may have resulted in some form of medical intervention by a member of the family. This depends on the subjective view of the seriousness of the accident, on the part of those responsible for the child, and on their level of concern, their medical knowledge and social background.

5.6 LOGISTICS

5.6.1 PREPARATIONS FOR DATA COLLECTION.

Permission for research was obtained from the Office of the President who then communicated with the D.O Winam. The preparatory visit to Kisumu at the D.O Winam's office. Once the D.O, was aware of the study, he subsequently informed the chiefs and assistant chiefs through letters. The investigator then paid visits to the relevant sublocations to meet the assistant chiefs. The assistant chiefs, who were very co-operative, then allocated the village elders as guides for the study group.

Meanwhile twelve research assistants, who were enrolled community nurses, were selected from the Nyanza Provincial General Hospital. These assistants were trained in a

three day workshop.

The research group then made a familiarisation tour to identify the boundaries in the areas under study. We made schedules and informed the guides and assistant chiefs of the days the data would be collected in the respective areas.

The questionnaire was then pretested in thirty households under the supervision of the principal investigator. This took a period of two days. Following this appropriate adjustments to the questionnaire were made and its final copies printed out for data collection.

All other requirements such as transport and stationery were also made ready and the data collected in a period of eighteen days.

5.6.2 DATA COLLECTION TECHNIQUES

The main tool of the study was a semi-structured questionnaire which was administered by enumerators fluent in Dholuo and Kiswahili as well as in the English language for ease of communication and to minimise instrumental errors. As already mentioned, the personnel were trained to administer the questionnaire which had been pretested. The mothers of the children, or their guardians (where mothers were absent), were interviewed once they consented. The interviewees were told what the study was all about and what it was aiming to achieve.

The data was collected under close supervision of the principal investigator. Every evening, discussions were held to deliberate and solve any problems as well as to clarify and correct any ambiguous, wrong and omitted entries by the research assistants.

The total time spent from preparatory visits to the local authorities, the training, pretesting of questionnaire and actual data collection was thirty days.

5.7. CONSTRAINTS ENCOUNTERED DURING THE STUDY PERIOD

5.7.1. COMPLIANCE

Few (about 3) respondents from Manyatta "A" Sublocation who became uncooperative, expressed fears that:

i) The survey endeavoured to establish the number of children they had so that they can be told to do family planning.

ii) There was a move to establish their wealth for purposes of burglary.

iii) Their husbands would not be happy with their decisions to talk to strangers. Sometimes enumerators had to go back to a household to correct the mistakes or collect data accordingly. Thanks to the *mlangos or miji kumi's* who were well known to the community.

5.7.2. ACCESSIBILITY

Kisumu Municipality besides being very hot and dusty, the survey team had to climb some hilly areas especially the Got Nyabondo, Ojola and Kanyawegi sublocations. To get to the next household meant going down a valley and up a ridge. But with determination,

the desired objectives were achieved.

5.8. APPROACHES TO ANALYSIS AND PRESENTATION OF DATA

The open-ended questions from the questionnaire were coded. Data collected was entered into the computer and cleaned for analysis using D-base program. The data was then translated to the SPSSPC+ (Statistical Package For Social Scientists) programme for analysis. The Chi-square statistical test of significance was done to assess significance of the associations. Pictorial presentations (e.g. pie charts, graphs), were made using the Lotus 123 computer software.

The circumstances surrounding home accidents that were studied during the survey were categorised as dependent or independent variables. They could also be viewed in three levels: The descriptive demographic and social characteristics that existed

(i) before the occurrence of the accidental injury;

(ii) during the occurrence of the accidental injury as well as describing the accident; and

(iii) those following the injury and hence leading to the outcome.

DEPENDENT VARIABLES:

These were those representing the extent of accidents namely;

- The occurrence of home accidents
- Prevalence of home accidents
- Type, severity and outcome of the accidents

INDEPENDENT VARIABLES:

These were representing the possible determinants of home accidents and other circumstances surrounding these accidents namely;

- Age of child
- Sex of child
- Supervision during play
- Type of caretaker - age and education level
- Parents age, education and occupation
- Place of accident
- Action taken following injury (type and time taken to act)
- Presence of risk factors in the environment such as ; Scattered litter in compound, Safe custody of medicines, chemicals and harmful objects, Use of home as work place or workshop as in carpentry and commercial fish frying, Protection of fire place (whether open or not)
- Type of cooking fuel
- Lighting system
- Type of housing (includes number of rooms, house size, persons per household and building materials)

CONFOUNDING VARIABLES:

The confounding variables which were controlled for were the Socio-demographic characteristics of parents and other caretakers namely;

Age, Sex, Education, Occupation, Residential location.

Elements of the data collected consisted of;

1. Basic demographic data from the households e.g. name, age, sex, number of siblings, birth place, (or location of origin), area of residence.
2. who is the caretaker of the child.
3. conditions of the physical environment.
4. History of any accidental injuries over the last twelve months: place of the accident; circumstances and causative agent.
5. Type and severity of accident.
6. What action was taken and type of treatment given.
7. What was the residual state or outcome of the child following the injury: Immediate sequelae and site of wounds.
8. Composition of the family: Parent(s) marital status; Parents occupation; Parents education and residential status.

CHAPTER SIX

RESULTS

RESULTS

The results presented here are as follows:

- Background characteristics of child, parents caretakers and the environment considered to be vital as **determinants** of home accidents either directly or indirectly as risk factors in the particular home set up;
- The **extent** of Home Accidents is reflected in the analysis of variables related to accidents such as the prevalence, the different types of accidents, their severity, type of action taken following accidents and, outcome status of the victims;
- Analysis of associations between variables and accident occurrence which were subsequently tested by the Chi-square and t tests of significance.

6.1. SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE STUDY SAMPLE

Out of 774 households that were visited, 1,465 children were found in the age-group 0-5 years. This therefore formed the study sample for Home Accidents in children 0-5 years. The socio-demographic characteristics of the child, parents and caretakers are presented in table 6.1.

6.1.1. CHILD'S DEMOGRAPHIC CHARACTERISTICS

The ages of the children were recorded in months and then re-grouped into five classes of one year (12 months) intervals. The mean age was found to be 28.1 months, (SD = 18.5). Table 6.1 shows the sex distribution in all the age groups.

TABLE 6.1 AGE/SEX DISTRIBUTION OF CHILDREN.

AGE IN MONTHS	SEX					
	MALE		FEMALE		TOTAL	
	n	%	n	%	n	%
0 - 11	186	12.7	180	12.3	366	25.0
12 - 23	131	8.9	168	11.5	299	20.4
24 - 35	141	9.6	121	8.3	262	17.9
36 - 47	120	8.2	121	8.3	241	16.5
48 - 60	139	9.5	158	10.8	297	20.3
TOTAL	717	48.9	748	51.1	1465	100

($\chi^2 = 6.8$ DF = 4 p = 0.15)

The highest proportion of children was found in 0-11 months age group comprising 25% of the 0-5 year olds, followed by the 12-23 months (20.4%), the 24-37 months (17.9%) and the 36 -47 months (16.5%). There was a gradual decrease in proportion of the children represented in the study sample as the age increased upto 16.5% in the 4th year (35-47months) then the 48-60 months were 20% showing a spike.

SEX DISTRIBUTION

The sex distribution of the children was as follows: 748 (51.1%) females and 717 (48.9%) males with a male:female ratio of 1:1.04 *(see table 6.1)*. There was no significant difference observed in the distribution of males and females within all the age-groups (p = 0.15).

6.1.2. PARENTS CHARACTERISTICS

The variables analysed below were: Age, educational, occupational, residential and marital status of parents.

Age

The fathers' as well as mothers' ages were recorded and summarised in age groups with 10 year intervals as in table 6.2 below.

TABLE 6.2 DISTRIBUTION OF PARENTS BY AGE.

AGE IN COMPLETE YEARS	MOTHER		FATHER	
	n	%	n	%
15-24	381	27.2	32	2.7
25-34	816	58.2	589	50.0
35-44	172	12.3	424	35.9
45-54	26	1.9	100	8.5
≥55	6	0.4	34	2.9
TOTAL	1401	100	1180	100

TABLE 6.3 SUMMARY STATISTICS ON AGE FOR THE PARENTS

	MEAN	n*	SD*	RANGE
Mothers' age (years)	28.5	1401	6.4	15 - 59
Fathers' age (years)	35.2	1180	7.9	18-74

n * = Number; SD * = Standard deviation

Most of the parents were between 25 and 34 years old. The mean age for the mothers was 28.5 years, while for the fathers was 35.2 years *(see table 6.2 & 6.3)*.

PARENTS EDUCATION LEVEL AND OCCUPATION

This information for both parents was obtained from mothers who were the main respondents. In some cases the mothers did not know the fathers occupation nor education hence the lower response observed for the fathers as compared to the mothers *(see table 6.4 & 6.5)*.

Education of parents

The education of the parents was classified in 3 groups as none, Primary , secondary and higher education *stati* as in the table 6.4.

TABLE 6.4 EDUCATION OF PARENTS

LEVEL OF EDUCATION	MOTHER		FATHER	
	n	%	n	%
None	105	7.2	36	2.6
Primary	878	60.3	548	40.1
Secondary & Higher	472	32.4	783	57.3
TOTAL	1455	100	1367	100

($\chi^2 = 284.8$ df= 4 p = 0.000)

Most of the parents had some education. The fathers were generally more educated with 57.3% of them having secondary and higher education levels as compared to the mothers (32.4%). The larger proportion (60.3%) of the mothers had primary education, and 7.12% had no education. Of the fathers, 40% had primary education while 2.6% had no education. This difference between the education of the father and that of the mother was found to be statistically significant (*See table 6.4*).

Occupation

The parents was classified in three occupation groups of Professional (e.g. Teacher, Doctor, Nurse, Lawyer, Secretary, Clerks and so on); Business, Craftsman and artisan; Housewife, Farmer or Unemployed as in table 6.5.

TABLE 6.5 OCCUPATION OF PARENTS

OCCUPATION	MOTHER		FATHER	
	n	%	n	%
Professional	140	9.7	539	39.0
Business, Craftsman, Artisan	604	41.8	706	51.0
Housewife, Farmer, Unemployed	702	48.5	138	10.0
TOTAL	1446	100	1383	100

($\chi^2 = 110.7$, df = 4, p = 0.0000)

Most of the mothers were either housewives, farmers or unemployed (48.5%) while 41.8% were in the business group. The professional mothers were only 9.7%.

The fathers were employed mainly in business, crafts or as artisans (51%). The professionals were 39.0% and the farmers or unemployed were 10%. The father's occupation was higher in category than that of the mother (*See table 6.5*) .

Marital Status of Child's Mother

Although the marital status was analysed for both parents, only the marital status of the mother is used to represent that of the parents since the marriage is a unit for both mother and father and mothers have known to be closer with their children as will also be seen below.

TABLE 6.6 MARITAL STATUS OF CHILD'S MOTHER

MARITAL STATUS	MOTHER	
	n	%
Single	43	2.9
Married	1378	94.4
Separated and/or Divorced	17	1.2
Widowed	22	1.5
TOTAL	1460	100

The majority of parents were married with 94.4% of mothers married and 99.1% fathers married. Only 2.9% of the mothers were single while single fathers were only 0.4%. Very few were either separated, widowed or divorced (*See table 6.6*).

Residential Status of Parents

The residential status of both the parents was analysed and grouped into three as, resided permanently (always lived together) with their children; Non permanent (lived separated from their children); Partly permanent (lived together with their children some of the time) as in table 6.7.

TABLE 6.7 RESIDENTIAL STATUS OF PARENTS

RESIDENTIAL STATUS	MOTHER		FATHER	
	n	%	n	%
Permanent	1211	83.6	1082	78.5
Non permanent	27	1.9	22	1.6
Partly permanent	211	14.6	274	19.9
TOTAL	1449	100	1378	100

More of the mothers (83.6%) resided permanently (always lived together) with their children as compared to the fathers (78.5%). Few (14.6% for the fathers and 19.9% for the mothers) were partly permanent (lived together some of the time) and even fewer (1.9% for the mothers and 1.6% for the fathers) were non permanent (residing separately). The two parents residential *stati* are statistically related (*See table 6.7*).

6.1.3 CARETAKER

The caretaker was defined as the person who routinely supervised the child as he or she played. The characteristics of caretaker analysed were: Category (or relationship to the child), the age and educational status.

Category of Caretaker

Mothers were the majority of caretakers (79.1%) of children, followed by the maid (10.8%), grand parents (4.0%), older children (3.0%), other relatives (1.6%), and the last in rank was the father (1.5%) *(see table 6.8).*

Age of Caretaker

For all the caretakers, the ages were recorded in three categories as, less than 13 years; 13-18 years; and above 18 years as in table 6.8.

TABLE 6.8. DISTRIBUTION OF CARETAKER BY AGE

CARETAKER OF CHILD	AGE RANGE IN YEARS			TOTAL
	< 13	13 - 18	> 18	
Father	0 (0%)	0 (0%)	21 (100%)	21 (1.5%)
Mother	0 (0%)	16 (1.5%)	1081(98.5%)	1097(79.1%)
Maid	18 (12.0%)	73 (48.7%)	59 (39.3%)	150 (10.8%)
Grand parents	0 (0%)	0 (0%)	55 (100%)	55 (4.0%)
Older children	23 (54.8%)	4 (9.5%)	15 (35.7%)	42 (3.0%)
Other relatives	5 (22.7%)	3 (13.6%)	14 (63.6%)	22 (1.6%)
All caretakers	46 (3.3%)	96 (6.9%)	1245(89.8%)	1387 (100%)

The majority of caretakers (89.8%) were over 18 years, while those in the 13 - 18 year age group were 6.9%. Persons under 13 years taking care of children formed only 3.3%.

The majority (98.5%) of the mothers as caretakers were over 18 years old. The maids were 13-18 years in most cases (48.7%), 39.3% were above 18 years while only 12% were under 13 years. For the older children (siblings), the majority were under 13 years (54.8%), 35.7% were above 18 years while 9.5% were 13-18 years. Other relatives were mainly (63.6%), followed by those under 13 years (22.7%) and 13-18 years were only 13.6%. The fathers and grandparents were all above 18 years as expected especially for grand parents *(see table 6.8)*.

Education Level of Caretakers

Information on the educational status of the caretakers were categorised in four levels and summarised in three levels as in the table 6.9.

TABLE 6.9 DISTRIBUTION OF CARETAKERS BY EDUCATION LEVEL.

CARETAKER	EDUCATION LEVEL			TOTAL
	NONE	PRIMARY	SECONDARY OR HIGHER	
Father	2 (9.5%)	5 (23.8%)	14 (66.7%)	21
Mother	68 (6.2%)	742 (67.8%)	285 (26.0%)	1095
Maid	14 (9.7%)	112 (77.8%)	18 (12.5%)	144
Grand parents	29 (61.7%)	14 (29.8%)	4 (8.5%)	47
Older children	8 (27.6%)	21 (72.4%)	0 (0%)	29
Other relatives	3 (12.5%)	10 (41.7%)	11 (45.8%)	24
All caretakers	124 (9.1%)	904 (66.5%)	332 (24.4%)	1360 (100%)

($\chi^2 = 226$, df = 10, p = 0.0000)

The table shows that most of the caretakers (66.5%) were of primary education level. This distribution pattern can be seen throughout all the caretaker categories except in the one for the fathers where most (66.7%) were of secondary or higher education levels.

The mothers who were the main caretakers of the children other than the maid or house girl were also mainly educated upto primary level (67.8%).

The majority of maids (77.8%) were educated upto primary level, 12.5% upto secondary or higher levels and 9.7% had no education at all.

The grandparents had 61.7% with no education at all, 29.8% with primary education and 8.5% with secondary or higher education.

The older children or siblings had 27.6% with no education, 72.4 % with primary education while none with secondary or higher education.

Other relatives had 12.5% of them not educated, 41.7% upto primary level and 45.8% secondary or higher level. A small proportion (<10%) in all the groups had no education at all (*see table 6.9*).

ENVIRONMENTAL CHARACTERISTICS

The characteristics considered were the main factors in the environment that play a major role in childhood accidents. These were: area of residence; type of housing; source of artificial light during darkness; source of cooking fuel; whether the fire place is protected or not; safe keeping of medicines and chemicals away from children; presence or absence of harmful objects (scattered litter) in the compound; whether home is used as a working place or workshop as in carpentry among others.

Area of Residence

The areas of residence for the children were categorized into four groups as shown in the table 6.10 below.

TABLE 6.10 AREA OF RESIDENCE

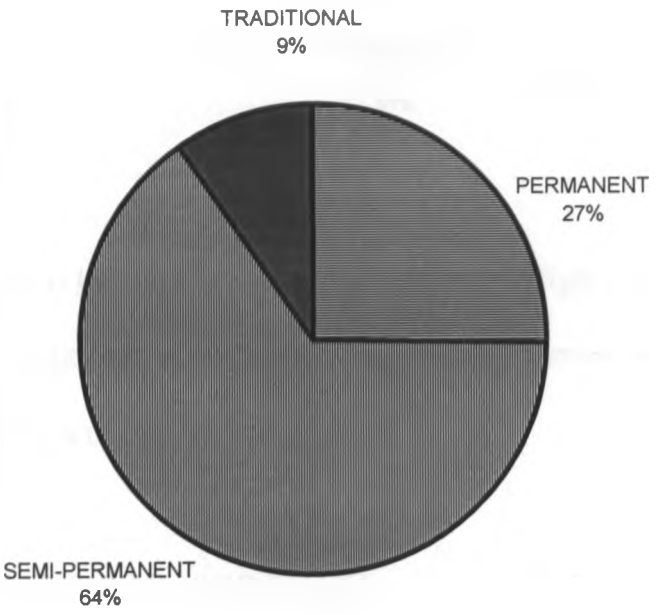
AREA OF RESIDENCE	n	%
Rural	224	15.4
Urban	913	62.9
Periurban	298	20.5
Slums	17	1.2
TOTAL	1452	100

Most of the homes (62.9%) were in the urban region, 20.5% were in the peri-urban and 15.4% in the rural. The least were the slum dwellers who formed 1.2%.

Types of Housing

The houses were classified in descending order of quality and durability of building material as permanent (stone or cemented walls and floor); semi-permanent (mud plus cemented walls and/or floor) and traditional (grass-thatched mud hut). The proportions represented by the houses are as seen in figure 1 below.

FIG: 1 TYPE OF HOUSES

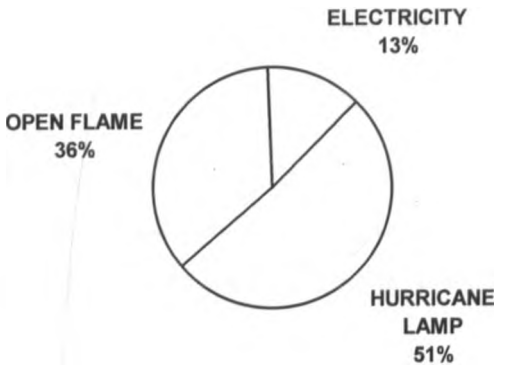


The semi-permanent houses were the majority (64%) followed by the permanent (27%) and the traditional mud hut was last (9%).

Types of Artificial Lighting

The types of artificial lighting routinely used by the respondents are as shown in figure 2.

FIG: 2 TYPE OF ARTIFICIAL LIGHTING



The hurricane lamp is the most commonly used source of light (51%) followed by the very dangerous traditional open flame lamp locally known as *Nyangile* (36%). Electricity is used by a mere 13% of the households.

TABLE 6.11 SOURCE OF COOKING FUEL

COOKING FUEL	n	%
Electric cooker	43	2.9
Gas cooker	62	4.2
Charcoal stove	819	56.0
Kerosene stove	258	17.6
Firewood	280	19.2
TOTAL	1462	100

The most frequently used source of fuel was found to be the *jiko* or charcoal stove (56%), followed by firewood (19%), kerosene stove (18%). The gas and electric

cooker together formed 7%.

RISK FACTORS IN CHILD'S HOME

The enumerators assessed the environment for presence or absence of risk factors by observation and the findings are as indicated in table 6.12

TABLE 6.12 PRESENCE OR ABSENCE OF RISK FACTORS IN THE HOME.

ENVIRONMENTAL CHARACTERISTICS (Risks)	Present		Absent	
	n	%	n	%
Open fire place (n = 1461)	865	59.2	596	40.8
Unsupervised playing (n = 1457)	847	58.1	610	41.9
Custody of medicines and chemicals within easy reach for the children (n = 1461)	430	29.4	1031	70.6
Sharp instruments (e.g knives) custody within easy reach for the children (n = 1462)	528	36.1	934	63.9
Home as working place or work shop (n = 1453)	222	15.3	1231	84.7
Litter scattered around compound (n = 1452)	460	31.7	992	68.3
Crowding status (n = 1459)	534	36.6	925	63.4

Each type of risk was considered independently and most of the risk factors analysed were found to be absent in the majority of the homes except the 'Open fire place' found in 59.2% of homes and 'unsupervised playing' found in 58.1% of them. These two risk factors were found to be present in more than half of the homes.

6.3. HOME ACCIDENTS

6.3.1. Prevalence of injuries due to home accidents

Out of the 1465 children studied, the number that was reported to have suffered injuries due to accidents in the year prior to the study period was 456. The prevalence was therefore 32.1 %.

TABLE 6.13 **INJURIES DUE TO HOME ACCIDENTS**

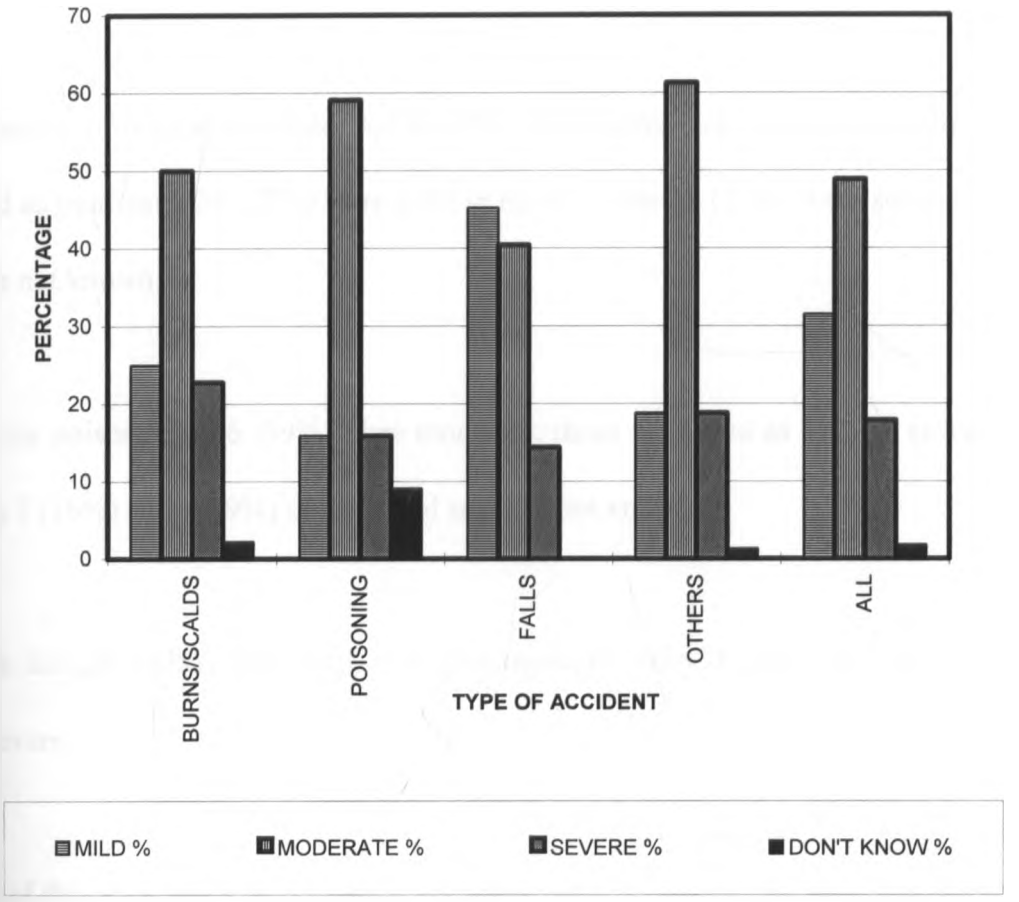
TYPE OF INJURY.	n	%
Burn /Scald	136	30.3
Poisoning	44	9.8
Falls	189	42.1
Others	80	17.8
All accidents	456	32.1

Out of the injuries, 42% occurred due to falls. The next commonly occurring injury was burns and scalds (30%), followed by poisoning (10%). Other types of injuries i.e. foreign bodies in the airways, drowning, suffocation and others formed 18% (*see Table 6.13*).

6.3.2. Severity of Home Accidents

Information on the type of accident was obtained from the mother and her opinion recorded as to whether the accidents was mild, moderate or severe in nature. The resulting information has been shown in figure 3.

FIG: 3 SEVERITY OF ACCIDENTS



Out of all the accidents, 219 (48.9%) of the injuries that occurred, were of moderate nature; the mild ones were 141 (31.5%); the severe ones were 80 (17.9%) and 8 (1.8%) could not be graded by the mothers.

Out of the 80 **severe** injuries that occurred, 31 (38.8%) of them were due to burns; 27 (33.8%) due to falls ; 7 (8.8%) due to poisoning and 15 (18.8%) due to others such as foreign bodies in openings. The **moderate** injuries were predominated by falls, then burns, other accidents grouped together and lastly poisoning. The **mild** injuries were predominated by falls then burns, others and lastly poisoning in that order. For the

injuries that **could not be graded** on severity, poisoning was leading, then burns followed, then others. No falls were in this group. The trend for each type of injury was as follows:

On enquiry from the respondents, 68 (50%) of the burns and scalds that occurred were rated as moderate, 34 (25%) were mild in nature while 31 (23%) were severe and 2% were not known.

For the poisonings, 26 (59%) were moderate, those classified as mild or severe were each 7 (16%) and, 4 (9%) of them had severity not known.

With falls, 85 (45%) were mild, and those moderate were 76 (40%), leaving 27 (15%) as severe.

Out of the other types of accidents, 49 (16%) were moderate, the mild and the severe ones were each 15 (19%) and only 1 (1%) had severity not known by the respondents.

MOTHER'S OPINION ON PREVENTION OF THE ACCIDENTS.

Mothers were asked whether they thought the accidents could have been prevented or not. Out of all accidents, 246 (55.4%) were said to be preventable while 198 (44.6%) not preventable according to the mothers.

For each accident thought preventable, the corresponding rates were obtained by cross tabulation and compared as follows: Burns and scalds (68%) were leading, followed

by poisoning (58%), others (52%), and lastly falls (47%). For the other types of accidents, 52% were thought not preventable (p=0.007).

6.3.3 HOME ACCIDENTS AND CHILD'S SOCIO-DEMOGRAPHIC CHARACTERISTICS

TABLE 6.14 ACCIDENT RATES IN THE 0-5 YEARS

AGE GROUP (MONTHS)	n	ACCIDENTS PER AGE GROUP	ACCIDENT RATES (%)
0-11	366	56	15.9
12-23	299	98	33.7
24-35	262	95	37.5
36-47	241	101	43.7
48-60	297	106	36.4
TOTAL	1465	456	31.1

($\chi^2 = 63.25$, df = 4, p=0.000)

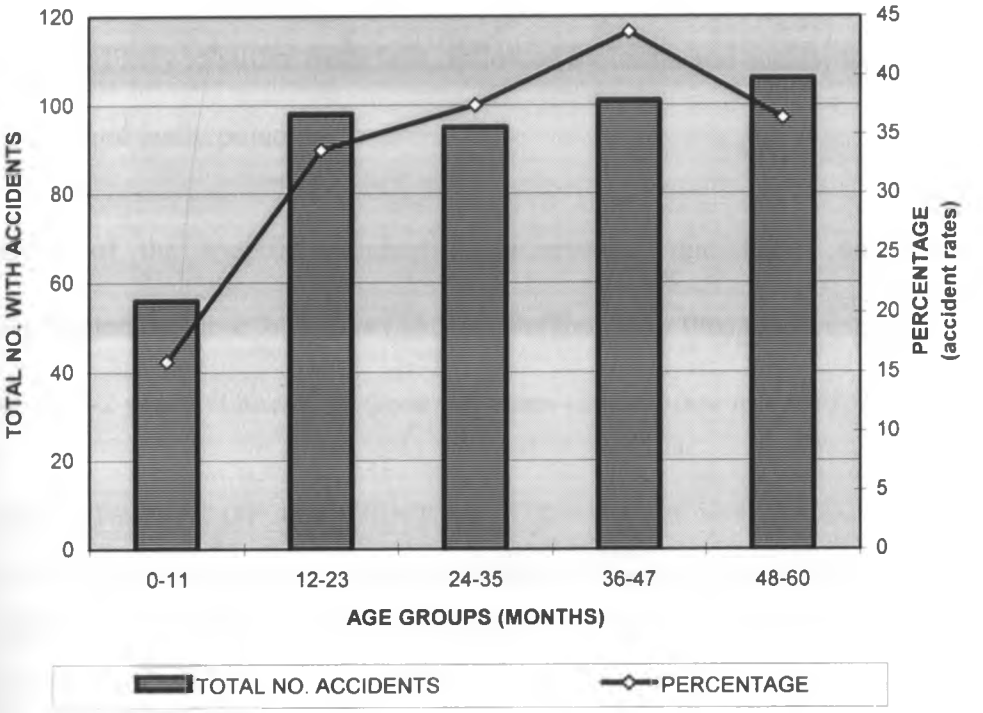
Age and Accidents

For the whole sample, the number of accidents increased with age and most accidents (106) were found to have occurred in the 48 - 60 months age-group while the least (56) in the 0 -11 months. Further analysis was done and the rates of accidents in each particular group obtained. The findings are shown in table 6.14 above.

Of children under one year, 15.9% are likely to suffer an accident in a period of one year. So are 33.7% of children 1-2 years, 37.5% children 2-3 years, 43.7% children 3-4 years, and 36.4% of children 4-5 years. As age increases, children are more prone to

accidents. This relationship is statistically significant (p= 0.000), therefore age is an important determinant of whether a child gets an accident or not (*see also figure 4).*

FIG. 4 ACCIDENTS BY AGE OF CHILDREN



The specific accidents that occurred were distributed across all the age groups as shown in table 6.15 below.

TABLE 6.15 TYPES OF ACCIDENTS IN THE VARIOUS AGE GROUPS

AGE GROUP IN MONTHS	BURNS	POISONING	FALLS	OTHERS	ALL ACCIDENTS
0-11	19 (14%)	6 (13.6%)	15 (7.9%)	14 (17.5%)	54 (12%)
12-23	27 (19.9%)	11 (25%)	47 (27.9%)	12 (15%)	97 (21.6%)
24-35	36 (26.5%)	5 (11.4%)	40 (21.2%)	14 (17.5%)	95 (21.2%)
36-47	26 (19.1%)	10 (22.7%)	43 (22.8%)	21 (26.3%)	100 (22.3%)
48-60	28 (20.6%)	12 (27.3%)	44 (23.3%)	19 (23.8%)	103 (22.9%)
TOTAL	136 (30.3%)	44 (9.8%)	189 (42.1%)	80 (17.8%)	449 (100%)

(χ^2 = 14, df = 12, p = 0.000)

The children under one year were more likely to suffer from burns and scalds, followed by falls, followed by other accidents combined then poisoning.

The subsequent age groups (2-3yrs, 3-4yrs, 4-5yrs) had identical trends where they were more likely to suffer from falls, followed by burns and scalds, followed by other accidents and lastly poisoning.

Analysis of the specific accident types revealed that Burns and scalds were predominated by those 2-3 years (26.5%); Poisoning by those 4-5 years (27.3%); Falls by those 1-2 years; 'Others' by those 3-4 years (26.3%) *(see table 6.15)*.

TABLE 6.16 TYPE OF ACCIDENT BY SEX

SEX	BURNS & SCALDS	POISONING	FALL	OTHERS	ALL ACCIDENTS
MALE	74 (54.4%)	21 (47.7%)	95 (50.3%)	40 (50%)	230 (33.6%)
FEMALE	62 (45.6%)	23 (52.3%)	94 (49.7%)	40 (50%)	219 (30.8 %)
TOTAL	136 (30.3%)	44 (9.8%)	189 (42.1%)	80 (17.7%)	449 (32%)

($\chi^2 = 0.9$, df = 3, p = 0.2)

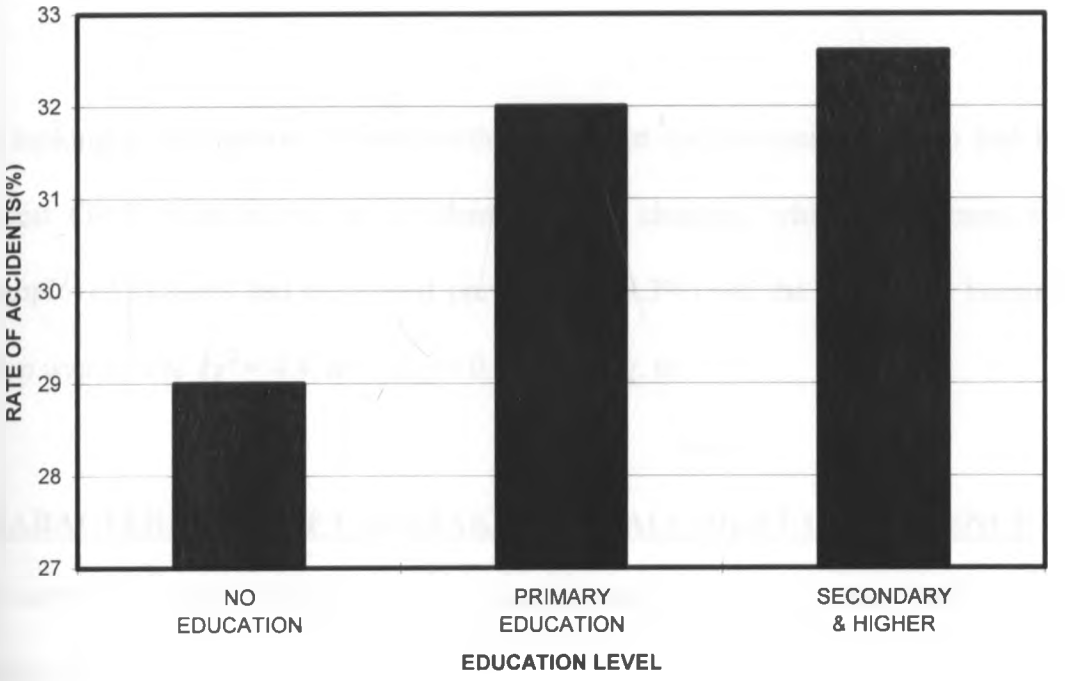
Of the girls, 30.8% had accidents while 33.6% of the boys had accidents. This finding was not statistically significant (p= 0.2). Further analysis was done for each type of accident and sex of child was controlled for, and it was found that for all the accidents except poisoning, the accident rate for males was always a fraction higher, though the observed small difference was not statistically significant. This means that a child's sex is not a significant determinant of the type of accident that occurred. In both sexes,

the falls were the leading cause of accidents followed by burns, poisoning and then other accidents (*see table 6.16*).

PARENTS CHARACTERISTICS AND ACCIDENT OCCURRENCE

Cross tabulations were done on the accident occurrence and mothers education level and the following was the result:

FIG. 5: ACCIDENT OCCURRENCE BY EDUCATION OF MOTHER



The relative prevalence of accidents was found to increase as the level of education increased. Thus, those not educated had 29% of their children with accidents; 32% children from the primary and 32.6% in those whose mothers had secondary and higher school education ($\chi^2 = 0.5$, df = 2, p = 0.8) (*see fig.5*).

FIG: 6 ACCIDENT OCCURRENCE AND OCCUPATION OF MOTHER

On looking at occupation, it was worth noting that the professional group had the highest (34.8%) prevalence of accidents in their children, while the farmers and unemployed mothers had the lowest prevalence (29.3%) and the rate in the business group was 34.4% ($\chi^2 = 4.4$, df = 2, p = 0.11) (*see fig. 6).*

CHARACTERISTICS OF CARETAKER AND ACCIDENT OCCURRENCE

The table below shows the different rates of accident occurrence in the different age groups of caretakers.

TABLE 6.17 ACCIDENT BY AGE OF CARETAKER.

ACCIDENT	< 13 YRS		13-18 YRS		> 18 YRS		TOTAL	
OCCURRENCE	n	%	n	%	n	%	n	%
Yes	15	33.3	38	39.6	373	27.8	426	31.7
No	30	66.7	58	60.4	828	68.9	916	68.3
TOTAL	45	100	96	100	1201	100	1342	100

($\chi^2 = 3.03661$, df = 2, p value = 0.2).

The 13 - 18 years age group having the highest rate (39.6%) followed by those under 13 years (33.3%) and lastly those above 18 years (27.(%). This was not a statistically significant finding (p = 0.2). Further analysis was done to compare the pattern of accidents rates in the different caretaker categories before and after controlling for their ages and the rates obtained were as follows:

TABLE 6.18 ACCIDENT OCCURRENCE RATES IN THE DIFFERENT CARETAKER CATEGORIES CONTROLLING FOR AGE

AGE GROUP (YEARS)	CARETAKER						ALL CARE-TAKERS
	FATHER	MOTHER	MAID	GRAND PARENT	OLDER CHILDREN	OTHERS	
< 13 p = 0.5	0	0	5/18 (27.8%)	0	9/22 (40.9%)	1/5 (20%)	15/45 (33.3%)
13-18 p = 0.4	0	5/18 (31.3%)	31/73 (42.5%)	0	2/4 (50%)	0/2	38/96 (39.6%)
> 18 p = 0.000	9/18 (50%)	304/1043 (29.1%)	23/56 (41.1%)	28/55 (50.9%)	1/15 (6.7%)	8/14 (57.1%)	373/1201 (27.8%)
TOTAL p = 0.0023	9/18 (50%)	309/1059 (29.2%)	59/147 (40.1%)	28/55 (50.9%)	12/41 (29.3%)	9/22 (40.9%)	426/1342 (31.7%)

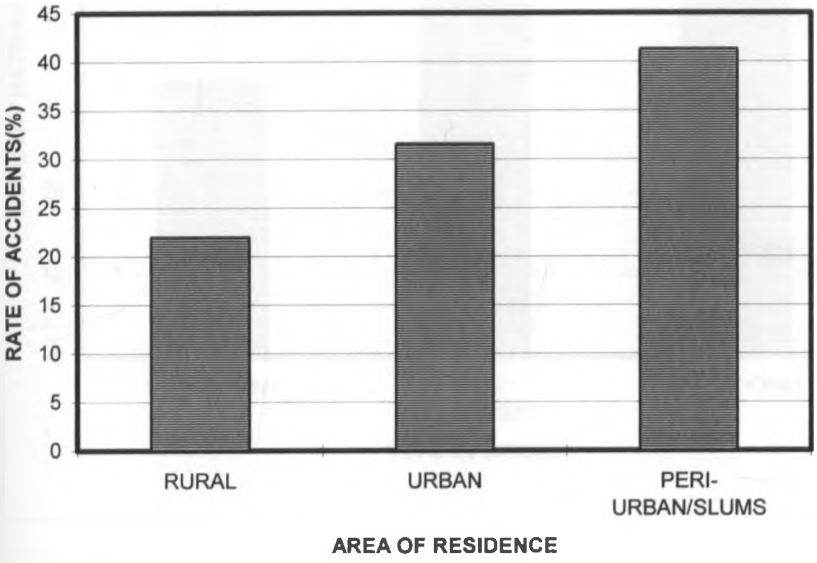
In the first two age groups, there was no significant finding except in the above 18 years age group where the highest rate of accidents occurred in children being taken care of by other relatives (57.1%) followed by the grandparents (50.9%), father (50%), maid (41.1%), mother (29.1%) and lastly, those being cared for by older siblings (6.7%) (p = 0.000).

6.3.4 ENVIRONMENTAL CIRCUMSTANCES AND ACCIDENT OCCURRENCE

Area of residence and accident occurrence

Accidents were analysed in relation to the area of residence and the corresponding rates shown in fig. 7.

FIG: 7 ACCIDENT BY AREA OF RESIDENCE



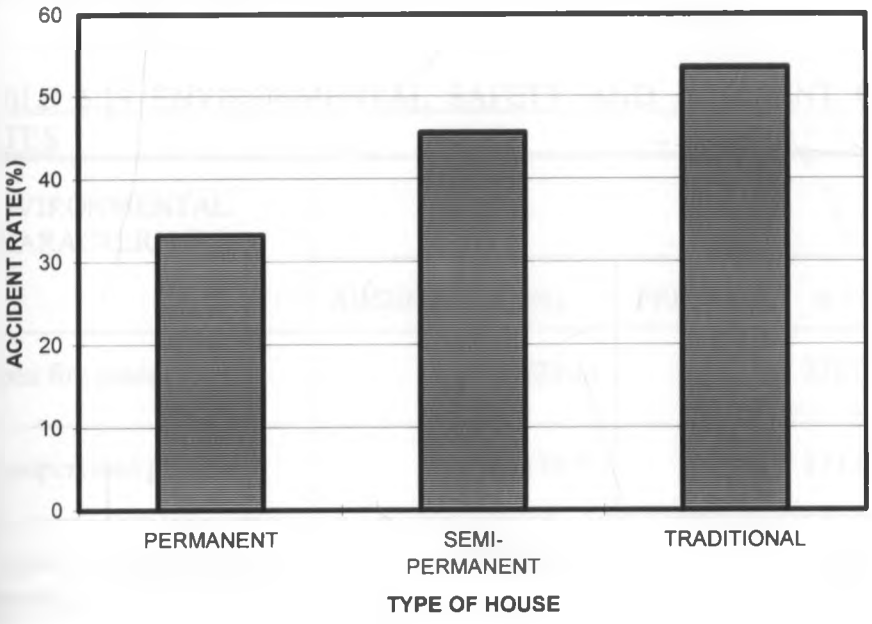
Out of all the accidents, 64% occurred in the urban area, 25% in the peri-urban and slums, and 11% in the rural areas ($p = 0.000$).

When the area specific prevalence rates were calculated, the peri-urban and slums were leading with 42.1%, followed by the urban with 31.6%, and the rural areas with 22% [$\chi^2 = 22.67$, $df = 3$, $p = 0.0000$ *(see fig. 7)*].

Housing and accidents

The rates of accidents in the different types of housing were calculated and compared as in fig. 8.

FIG. 8: ACCIDENTS IN RELATION TO TYPE OF HOUSE



Of all the accidents that occurred, 67.6% were from those living in semi-permanent houses, 20.6% from those in permanent houses and 11.8% from those in the traditional mud huts.

Figure 8 shows the actual prevalence of accidents in these house types rather than the distribution above. The traditional grass thatched mud huts were leading with 34.9%, followed by the permanent houses (33.2%), and the semi-permanent houses (31.3%) These observations were found not to be statistically significant ($\chi^2 = 0.95$, df=2, p=0.6).

ENVIRONMENTAL RISKS AND ACCIDENT OCCURRENCE

Enumerators observed whether risk factors were present or absent in the homes. Accident rates were subsequently analysed by doing individual cross-tabulations for each risk factor found. Table 6.19 shows a combination of the resultant 2x2 tables, and shows the numbers of accidents observed, and the accident rates for these risks. The levels of significance are as indicated for each risk.

TABLE 6.19 ENVIRONMENTAL SAFETY AND ACCIDENT OCCURRENCE RATES

ENVIRONMENTAL CHARACTERISTICS	RISKS		
	ABSENT: n (%)	PRESENT: n (%)	Significance
Open fire place	179 (31.1)	276 (32.9)	p = 0.61 n = 1416
Unsupervised playing	183 (30.7)	271 (33.2)	p = 0.32 n = 1412
Custody of medicines and chemicals	319 (32.1)	135 (31.9)	p = 0.94 n = 1416
Custody of sharp instruments (e.g knives)	293 (32.6)	162 (31.3)	p = 0.61 n = 1417
Home as working place or work shop	392 (33.0)	62 (28.2)	p = 0.16 n = 1408
Litter scattered around compound	319 (33.4)	134 (29.6)	p = 0.16 n = 1407
Crowding status	305 (34.0)	147 (28.5)	p = 0.03 n = 1414

The accident rates (ranging from 28.2% to 34%) were not markedly different in the different situations and there was no statistical significance in most of the findings except for the crowding status where the rate of accidents was higher (34% vs. 28%) in the houses classified as not crowded ($\chi^2 = 4.5$, p = 0. 03, df = 1). The crowding status was assessed by enumerators as more than four people sleeping in a room, and

about two thirds of all the sampled houses, in the study, were assessed as crowded.

Place of accidents

Analysis was done to determine the place with the highest risk for childhood accidents and the results obtained are as shown in table 6.20.

TABLE 6.20 ACCIDENT TYPE BY PLACE OF ACCIDENT

TYPE OF ACCIDENT	KITCHEN		LIVING AND BED ROOM		COMPOUND		TOTAL	
	n	%	n	%	n	%	n	%
Burn/Scald	67	50.4	49	36.8	17	12.8	133	30.8
Poisoning	17	38.6	26	59.1	1	2.3	44	10.2
Falls	8	4.4	30	16.4	145	79.2	183	42.4
Other	13	18.1	11	15.3	48	66.7	72	16.7
All accidents	105	24.3	116	26.9	211	48.8	432	100

($\chi^2 = 199$, df = 4, p = 0.0000).

Out of all the injuries from all the accidents combined, 51% occurred within the house (26.9% in the living and bed rooms and 24.3% in the kitchen). Those occurring out of the house structure (outdoors) were 49%.

Most burns occurred in the **kitchen** (50.4%) followed by the living(sitting) and bedroom (36.8%), and least in the compound (12.8%).

Most poisonings occurred in the **living and bedroom** (59.1%), followed by the kitchen (38.6%), and lastly out in the compound(2.3%).

Falls were most likely to occur in the **compound** (79.2%), followed by the living and bedroom (16.4%), then lastly the kitchen(4.4%).

Other accidents were most likely to occur in the **compound** (66.7%), followed by the kitchen (18.1%), and lastly the living and bedroom.

Compound

In the compound, the most likely accident was **falls** (145), followed by other accidents (48), then burns and scalds (17), then poisoning (1).

Living and Bedrooms

In the living room and bedroom, the majority (49) of accidents were due to **burns and scalds,** 30 due to falls, 26 due to poisoning and 11 due to others.

Kitchen

In the kitchen, 67 of the injuries that occurred were due to burns or scalds, 17 were due to poisonings, 8 due to falls, and 13 due to other accidents.

There is a statistically significant relationship between the type of accident and the place where the accident occurred ($p<0.05$) (*see table 6.20*).

ACCIDENT OCCURRENCE AND LIGHTING SYSTEMS

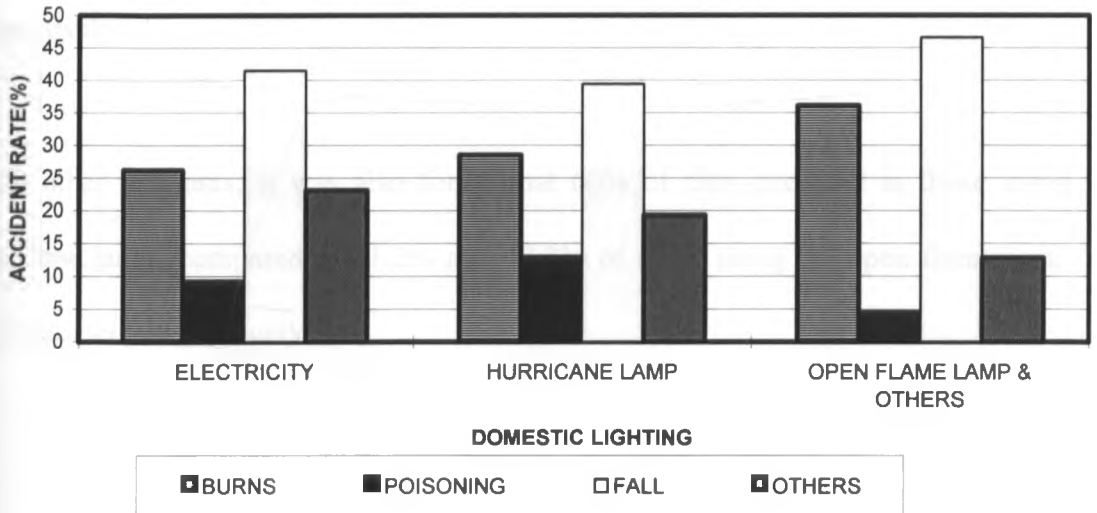
TABLE 6.21 ACCIDENT OCCURRENCE BY THE LIGHTING SYSTEM

ACCIDENT	ELECTRICITY		HURRICANE LAMP		OPEN FLAME PARRAFIN LAMP		OTHER		TOTAL	
	N	%	N	%	N	%	N	%	N	%
YES	67	14.8	250	55.2	134	29.6	2	0.4	453	32.2
NO	113	11.8	474	49.7	364	38.2	3	0.3	964	67.8
TOTAL	180	12.8	724	51.5	498	35.4	5	0.4	1407	100

(χ^2= 10.4, df= 3, p= 0.01539).

Table 6.21 shows that of the 453 accidents, 250 (55.2%) were in those using hurricane lamps, 134 (29.6%) in those using the open flame paraffin lamp, 67 (14.8%) in those using electricity, and other types were only 2 (0.4%).

FIG. 9: RATE OF ACCIDENTS BY TYPE OF DOMESTIC LIGHTING



On the other hand, the accident rates shown in table 6.21 can be summarised for all the accidents combined as follows; 67/180 (37.2%) of those using electricity are likely

to have an accident as compared to 250/724 (34.5%) of those using hurricane lamp, 135/498 (27.0%) of those using the open flame paraffin lamp and other methods of lighting. This relationship is statistically significant.

The specific accident rates shown in figure 9 are follows:
It was found that 52.2% of burns occurred in those using hurricane lamps compared to 35.3% and 12.5% of those using the open flame lamp and electricity respectively.

It was found that 72.8% of poisoning occurred in those using hurricane lamps compared to 13.6% and 13.6% of those using the open flame lamp and electricity respectively.

With falls, it was also found that 52.4% occurred in those using hurricane lamps compared to 33.2% and 14.4% of those using the open flame lamp and electricity respectively.

With other accidents, it was also found that 60% of falls occurred in those using hurricane lamps compared to 21.2% and 18.8% of those using the open flame lamp and electricity respectively.

Further analysis in an attempt to find out the type of injury mechanism in these different situations, time of accident and method of injuries were controlled for. In the day time it was found that 50.9% of the injuries in those with hurricane lamps, were due to striking by person, object or animal; 23.9% due to burns or scalds whereas

7.5% and 4.9% were due to paraffin and foreign body ingestion respectively. The rest were other accidents ($p< 0.05$).

In the night time when the lighting is dependent on these lamps, it was found that 15% of the injuries in those with hurricane lamps, were due to striking by person, object or animal; 70% due to burns or scalds whereas 5% and 5% were due to paraffin and foreign body ingestion respectively. The rest were other accidents ($p >0.05$). The same pattern was mirrored in those using the open flame lamp. This however, was found to be not statistically significant.

SOURCE OF COOKING FUEL AND ACCIDENTS

TABLE 6.22 ACCIDENT BY SOURCE OF COOKING FUEL

ACCI-DENT	ELECTRI-CITY		GAS		CHARCOAL		KEROSENE		FIREWOOD		TOTAL	
	n	%	n	%	n	%	n	%	n	%	n	%
YES	12	2.6	20	4.4	258	56.7	73	4.0	92	20.2	455	32.1
NO	31	3.2	40	4.2	537	55.8	184	19.1	170	17.7	962	67.9
TOTAL	43	3	60	4.2	795	56.1	257	18.1	262	18.5	1417	100

($\chi^2 = 3.14$, df= 4, $p = 0.54$).

The distribution of accidents were as follows:

Of the accidents that occurred, 56.7% used charcoal for cooking, 20.2% use firewood, 4.4% use gas, 4% use kerosene and 2.6% use electricity. The prevalence of accidents in those who use firewood burners is 35.1%, those using gas is 33.3% those using charcoal burners is 32.5%, those using kerosene 28.4%, and those using electricity 27.9%.

The different types of accidents were controlled for and it was found that:

With charcoal stove users, the most likely accident was falls, followed by burns, poisoning, then others;

With firewood stove users, the most likely accident was burns and scalds, then falls, then others, then poisoning;

With kerosene stove users, the most likely accident was falls, then burns, then poisoning and others;

With electricity and gas combined, the most likely accident was falls, then burns and scalds and others and lastly poisoning. All the above, however were not found to be statistically significant ($\chi^2 = 15$, df = 9, p = 0.09).

6.35 THE COURSE OF ACTION TAKEN FOLLOWING ACCIDENTS

TABLE 6.23. DISTRIBUTION OF ACCIDENTS BY TYPE OF ACTION TAKEN.

ACCIDENT	NONE		OUTPATIENT		INPATIENT		HOME REMEDY		TRADITIONAL HEALER		ROW TOTAL	
	n	%	n	%	n	%	n	%	n	%	n	%
Burns/ Scald	1	0.7	50	36.8	51	37.5	34	25.0	0	0	136	30.4
Poisoning	0	0.0	20	45.5	18	40.9	4	9.1	2	4.5	44	9.8
Fall	8	4.3	63	33.9	24	12.8	82	43.9	10	5.3	187	41.8
Other	0	0	27	33.8	21	26.3	32	40.0	0	0.0	80	17.9
All Accidents	9	2.0	160	35.8	114	25.5	152	34.0	12	2.7	447	100

On considering all the accidents together, most of them (35.6%) were managed in an

outpatient facility. The second course of action was home remedy or self treatment of 34.2% of the accidents, then in-patient management of 25.6% and lastly 2.7% of the accidents by traditional healer, 2.5% were given other treatments, 9 (2%) were not acted upon, while none (0%) were managed by prayers (*see table 6.23*).

The different types of accidents were considered individually for course of action following injuries and the results were as follows (*see table 6.23 & 6.24*):

TABLE 6.24. SUMMARY OF COURSE OF ACTION TAKEN ON THE SPECIFIC TYPES OF ACCIDENTS.

ACCIDENT TYPE	**TREAMENT FROM HEALTH INSTITUTION**	**HOME TREATMENT**	**NO ACTION**
Burn/Scald	101 (74.3%)	34 (25.0%)	1 (0.7%)
Poisoning	40 (90.0%)	4 (9.1%)	0 (0.0%)
Fall	97 (51.9%)	82 (43.%)	8 (4.3%)
Other	48 (60.0%)	8 (4.3%)	0 (0.0%)
All Accidents	**286 (64.0%)**	**152 (34.0%)**	**9 (2.0%)**

From the above finding, it is evident that the type of accident determines the action taken following injury.

Of the 136 burns and scalds, 37.5% were treated as in patients, 36.8% were treated as out patients in an institution, 25% given home remedy, and 0.7% were not treated.

At least something was done about all the 44 poisonings where 20 (45.5%) were given

out patient treatment, 18 (40.9%) were treated as in patients, 4 (9.1%) were given home remedy and 2 (4.5%) treated by a traditional healer.

Of the falls, 43.9% were given home remedy, 33.9% were treated as out patients, 12% as In - patients in institutions, 10 (5.3%) were treated by traditional healers, and 8 (4.3%) had no treatment.

Other accidents such as drowning, suffocation and insect or animal bites were considered collectively. It was found that 33.8% were outpatients, 26.3% hospitalised as inpatients and 40% given home treatments.

TREATMENT GIVEN

The type of treatment given can be seen to be interrelated with the severity of accidents and this is considered separately as follows:

Home Treatment

Most of the home treatments were given to falls (43%), followed by burns (25%). Few home treatments were given to poisonings (9.1%) and other accidents *(see table 6.23 & 6.24)*.

Admissions (In-Patients)

The majority of admissions (in patients) were due to burns and scalds, followed by falls, poisonings, and others.

Outpatients

The majority of out patients were falls, followed by burns, poisonings, and others.

No Treatment

Out of the 9 that were not treated, 8 (89%) were falls and 1 (11%) burn or scald.

These differences are statistically significant.

TABLE 6.25 TIME TAKEN TO ACT FOLLOWING SPECIFIC ACCIDENT OCCURRENCE

TYPE OF ACCIDENT	TIME TAKEN TO ACT FOLLOWING ACCIDENTS					
	IMMEDIATE (WITHIN 2HRS.)		DELAYED (AFTER 2HRS.)		ROW TOTAL	
	n	%	n	%	n	%
Burn/Scald	125	91.9	11	8.1	136	30.6
Poisoning	42	95.5	2	4.5	44	9.9
Fall	158	85.4	27	14.6	185	41.6
Other	68	85	12	15	80	18.0
All Accidents	393	88.3	52	11.7	445	100

There was good response to all the accidents because 88% were acted upon immediately, i.e. within two hours. For poisoning, two hours was considered too prolonged for action so it was separately analysed as follows:

TABLE 6.26 POISONING : TIME OF ACTION

0-30 min		30 min - 2hr.		MORE THAN TWO HOURS.		TOTAL	
n	%	n	%	n	%	n	%
34	77.3	8	18.2	2	4.5	44	100

Of the poisonings, 77% were acted on in 30 minutes, 18% between 30 minutes and two

hours, and only 2 (4.5%) more than 2 hours.

Of the accidents leading to **immediate actions**, falls were the majority (40%) followed by burns (32%), poisonings (11%) and others (17%).

Of those with **delayed actions**, again falls predominated (52%), followed by burns (21%), poisoning (5%) and others (23%). This relationship was not statistically significant.

6.3.6 OUTCOME OF ACCIDENTS

TABLE 6.27 OUTCOME OF ACCIDENTS

TYPE OF ACCIDENT	FULL RECOVERY		RESIDUAL SCARRING AND CHRONICITY		DEATH		TOTAL	
	n	%	n	%	n	%	n	%
BURN/SCALD	113	29.4	23	41.8	0	0	136	30.3
POISONING	33	8.6	5	9.1	6	66.7	44	9.8
FALLS	165	42.9	23	41.8	1	11.1	189	42.1
OTHER	74	19.2	4	7.3	2	22.2	80	17.8
ALL ACCIDENTS	385	85.7	55	12.2	9	2.0	449	100

($\chi^2 = 41.63496$, df = 6, p = 0.0000)

Of **all** the 449 accidental injuries, most resulted in full recovery (85.7%). However 12.2% had residual damages and chronic problems, while 9 (2%) resulted in death[1].

Out of the **burn or scald injuries**, 83.1% recovered fully while 16.9% had residual

[1] The information on the dead children was obtained only from the house holds that were visited (those with children under five years).

damages or scarring and no deaths were reported.

In the **poisonings** group 75% recovered fully, 11% had residual damage or chronicity, and 6 (13%) died.

The majority of those with **falls** recovered fully (87.3%), 12.2% had residual damage or chronicity, and 1 (0.5%) resulted in death.

There is a statistically significant relationship between type of accident and outcome . Most of the children (41.8%) with residual scarring and chronic problems were victims of burns and poisoning (41.8%). Of those who recovered fully, the majority had falls (42.9%). Of the deaths, 66% were due to poisoning, 11% due to falls and the other 2 deaths (22%) were observed in the group of other accidents (*see table 6.27*).

The deaths were analysed and two thirds found to have resulted mainly from poisoning. Out of the 6 deaths that occurred due to poisoning, 5 (83.3%) were due to ingestion of medicines and 1 (16.7%) due to poisoning from a sting or snake bite. There was one death resulting from a fall and the method of injury was the impact of being thrown and getting struck by an object when a couple (the parents) had a fight.

The method of injury for the two other accidental deaths were from drowning (1) and one from foreign body ingestion ($\chi^2 = 12.6, df=6, p=0.005$).

CHAPTER SEVEN

DISCUSSION, CONCLUSION AND RECOMMENDATION

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

7.1. DISCUSSION

This descriptive study on the extent and determinants of home accidents in children under five years was carried out with the intention of getting some vital information. The information sought was mainly related to socio-demographic and environmental health circumstances of home accident in children under five. Parental characteristics, child's characteristics as well as environmental factors were considered as vital in the search for determinants of accidents in the particular home set up.

7.1.1. BACKGROUND CHARACTERISTICS OF THE STUDY SAMPLE

A. CHILDREN'S DEMOGRAPHIC CHARACTERISTICS

The demographic characteristics of the 1465 children studied were found to conform with the general trend of Kenyan children as seen in the population pyramid of the same age-group. This was seen when the children were regrouped into five groups of one year intervals and the frequency was found to decrease with age. The most were the infants (0-1 years) who formed 25% of the 0-5 year olds. However the last group containing the 4-5 year olds showed an exceptional spike from the trend possibly due to an artefact or pooling of the children whose ages were unknown by the respondents ($p = 0.15$). This was not a statistically significant finding (*see table 6.1*).

The children's sex distribution in all the five age- groups, was found to have slightly more girls (51%) than the boys (49%) giving a male: female ratio of 1:1.04. This was however not a statistically significant finding (p=0.15).

B. PARENTS DEMOGRAPHIC CHARACTERISTICS

The parents were mostly between 25 and 34 years with the mothers, in most cases, proving younger than the fathers. The mothers had a mean age of 28.5 years and the fathers 35.2 years. This is the most economically active period in both parents lives. Both parents had some education and very few had no education at all. For the mothers, two-thirds had primary school education and one-third had higher education. The fathers had significantly better education with one third having primary and two-thirds having higher than primary education *(see table 6.4)* ($p = 0.000$).

Analysis of the mothers occupation revealed that about half (48.5%) were either housewives, farmers or unemployed; while 41.8% engaged in business, crafts or artisanship. Only 9.7% had professional jobs such as teaching, medicine, law and so forth. For the fathers, the picture was different and 39% of them had professional jobs and 51% were businessmen, craftsmen or artisans. The unemployed fathers were only 10%. The proportion of the fathers reduced as one descended down the list of professions while that of the mothers increased *(see table 6.5)*. This was found to be a statistically significant relationship.

Almost all the parents (> 90%) were found to be married and, 83.6% of the mothers as compared to 78.5% of the fathers reside together with their children showing a complete family unit for most of these children *(see table 6.6 and 6.7)*.

The socio-economic profile of the study population as described above by the education and occupation of parents is of low to middle class. This low socio-economic status (though beyond the scope of this study) has been shown by researchers such as Gupta M., to contribute to increased incidence of burn accidents in children[14]. On comparison of characteristics between the two parents, it was found that they are statistically related. Subsequently, the mothers' characteristics have been used to represent that of the parents.

C. CARETAKERS OF CHILDREN

The type of caretakers were analysed for their characteristics such as age and educational status each of which were categorised in three groups as in table 6.8 & 6.9. In the majority of homes, the leading caretaker was the mother (79.1%), followed by the maid (10.8%), the grand parents (4.0%), older children or siblings (3.0%), other relatives (1.6%) and lastly the father (1.5%).

Since the mothers have to do household chores, feed the family and do farm work, children may not get the maximum supervision possible from their mothers. This is a major risk to children because the mothers may not concentrate on guiding their children as they play *(see table 6.8)*.

For **all the caretakers** together, about 90% were over 18 years (the mothers, whose ages had already been discussed, are also included).

The majority (49%) of **maids** were found to be adolescents (i.e. aged mainly between 13 and 18 years), 39% were above 18 years, while 12% were under 13 years. Because of their age and hormonal changes, these adolescent maids are apt to labile moods, irrational behaviour and may easily get distracted and therefore not perform the duty of child care as necessary.

More than half (54.8%) of **older children** taking care of their siblings were under 13 years meaning they were children themselves taking care of children. Other relatives were mainly (63.6%) over 18 years old and the rest were adolescents (13.6%) or children (22.7%).

For the **fathers** and **grandparents**, they were all over 18 years as would be expected. The grandparents are a special risk as caretakers because of the advanced ageing process going on, leading to deterioration of their senses and reflexes *(see table 6.8)*.

The education level for most of the caretakers combined was primary education (66.5%). The mothers education status was found to be lower than the fathers.

The maids were mainly educated upto primary school level (78%), only few (12%) upto secondary or higher and about 10% with no education at all. This low education status may be an important determinant of their effectiveness in child-care.

The grandparents had the lowest level of education with 61.7% having no education at all. Only about 29.8% had primary education and 8.5% had secondary education. The other relatives and older siblings were mainly of primary education status (*see table 6.9*).

Contrary to this study, the low education status of these caretakers would be expected to contribute an unknown amount of danger to the children as far as risks to accidents are concerned. This was attributable to an interplay of other factors beyond this study.

D. ENVIRONMENTAL CHARACTERISTICS

Out of the environmental characteristics studied it was found that on the geographical area of residence, the majority (62.3%) in the sample were in the urban region; 20% in the peri-urban; 15.4% in the rural and 1.2% from the slums (*see table 6.10*). This portrays a predominantly urban community which is according to the sampling.

The type of housing as priorly defined, was found to be mainly the semi-permanent (64%) one followed by the permanent (27%) and lastly the traditional grass thatched one (9%) (*see fig.1*). These semi-permanent houses are mostly found in the peri-urban, slums and rural areas of Kisumu and few in the urban area. The traditional house being simpler and cheaper to construct is predominant in the rural areas while the permanent house, in the urban and to a lesser extent in the peri-urban and rural areas. The type of housing generally depends on the economic capability of the individuals.

It was found that the most commonly used source of cooking fuel was the charcoal stove (56%) followed by firewood (19%), kerosene stove (18%) then gas and electric cookers combined formed 7% *(see table 6.11)*.

The most commonly used source of light was the hurricane lamp (51%) followed by the open flame lamp (36%) and electricity (13%) (*see table 6.11).* These findings show that most children are exposed to the risks posed by these stoves firewood and charcoal) and lighters (hurricane and open flame lamps) and are likely to get burns and scalds from them because they are vectors of direct heat and are most often placed within reach to the children.

Findings from the analysis of risk factors supports this where 59.2% of the homes had open or unprotected fireplace. Other risks analysed showed that 58.1% homes had children 0-5 years playing without routinely being supervised; 29.4% homes had custody of medicines and potentially harmful chemicals within easy reach of the children; Sharp instruments were within easy reach of the children in 36.1% of the homes; litter was scattered around the compound in 31% of homes; 36.6% of the households were assessed as crowded and only 15% had homes being used as work place such as workshops (*see table 6.12*).

Some of the aforementioned risk factors may contribute to all the accidents while some such as the sharp instruments, medicines and chemicals within reach of children and open fireplace are specific to accidents as cuts, poisoning and burns respectively.

7.1.2. THE EXTENT AND DETERMINANTS OF HOME ACCIDENTS

A. PREVALENCE OF HOME ACCIDENTS

In this study of 1465 children, it was found that 456 (32%) of the children under five had accidents over the last one year. This figure of 32% is higher than the already stipulated 10 % from the study done five years earlier in Baringo District, Kenya by Oloo M. among the 0 - 18 year old children [27]. The study done in Turkey also came up with an incidence rate of 21.6% in those under fifteen years of age[28]. This could be due to the differences in age group studied, environmental factors and the difference in perceptions of accidents. In the Baringo District study it was found that most of the accidents in persons under twenty years of age, are contributed to by those five years and below.

B. TYPE OF ACCIDENTS

The most commonly occurring type of accident was found to be **falls** with injuries (42%); followed by **burns and scalds** (30%); **poisoning** (10%) then **others** (18%). This finding concurs with that of Oloo in the Baringo District study [27] *(see table 6.13)*.

C. SEVERITY OF HOME ACCIDENTS

Most (48.9%) of the injuries were rated as being of moderate severity. The mild injuries formed 31.5%, while the severe ones were 17.9%. Of the 80 severe injuries that occurred; 38.8% were due to **burns**, 33.8% due to **falls** and 8.8% due to **poisoning**. This trend of finding is similar to that by Oloo M. in the Baringo Study[27].

When each type of accident was considered alone it was found that injuries due to **burns and scalds** were more likely to be **severe** (22.8%) than those due to **poisoning** (15.9%)

and **falls** (14.4%). Injuries due to falls (45%) were more likely to be mild as compared to burns/scalds (25%) and poisoning (16%). Poisonings were more likely to be moderate (60%) as compared to burns/scalds and falls (40%) (*see figure 3*).

This shows that even though falls predominate, they are more trivial in nature than the other accidents such as burns and poisoning.

D. MOTHERS' OPINION ON ACCIDENT PREVENTION

For those whose children got accidents, the mothers were asked if they thought the accident could have been prevented and 55% of the responses were in the affirmative, 34% were thought not preventable and 11% responses were 'unknown'. Further analysis showed that the mothers thought Burns and Scalds were most preventable (68%), followed by Poisoning (58%) and Falls (51%). This was a statistically significant finding ($p=0.007$). This attitude is encouraging for any intended accidents prevention programme because it allows for direct interaction with mothers at the grassroots level. The few (34%), who are negative and more so those (11%) who are undecided as to whether accidents are preventable can, through education and advocacy, be convinced to have positive attitudes towards accident prevention and actually do something about it.

E. CHILD'S CHARACTERISTICS AND ACCIDENTS OCCURRENCE

i). AGE

In the 0-5 years age-group alone, it was found that as age increases, children were more at risk of suffering from accidents because, presumably, they became more adventurous and exploring as they developed. Children 3-4 years were the most at risk of getting an accident with a rate of 43.7% as compared to children 2-3 years (37.5%); 4-5 years (36.4%); 1-2 years (33.7%); and least at risk were the 0-1 years. This can be explained by the fact that the infants are not yet developed enough to go exploring as older children are, and also that they almost more often have supervision by a caretaker (*see figure 4).* This relationship was statistically significant ($p = 0.00$), therefore age is an important determinant of accident occurrence. This was also shown by the Baringo District study by Oloo[27] and the Swedish study which found an increasing incidence with age and a predominance in boys[20] (N.B. sex is not a significant accident determinant in this study).

The different age groups were analysed for susceptibility to the various accidents and a special pattern was observed. The children 2-5 years were most likely to suffer from falls, burns and scalds, other accidents (such as suffocation and drowning) then poisonings. The 0-1 years had a different pattern because they were found to be more likely to suffer from a burn accident followed by falls, then others accidents and least poisoning.

When the type of accident was controlled for, it was found that with burns and scalds, the 2-3 years age group were leading; for poisonings, the 4-5 years were leading; as for falls, the 1-2 years were leading; and as for other accidents, the 3-4 years were leading. These

age groups mentioned contribute the largest to the respective accidents and this is a statistically significant finding.

ii). SEX

It seemed as though boys get more accidents (33.6%) than girls (30.8%) and that a smaller proportion of the accidents in total was contributed to by girls (219), but this difference was not found to be statistically significant in this age-group ($p = 0.8$). Girls are therefore as equally likely to get an accident as boys are (*see table 6.16*). When sex was controlled for, the analysis revealed that either boys or girls were most likely to suffer falls, burns and scalds and, lastly poisoning, in that order.

F. PARENTS' CHARACTERISTICS AND ACCIDENT OCCURRENCE

The relative prevalence of accidents in children 0-5 years was found to increase with mothers' level of education with the lowest being in the children whose mothers were not educated (29%) and highest in those whose mothers had secondary and higher education (32.6%). The less educated mothers were more likely to be at home than employed in formal jobs and they were more likely to take care of their children themselves (*see figure 5*). This trend was also observed with the occupation status.

The unemployed mothers or housewives had the lowest prevalence while the highest was in the business, crafts or artisan group (*see figure 6)*. The unemployed mothers had comparatively better opportunity to take care of their children directly as compared to mothers in the professional and business groups. The latter two groups were likely to leave their children in other people's hands. The relationship between the mothers'

education or occupation and accident occurrence were each not found to be statistically significant.

G. CARETAKERS AND ACCIDENT OCCURRENCE

When ages of all the caretakers, were analysed for accident occurrence, it was found that the 13-18 years had the highest (39.6%) accident rates in their children followed by those < 13 years (33.3%) and lastly those >18 years (27.8%) (*see table 6.17*). This is possibly due to their inexperience and lack of commitment resulting from their stage in development which tends to be of playful nature and lacking in concentration and commitment.

The rate of all the accidents combined in the group with other relatives as caretakers was the highest (57.1%), then the grandparents (50.9%), closely followed by the father (50%), followed by the maid (41.1%) as compared to the mothers (29.1%) and older siblings (6.7%). Of the maids, those less than 18 years had more than 60% of their children suffer accidents. This was however not a statistically significant finding *(see table 6.18).* The high rate of childhood accidents for those with grand parents as caretakers, corresponds with the finding that more serious poisoning than other caretakers in a study done in the under 6 years of age by Werozek C. et al [17]. This means they are not the best caretakers as they have mostly reduced reflexes due to age.

H. ENVIRONMENT AND ACCIDENT OCCURRENCE

i). AREA OF RESIDENCE

The area of residence with most accidents in total was the urban one which contributed to 64% of all the accidents, followed by the peri-urban (25%), and lastly the rural areas (1!%). This finding was statistically significant ($p< 0.05$). This can be explained by the fact that the sample had a similar distribution.

However further analysis showed that the highest prevalence rates of accidents was found in the peri-urban and slum areas (42.1%), followed by urban (31.6%) and lastly the rural area (22%) *(see figure 7).* The higher rates observed are possibly due to the environmental disadvantages inherent in the peri-urban and urban areas as compared to the rural areas with less apparent risks. It is also worth noting that, in order to get the most impact, one would start an accident control program in the urban area.

ii). HOUSING AND ACCIDENTS

Most accidents occurred in those with semi-permanent houses (67.6%), fewer in the permanent (20.6%) and 11.8% in traditional huts which is common in the rural areas Again this relationship may not be a causative one but a result of certain characteristics of the lifestyles and environmental factors interacting and affecting persons living in the particular areas and the different types of houses.

The relative prevalence of accidents was found to be highest (34.9%) in the traditional (grass thatched mud hut), followed by 33.2% in the permanent houses, and 31.3% in the semi-permanent *(see fig. 8).* The rates, though not statistically significant, may be

attributable to an interplay of many socio-economic factors.

iii). ENVIRONMENTAL RISKS AND ACCIDENTS

In this study, analysis was made of some particular hazards found in the homes. It was found that the accident rates were slightly higher in those homes with observed risks as open fire places and where children played without supervision although this was not statistically significant. But surprisingly, the rates were found to be lower in the houses with risk factors such as: unsafe custody of medicines and harmful chemicals, unsafe custody of sharp instruments, home being used as a working place such as workshop, litter scattered around compound and crowded houses *(see table 6.19)*. This was also not statistically significant.

The accident rates were not markedly different in the different situations (ranging from 28.2% to 34%) and that there was no statistical significance in most of the findings except for the crowding status where the rate of accidents was higher in the houses classified as crowded.

The crowding status was assessed by enumerators as more than four people sleeping in a room, and about two thirds of all the sampled houses were assessed as crowded. Of all the accidents, 28% were found to occur in the houses classified as crowded and 34% in those not crowded. This was a statistically significant finding ($p< 0.05$, $\chi^2 = 4.5$, $df = 1$). Just as in the homes without apparent risks, the homes classified as not crowded may be posing unknown danger to young children and thus contributing to the higher incidence of accidents as compared to those classified as crowded. This relationship is not obvious because the available rooms in crowded residences or few roomed houses are normally of

multipurpose use as kitchens, sitting room, and bedroom. This situation is normally associated with congestion and thus exposure to hazardous environment. This type of situation is most commonly found in the peri-urban and slum areas in towns. In some cases, the cooking is done indoors or out in the compound alternately. Children are also more likely to play out of the house.

iv). PLACE OF ACCIDENT

Out of all the accidents that occurred, 51% were indoors (27% in the living and bedrooms and 24% in the kitchen). Those outdoors comprised 49%, making the house a more risky environment for the child than the outdoors one. This higher prevalence of accidents indoors was found to be statistically significant.

The house has been found to be a high risk environment as concerns childhood accidents occurring at home, in other studies as well[22]. In the study done in Paris, by Gaillard the injuries that occurred in the household were found to have a higher pre-hospital mortality rate as compared to those out of the compound and were found to occur more commonly in the under five years [19].

Burns and scalds occurred mostly in the kitchen (50%), poisonings in the living and bedrooms (59%), and falls mainly in the compound (79%). Other accidents such as drowning and suffocation occurred mainly in the compound (67%). This was a significant finding and therefore, in order to curb burns and scalds, poisoning and even falls, children should stay away from the house and play outside in carefully and deliberately made safer environments or play grounds. There should be supervision of the children where they play which should also be clean and appropriate.

v). TYPE OF LIGHTING

The highest number of all the accidents was contributed to by those using hurricane lamps (55.7%), followed by the open flame lamp and other types of lighting such as sticks or papers (29.8%), and lastly, in those using electricity (14.5%) and lastly those using other lamps (*0.4%) (see table 6.21*).

The highest rate of accidents however, was found to be in those using 'other' methods of lighting (40%), followed by those using electricity (37%), then the hurricane lamp (35%), and lastly the open flame paraffin lamp (*see figure 9).* These percentages comparable to those of the relationship between accidents and the areas of residence, possibly due to interactions of the socio-economic factors within the study sample where, urban dwellers have access to electricity and may also use hurricane and the open flame lamps, the rural - the open flame lamps and hurricane lamps and to a lesser extent electricity. The findings are statistically significant.

When the specific accidents were analysed, it was found that:
The highest rate of burns occurred in those using the open flame lamp, followed by the hurricane lamp and then electricity; The highest rate of falls was also found in the group using open flame lamp and others, followed by the electricity and then hurricane lamps; The highest rate of poisoning was found in those using the hurricane lamps, followed by electricity and then open flame lamps and others *(see figure 9).*

Further analysis done, to find out the type of injury mechanism in these different

situations, time of accident and method of injuries were controlled for. In the day time it was found that 50.9% of the injuries in those with hurricane lamps, were due to striking by person, object or animal; 23.9% due to burns or scalds whereas 7.5% and 4.9% were due to paraffin and foreign body ingestion respectively. In the night time when the lighting is dependent on these lamps, it was found that 15% of the injuries in those with hurricane lamps, were due to striking by person, object or animal; 70% due to burns or scalds whereas 5% and 5% were due to paraffin and foreign body ingestion respectively. The same pattern was mirrored in those using the open flame lamp. This pattern suggests that these lamps contribute directly to the burns. ($p < 0.05$).

vi). SOURCE OF COOKING FUEL AND ACCIDENTS

The most number of accidents was observed in those using charcoal stoves for cooking (56.7%), followed by those using firewood stoves (20.2%), then gas (4.4%), then kerosene and lastly electricity (2.6%). These proportions are more or less similar to that of the sampled population and the distribution can be attributed to that *(see table 6.22)*.

The highest accident occurrence rates were however observed in those using firewood (35.1%), then those using gas (33.3%), charcoal (32.5%), kerosene (28.4%) and lastly electricity (27.(%). The children from families using firewood and gas are the most at risk of getting accidents than in the other groups. However this observed relationship was not statistically significant.

Analysis of the relationship between accident occurrence and the various sources of cooking fuel revealed a trend similar to the one already observed for the whole sample

where for each type of fuel, the most likely accident to occur was falls, followed by burns and scalds, followed by poisoning and other accidents. The only difference observed was in the case of firewood where burns and scalds were leading followed by falls, followed by 'other accidents' and lastly poisoning. This finding could be attributable to the fact that it is the most open method of cooking and can easily be accessed even by young children. This was however, not statistically significant.

7.1.3. COURSE AND TIME OF ACTION FOLLOWING ACCIDENTS

The course of action taken following injury mirrors the severity of the accidents and has socio-economic implications on the family and health system in general.

About 88% of accidents were acted upon immediately (within two hours) which showed that parents did not take these accidents lightly. The type of accident was not found to determine the speed of action taken following an injury (*see table* 6.25 *& 6.26*).

For all the accidents considered together and individually, it was found that the majority (35.6%) were treated as outpatients in a public health institution, whereas an almost equal proportion (34.8%) were given home remedy. The ones which required admission into an institution were about a quarter (25.5%) and these possibly represented the more serious ones. Those not acted upon, and probably the most trivial, were very few (2%).

There was a different picture seen when each type of accident is considered separately. In the case of burns, the leading course of action was inpatient management, followed by

outpatient, home remedy and no treatment. This shows that for the burns the severity was significant and give a lot of strain on the health system.

For poisoning the leading action was outpatient treatment (45.5%), followed closely by inpatient treatment (40.9%), then home remedy (9.1%) and traditional healer (4.5%) .

For the falls, the highest tendency was to give home remedy, followed by outpatient treatment then inpatient treatment was last. This further proves the trivial nature of the falls as compared to the other types of accidents *(see table 6.23 & 6.24)*.

It was noted that of the accidents that led to admissions and outpatient treatments, burns/scalds and falls were the leading; those that were treated as out patients, burns were still leading together with poisoning. This shows the seriousness of these accidents as compared to falls which are leading in the treatments given at home and those that were not treated at all. This means that poisoning and burns and scalds have the most implications on the health system in general. These were all statistically significant findings.

7.1.4. OUTCOME OF HOME ACCIDENTS

In this study of the 0-5 years it has been observed that on for all the accidents together, 86% had full recovery and for specific accidents on average, 80% recovered fully, 12% had residual damages and chronic problems while the fatality rate observed was higher depending on the type of accident.

Just as in the study in Baringo, over 80% of the injuries led to full recovery while 20% had residual disability and lasting physical damage. The accident fatality rate was observed at 6/1000[28].

Burns and scalds and falls contributed the most to residual damages and scarring. These meant a certain amount of chronic problems and therefore additional burden after the initial recovery or partial recovery.

For the poisonings, the fatality rate was 13% or 130/1000 which is quite high. These deaths resulted from ingestion of medicines and snake bite. Poisonings made up two thirds of all the deaths. As for the falls it was 0.5% or 5/1000. This was one child who died as a result of the impact of being thrown during his parents fight.

Two other accidental deaths resulted from drowning in a drum of water and foreign body ingestion. The information on these deaths however, was limited because it was only obtained from the houses where there were other 0-5 years old children (*see table 6.27*). The burns and scalds resulted in no deaths during the period of the study. These were statistically significant findings.

7.2. CONCLUSION

The study established the prevalence of home accidents as 32% which is higher than the already stipulated in the previous study done in Baringo Kenya[27] five years before which was 10%. The three most commonly occurring types of injuries were due to falls (42%), followed by burns and scalds (31%), and poisoning (10%) for all the age groups. and therefore they have the most impact on the health system in general.

Age of children was found to be associated with accident occurrence and to the type of accidents that occurred with the 2-3 years age group being of special risk of getting burns and scalds and the 4-5 years age group at risk of poisoning. The older a child became, the more prone to accidents he got. The age group found to be of special risk was the 3-4 years (with the highest rate of 43.7%). Gender or sex was not found to predict one's risk of getting an accident.

The type of caretakers posing the highest risk to child accidents were relatives and grandparents, and 13-18 year old maids.

Accidents occurring within the house structure predominated (51%) over those occurring in the compound (49%). The kitchen was found to be a very dangerous place as for all the accidents.

Burns formed approximately 87% of the household injuries (burns that occurred in the kitchen were 50.4% as compared to falls (21%) and poisoning (98%).

Injuries in the compound were predominated by those due to falls.

About one third of homes were found to have risk factors (each considered separately) such as: unsafe custody of medicines and harmful chemicals, unsafe custody of sharp instruments, home being used as a working place such as workshop, litter scattered around compound and crowded houses. Accident rates were slightly higher in those homes with observed risks as open fire places and where children played without supervision.

The lighting system was found to be a statistically significant contributory factor. The children from families using hurricane lamps, firewood and gas were the most at risk of getting accidents than in the families using other methods of lighting and cooking respectively.

The residential areas with leading accident rates were the peri-urban and slums.

Most of the accidents (80%) were trivial (mild to moderate in nature). The severe injuries were contributed to mainly by burns/scalds and falls in equal proportion. Though if a child got a burn or scald, the chances that the accident would be severe are 1.5 times higher than if he or she got a fall (i.e. 23% versus 15% respectively).

For all the accidents, 64% required institutional management (25.5% resulted in admissions to health care institutions and 38.5% treated as out-patients), where most of the admissions were due to burns and scalds (46%).

The time of action in most cases was immediate and appropriate as 88% of them were acted upon within two hours (or 30 minutes in the case of poisoning).

The outcome of injuries due to home accidents was satisfactory as most (85.7%) resulted in recovery; while 12.2% had residual damages and chronic problems and 2% resulted in death. The deaths occurred due to poisoning (67%) and falls (11%) and others (22%).

Burns and scalds and falls contributed the most to residual damages and scarring and subsequently chronic problems and additional burden after the initial recovery or partial recovery. The highest fatality rate was found to be from poisoning (13%); followed by other accidents (5%); and falls (0.5%). There were no deaths reported with burns.

On accidents prevention, most mothers (55%) thought that accidents were preventable while 34% were thought not preventable and 11% did not know. This is a positive attitude and is encouraging because it shows that a good percentage would be receptive to intervention programmes to curb accidents at the grassroots level and, something can actually be done by tackling the problems as found from analysis in this study, of the correlated factors and the background of the population (*see recommendations*).

7.3. RECOMMENDATIONS

1. This study indicates that accidents are more prevalent than already known and are viewed as preventable by many mothers and that the next course of action should be an intensified campaign on health education and preventive measures on childhood accidents as a whole.

2. Children should be given some supervision which is specific and appropriate to their age and developmental stages.

3. Children, especially those above 1 year, should be encouraged to play out of the house in deliberately made safer environment and should specifically not be allowed in the kitchen.

4. Fireplaces should be protected within the households in case unguided children find their way near the fires.

5. Since the modern mother has to play various roles one of which is a family co-bread winner, caretakers such as maids should be given simple appropriate education on safety and child development.

6. Certain risk factors such as medicines and harmful chemicals should be particularly observed and emphasis made to keep them out of reach as poisonings resulting from these caused the highest fatality rate.

7. There should be more nation-wide and specific research to enable formation of national policies and guidelines on the feasible aspects of childhood accident prevention, especially more so relating to the low socio-economic status mothers who have too much in their hands and cannot adequately watch on children as they play and also do not have the means to employ caretakers. Active prevention of home accidents would also go along way in lessening the burden they cause on our health system

8. There should be more specific qualitative research locally on the significant contributing risk factors in the environment such as residential areas and housing, lighting systems, kitchens, fireplaces and cooking fuel sources to find out which methods are best used in preventive activities and programs. Meanwhile, using the findings from earlier studies to formulate age-specific safety education that is repetitive and individualised with active parental participation to increase knowledge and certain safety practices around homes.

9. Much can be achieved by actively involving communities in the aspect of accident prevention in the peri- urban and slum areas terms of Community Participation from the planning stages through the implementation right to the monitoring and evaluation stages. Preventive measures such as defining appropriate caretakers can be supervised at the grassroots level by community health workers who have been trained and who would therefore give repeated health education and monitor things like storage of medicines and at the same time advocate for adequate and safe play facilities outdoors rather than indoors for children to reduce household accidents.

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ANNEXES

I, II, & III

QUESTIONNAIRE **HOME ACCIDENTS** **ANNEX I**

Serial number ———————————————————

Enumerator's name———————————————————

1. Name of Respondent (mother, guardian or father)

———————————————————

2. Date of interview ———————————————————

3. Identification of h/hold (Homestead and house No.

———————————————————

4. Village/Estate ———————————————————

5. Sublocation of h/hold ———————————————————

PARENTS' PARTICULARS (to be entered in the table/register of parents.)

6. Parents/Guardians occupation
   1. Professional (e.g teacher) 2. Craftsman/artisan
   3. Housewife 4. Business 5. Farmer
   6. Unemployed 7. Others specify.
   ———————————————————
   ———————————————————

7. Marital status of parent:
   1. Single 2. Married 3. Separated
   4. Divorced 5. Widowed.

8. Educational status:
   1. None 2. 0-8 years(primary) 3. Secondary
   3. Post Secondary i.e (University, College, e.t.c)

9. Are the parents permanent residents in the house?
   1. Yes. 2. No. 3. Partly.

10. Who looks after the children as they play (i.e caretaker)? ___

    1. Father, 2. Mother 3. Maid
    4. Elderly grandparents. 5. Older children
    6. Other specify ———————————————————

11. What is his/her educational status? ___

    1. None 2. 0-8 years (primary) 3. Secondary
    4. Post Secondary i.e (University, College, e.t.c)

12. What is the caretaker's age? ___

    1. <13 years 2. 13-18 years 3. Above 18 years.

REGISTER OF ALL PARENTS, GUARDIANS AND ADULTS IN THE HOUSE-HOLD

No	NAME	DATE OF BIRTH	SEX	OCCUPATION	MARITAL STATUS	EDUCATIONAL STATUS	RESIDENTIAL STATUS	RELATIONSHIP TO HEAD OF H/HOLD	ETHNIC ORIGIN

ANNEX I

REGISTER OF ALL CHILDREN IN THE HOUSE-HOLD

No	NAME	SEX	DATE OF BIRTH	RELATIONSHIP TO HEAD OF H/HOLD	PLACE OF BIRTH	ETHNIC ORIGIN	MID ARM CIRCUM-FERENCE ≤ 5YRS	NAME OF. 1. FATHER 2. MOTHER 3.GUARDIAN 4.CARETAKER	MARITAL STATUS OF PARENTS	PARENTS' OCCUPA-TION	EDUCAT-IONAL STATUS

13. Have the children <5 years fallen sick over the last 1 YEAR? ☐

1. Yes. 2. No.

14. If yes, what was the illness in your opinion?
1. Accident. 2. Malaria 3. Diarrhoea
4. Other specify _____
List the illnesses in order of occurrence if more than once.

	Q15.	Q16.	Q17.	Q18.
a. _____	☐	☐	☐	☐
b. _____	☐	☐	☐	☐
c. _____	☐	☐	☐	☐
d. _____	☐	☐	☐	☐
e. _____	☐	☐	☐	☐
f. _____	☐	☐	☐	☐
g. _____	☐	☐	☐	☐
h. _____	☐	☐	☐	☐

15. What course of action was taken following the illness? ☐

1. Taken to the health centre/dispensary (out-patient)
2. Hospitalization (inpatient).
3. Traditional healer.
4. Self medication (home remedy).
5. Prayers.
6. None.
7. Others specify _____

16. How long after realising the illness was the action taken? ☐
1. <30 min. 2. 30 min.- 2 hrs. 3. 2-12 hrs
4. 12 - 24 hrs. 5. 1-3 days 6. >3 days

17. If health facility was used, how far was it? ☐
1. <1km 2. 1-2km 3. 3-4km 4. >4km
5. Not applicable.

18. Were you satisfied with the treatment given in the health facility? ☐
1. Yes. 2. No.

19. What means do you use to get to the health facility? ☐
1. Walk 2. Bicycle 3. Motor vehicle
4. Other specify. _____

20. What is the length of time taken to the reach the nearest service station? ☐
1. <1 hr 2. 1-2 hrs 3. >2 hrs

21. Has there been a death of any child under the ☐

age of five in this house ?
1. Yes 2. No
3. Don't know

22. What was the cause of death ?

1. Accident
2. Malaria
3. Fever
4. Diarrhoea
5. Don't know
6. Others, specify _____

_____

_____

ANNEX I
ACCIDENTS

23. Has there been an accident in the household among the children under five years ? ___

1. Yes 2. No
If yes, fill the table below as you answer following the questions:

CHILD REGISTER NUMBER	NAME OF CHILD	DATE OF ACCIDENT	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36

___

24. What type of accident was it ?
1. Burns 2. Poisoning 3. Fall
4. Others, Specify_____

25. Describe the method of injury. ___

1. Struck by object, person or animal 2. Scald from hot water, hot tea, uji or soup.
3. Foreign body. 4. Strangulation. 5. Bite/sting
6. Drowning/Submersion 7. Paraffin poisoning. 8. Medicine Poisoning
9. Insecticides/Other chemicals. 10. Other, Specify _____
_____

26. What was the resulting injury ? ___

1. Burns and/or scald, 2. Superficial abrasions
3. Fracture, 4. Deep flesh wounds, 5. Cuts.
6. Internal/Systemic injuries
7. Others specify, e.g combination of the above.

Describe other eventualities. _____

27. What was the anatomical site of the injury ? ___

1. Head/Neck 2. Upper limbs. 3. Lower limbs.
4. Trunk 5. Eyes, 6. Ears, 7. Nose,
8. Mouth.

28. What was the severity of the injury ? ___

1. Mild 2. Moderate. 3. Severe 4. Don't know

29. What course of action was taken following the accident ? ___

1. Taken to the Health Centre/Dispensary (Out-patient)
2. Hospitalisation (In-patient)
3. Traditional healer
4. Self Medication (Home Remedy)
5. Prayers. 6. None
7. Others, Specify _____

30. How long after realising the accident was the action taken ? ___

1: < 30 min. 2: 30 min.- 2hrs. 3: 2 - 12 hrs.
4: 12 - 24 hrs. 5: 1 - 3 days. 6: > 3 days.

31. Who was taking care of the child at the time of the accident ? ___

1. Parent 2. Relative 3. Other child
4. Maid 5. No one
6. Other, Specify _____

32. Where did the accident take place ? ___

1. Kitchen 2. Living Room 3. Bedroom
4. Out in the compound/Garden 5. Different home.
6. Other, Specify _____

33. At what time did the accident take place ? ___

1. Morning 2. Lunchtime 3. Afternoon/Evening
4. Suppertime 5. After supper/ bed time

34. What was the cause of the accident in your opinion ? ☐

1. Carelessness 2. Faulty equipment
3. Stubborn Child 4. Don't know
5. Other, Specify _____

35. Could the accident have been prevented in your opinion ? ☐

1. Yes 2. No. 3. Don't know.

If yes, how ? _____
_____

36. What was the final outcome of the accident ? ☐

1. Full recovery
2. Residual disability/extensive scarring
3. Death 4. Chronicity.

SOCIO-ECONOMIC STATUS

37. What is the salaried family income per month ? (Kshs.) ☐

1. 0-700 2. 800-1,500 3. 1,500-3000
4. > 3000 5. Don't know

38. What property is owned by the family ?
1. Cattle - Number _____
2. Farm land - State acre-age _____
3. Commercial business - type(s) _____
4. Motor Vehicles - number and type _____
5. Bicycle _____
6. Radio - What programmes do they listen to ? _____
_____

39. Do they read Newspapers ? ☐

1. Yes 2. No. 3. Other, Specify
_____

40. What is the system of lighting when dark ? ☐

1. Electricity 2. Hurricane paraffin lamp 3. Traditional paraffin lamp (Nyangile) 4. Other specify _____

41. What is the regular source of fuel for cooking? ☐☐☐☐

1. Electric cooker. 2. Gas. 3. Charcoal 4. Kerosene 5. Firewood
6. Other, Specify _____

42. What is the water source for the house/hold ? ☐
1. Piped water. 2. Borehole 3. Well 4. River
5. Other, specify
_____

43. How is the household waste disposed ? ☐
1. Burning 2. Compost pit 3. Open dumping

4. Municipal dustbins.

44. Is it within easy reach of the children ? ⌊__⌋
1. Yes 2. No

45. Does the home have the following characteristics ?
(To be observed, then enter 1. Yes 2. No)

1. Unprotected medicines or chemicals within the child's reach. ⌊__⌋
2. Knives and harmful tools left within reach ⌊__⌋
3. Unprotected fireplace. ⌊__⌋
4. Unsupervised play. ⌊__⌋
5. Home being used as a work place e.g Carpentry, Commercial fish frying etc. ⌊__⌋
6. Scattered harmful litter all over the compound. ⌊__⌋

46. Does any one in the house take alcoholic drinks ? ⌊__⌋
1. Yes 2. No 3. Don't know

47. If yes, how much ? ⌊__⌋
1. Socially acceptable levels
2. Excessive
3. Don't know

HOUSING AND ROOM ALLOCATION

48. What is the size of the house (in metre sq.) ?
_____

49. How many rooms does the house have ? ⌊__⌋

(Also indicate below)

Kitchen⌊__⌋ Sitting⌊__⌋ Bedroom⌊__⌋ Latrine⌊__⌋ Garden⌊__⌋

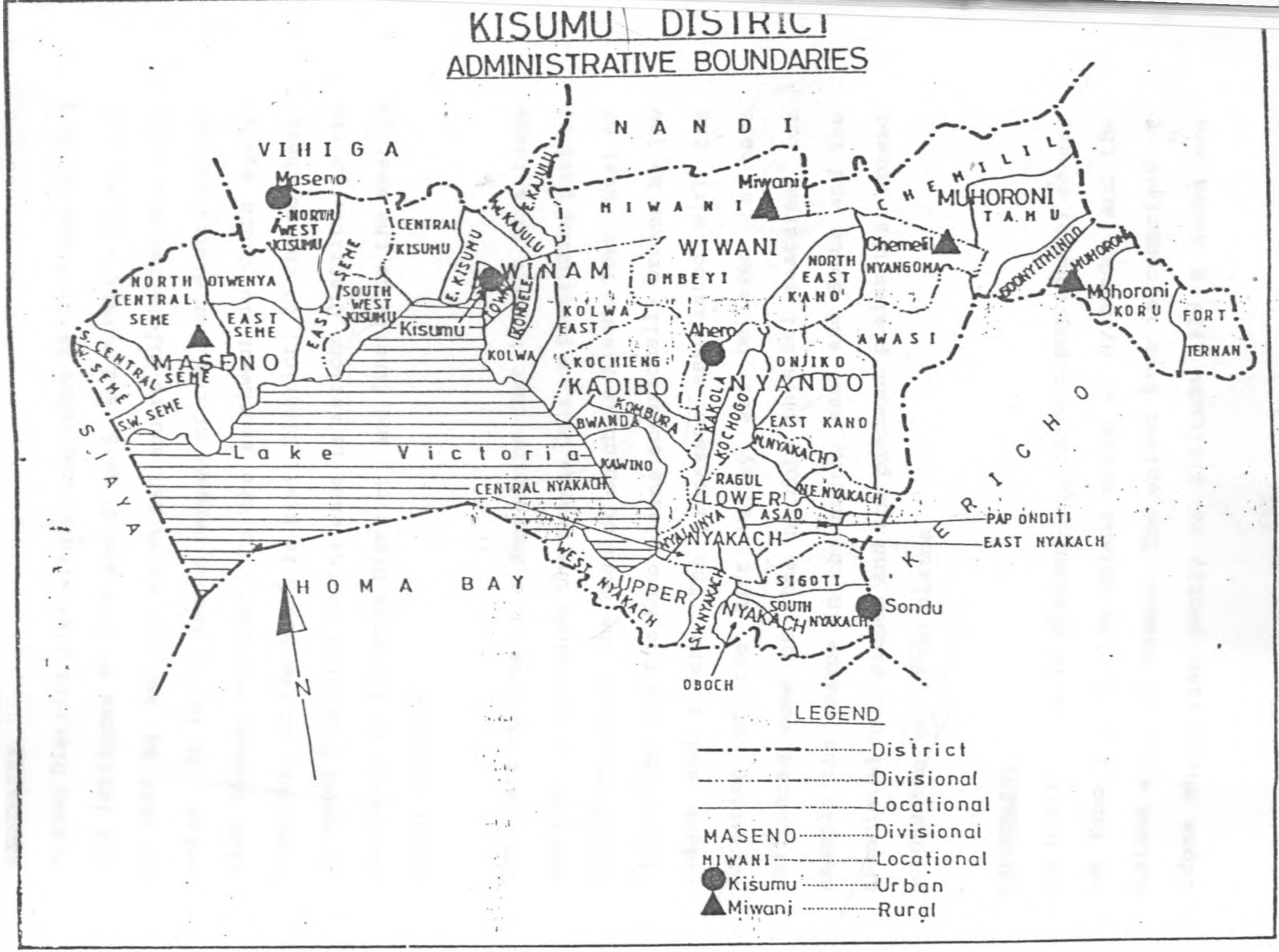
50. What are the housing materials ? ⌊__⌋ ⌊__⌋ ⌊__⌋ ⌊__⌋ ⌊__⌋ ⌊__⌋ ⌊__⌋
(Indicate by ticking) 1. 2. 3. 4. 5. 6. 7.
1. Thatched roof 2. Muddy wall 3. Semi-permanent walls i.e. Earth+Cement 4. Earth floor 5. Cemented, wood or stone walls
6. Corrugated iron roof 7. Cemented or wooden floor.

51. How do the children sleep in order of the rooms ?

Describe and give a simple sketch below:

52. Are the rooms four sleeping in a room), 1. Crowded (i.e more than 2. Not crowded ? ___

53. What is the Zone of residence of the household ? ___
1. Rural 2. Urban 3. Peri-urban 4. Slums.


KISUMU DISTRICT
ADMINISTRATIVE BOUNDARIES
VIHIGA
NANDI
Maseno
Miwani
MIWANI
CHEMILIL
MUHORONI
TAMU
NORTH WEST KISUMU
CENTRAL KISUMU
E. KISUMU
W. KISUMU
E. KAJULU
WIWANI
WINAM
OMBEYI
Chemelil
NYANGOMA
NORTH EAST KANO
KOOKOTH ITHINDA
MUHORONI
Muhoroni
KORU
FORT TERNAN
NORTH CENTRAL SEME
OTWENYA
EAST SEME
SOUTH WEST KISUMU
Kisumu
KONDELE
KOLWA EAST
KOLWA
Ahero
AWASI
MASENO
S. CENTRAL SEME
S.W. SEME
KOCHIENG
KADIBO
ONJIKO
NYANDO
KOMBURA
KAKOLA
KOCHOGO
BWANDA
EAST KANO
Lake Victoria
KAWINO
NYAKACH
CENTRAL NYAKACH
RAGUL
LOWER NYAKACH
N.E. NYAKACH
ASAO
PAP ONDITI
EAST NYAKACH
NYAUNYA
SIAYA
KERICHO
HOMA BAY
WEST NYAKACH
UPPER NYAKACH
S.W. NYAKACH
SIGOTI
SOUTH NYAKACH
Sondu
OBOCH
N
LEGEND
District
Divisional
Locational
MASENO Divisional
MIWANI Locational
Kisumu Urban
Miwani Rural

BACKGROUND INFORMATION ON KISUMU **Annex III**

GEOGRAPHY

Kisumu District lies within longitudes 33^0 20'E and 35^0 20'E and latitudes 0^0 20'S and 0^0 50'S, and covers a total area of 2660 sq. km. ,of which 567 square kilometres are under water . It is the second largest of the four districts that form Nyanza Province. To the southwest is South Nyanza District; to the South is Kisii District; to the northeast is Nandi District; to the east is Kericho District; to the northwest is Kakamega District; and finally to the west is Siaya District.

The District lies in a depression that is part of a large lowland. It surrounds the Nyanza Gulf, a protruding part of Lake Victoria at the head of which is Kisumu Town. East of Kisumu Town are the Kano plains occasionally broken by low ridges and rivers. The processes associated with the formation of the Rift Valley are believed to have influenced some of thhe notable physical features, for example the scarps in the north, east and South and the associated hill slopes and the piedmont plains that spread across the vast Kano plains.

TOPOGRAPHY

The District can be divided into three topographical zones; The Kano Plains, the upland areas of Nyabondo, and the midland areas of Maseno. The upland area is comprised of ridges which rise gently to altitude 1835 m above sea

level, while the Kano plains lie on the floor of the Rift Valley, which is a flat stretch bordered to the north and east by the escarpment.

The Nyabondo Escarpment forms the southern boundary of the Kano Plains and is far from the municipality. The Nyando Escarpment forms the northern boundary of the plains, with the Nyando and Nandi hills lying to the north-east and the western continuation of these hills forming the Kajulu and Kisian ranges up to Maseno in the north-west.

The flattest parts of the municipality occur within the Kano Plains. The Kano Plains are prone to annual flooding, especially the lower Kano plains and particularly in the Nyando Valley. Notably, the 1988 long rains caused a lot of flooding which destroyed a lot of crops and livestock as well as evacuating the residents. This virtually brought all activities to a standstill. Otherwise the area is well suited for sugar, maize and sorghum, and has a high potential for irrigation whereby rice does well. Zero-grazing is another potential in the area.

KISUMU TOWN

Kisumu is an old town which was established in 1901. It is surrounded on the southern side by Lake Victoria. Since 1971 when the town was given municipal status and its boundaries extended, there has been a rapidly expanding

informal squatter zone.

Due to its origins, Kisumu Town has over the years relied heavily on administrative and commercial development to sustain its growth. There are six major roads that connect kisumu to its regions and the nation; the main one being the Kisumu-Kericho-Nakuru-Nairobi-Mombasa road, among the other bitumen roads.

Apart from these bitumen roads, there are a large number of secondary roads connecting Kisumu to the various parts of its area of influence.

Other forms of transport include, rail, lake and, air transport. Kisumu also has good posts and telecommunications services, with the Kenya Power and Lighting company supplying the old town and, to a lesser extent, the peri-urban and rural areas of Kisumu municipality with electricity.

SOCIO-ECONOMIC PROFILE

Table 9.0: **Potential Land use**

Agro-Ecological zones* by Divisions (sq. km.)

Division	UM_3	LM_1	LM_2	LM_3	LM_4	Other
Maseno	0	26	149	236	7	13
Nyando	47	0	52	431	129	8
Winam	0	0	0	38	56	0
Muhoroni	24	6	337	0	0	0

*

UM_3 = Marginal Coffee Zone

LM_1 = Lower Midland Sugar Cane Zone

LM_2 = Marginal Sugar Cane Zone

LM_3 = Lower Midland Cotton Zone

LM_4 = Marginal Cotton Zone

Other = UM_1 (13) AND UM_2 (8), Coffee/Tea Zones

Source: District Agricultural Office.

Land use within the municipality is dominated by agriculture and residential, commercial and industrial housing.

There are varied types of soils within the municipality. Less than one third of the district is classified as being of high potential. This land is largely limited to the deep well drained soils of Kajulu and the Kano Plains area east of Kibos and lying between the Kisumu-Kibos and Kisumu-Kericho roads (subject to adequate drainage during the rainy season and to irrigation during the drier periods of the year).The balance of the municipality falls within the low potential areas of the district.

Livestock and Crop Production

There are four major activities in the agricultural sector of Kisumu Municipality: crop production, livestock production, fisheries and forestry. Crop production, ranks

first in order of importance and involves the growing of maize, beans, sorghum, rice, finger millet, cotton and sugar cane. The municipality has considerable potential for horticultural, crops, bananas, citrus, pawpaw, mangoes, pineapples and vegetables.

Maize and cotton are the crops occupying the largest area of cultivated land in Winam and Maseno divisions.

There are statistics that show that in 1988 only 10% of the land in the new municipality was cash cropped, and that the area under cash crops in the old municipality was negligible. The problems inhibiting increased agricultural production in Kisumu Municipality include inadequate advisory services, inadequate farm inputs, poor marketing systems, adverse weather conditions, pests and diseases, poor soils and flooding. These will continue to impede crop production in the foreseeable future. The people of Kisumu Municipality will continue to depend on off-farm activities for their livelihood. The Government recognizes this fact and has initiated programmes in the area to increase employment and help fight poverty.

Livestock Production

The latest records of livestock are data from 1983, there were 65 grade cattle and 19,111 local cattle in the new municipality, and no grade cows and only 48 of the local

variety in the old municipality. The effective stocking rate was 85 livestock per sq. km in the new municipality and 4% in the old municipality.The grade cattle in the area are mainly Zebu cattle which are kept for both meat and milk. Grade cattle are mainly found in the cooler areas of Maseno and Winam divisions.

Employment

Although agriculture is the mainstay of the area's economy, it is not developed well enough to employ the whole of western Kenya's working population. This results in the influx of people into the urban centre in search of work, but there are not enough jobs there for those seeking employment. The unemployment situation in Kisumu Municipality is particularly alarming.

A study done on the Kisumu water supply and sanitation in 1985, revealed that the total number of people employed in the formal sector was 11%.

Compared to Nairobi and Mombasa, Kisumu has been faring poorly in industrial development. According to Employment and Earnings in Modern Sector Reports (CBS,1979), Kisumu has the lowest employment prospects compared to Nairobi and Mombasa.

Although a breakdown of male/female ratios is not possible

for employment in Kisumu Municipality, it can be assumed that because of the bias of equipping more men than women with marketable skills, there are more men than women employed in the municipality's formal sector.

The informal sector in Kisumu Municipality, like nearly everywhere in Kenya, has gained increasing importance, offering employment opportunities for a large number of people.

Water and Sanitation

Kisumu Municipality stands at the shores of Lake Victoria-one of the largest fresh water lakes in the world-yet her residents have always experienced water problems. The residents' demand for water has outstripped the available supplies. But it is the peri-urban areas where water problems are acute.The residents are then forced to buy water expensively or fetching it from a far distance.

According to the Kisumu Water Supply and Sanitation Study, Vol. IIB, 1985 87% of Kisumu's old town urban population is served by a water-born sewerage system. Of the remainder, those living in low population density areas are served by septic tanks and house-holds within the high population density use low-cost sanitation methods, usually pit latrines.

Incomes and Expenditure

In Kisumu Municipality, incomes vary from earnings under Kshs.215 per month to incomes in excess of Kshs.6,000 per month for a period of five years.

As per the Government's stipulated minimum wage in 1985 (KShs.540 per month), 50% of those employed lived below or close to the poverty line.

Currently, Kisumu Municipality has an area of 270 sq. km. Most of the land in the expanded areas is in private hands.