Effects of an In-service Workshop for Teachers on Frequency of Pre-school Children's Accidents in Selected Divisions in Nairobi, Kenya

By

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DECLARATION

This research proposal is my original work and has not been presented for a degree in any other University

Date 9/10/2009

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This proposal has been submitted for review with our approval as university supervisors.

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DEDICATION

This work which had many data collection phases and long periods of absence from home during piloting, baseline study (pre-testing period), and post testing in Rounds One, Two and Three for over one year is first and foremost, humbly dedicated to God the Ebenezer, for bringing me this far! My beloved late parents: Wamaitha and Mwithiga; dearest husband Mugo, children Liz, Jackie, Victor, Evelyn; grand children: Levina, Damien, Tasha; sisters, brothers and friends without whom the completion of this study would have been impossible. May God bless them abundantly!

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ABBREVIATIONS AND ACRONYMS

ANOVA:	Analysis of Variance
CICECE:	City Centre for Early Childhood Education
DICECE:	District Centre for Early Childhood Education
ECD:	Early Childhood Education
GMG:	Global Millennium Goals
GoK:	Government of Kenya
ISO:	International Standards Organisation
KEBS:	Kenya Bureau of Standards
KECEPTIA:	Kenya Early Childhood Education Private Training Institutions' Association
KIE:	Kenya Institute of Education
MoE:	Ministry of Education
NACECE:	National Centre for Early Childhood Education
P1:	Primary One
U.K.	United Kingdom
UNICEF:	United Nations International Children's Emergency Fund
USA	United States of America
WHO	World Health Organisation

ABSTRACT

A High number of accidents among children in school have been reported and in order to curb them, the City Centre for Early Childhood Education in Nairobi, Kenya was to conduct a refresher or in-service workshop for teachers on child safety-care. It was however not known whether or not, safety-care in-servicing would have a positive impact in influencing teachers' safety-care skills, thus reducing the high number of accidents among children thus the need for the current research. The Quasi Experimental research design using the pre and post test approach with an Experimental and Control group was used. Out of 541 pre-schools in Nairobi Province, random selection of 54 (10%) pre-schools was done and then they were evenly distributed amongst 3 divisions of Nairobi, ending up with nine schools in both the Experimental and Control group respectively. A similar number of teachers from each pre-school were selected. Half or nine of the teachers in each division were trained while the other half was not. This sample was adequate for an experimental design. Data were collected in five different phases: during piloting, pre in-servicing or Baseline Study phase, and post in-servicing phases in Rounds 1, 2 and 3, using a pre and post quasi experimental research design. The test-retest technique was used to test the instruments and Cronbach Alpha Coefficient used to correlate the test items. Descriptive and Inferential statistics were used to analyse data. Descriptive analysis involved use of frequency tables, means and percentages. For inferential analysis, One-Way ANOVA was used to test the six null hypothesis on the significant differences amongst teachers knowledge, beliefs and practices towards pre-school children's accidents as well as actual number of pre-school children's accidents attributed to human factors and those in the pre-school play and learning environments. Results show positive effects of in-service training on teachers' knowledge, beliefs and practices towards accidents, which ultimately translated into reduced number of accidents among children particularly in Round One of the study. However, after the Baseline Study and subsequent in-servicing of teachers, the number of accidents progressively started to increase but at times the positive effect lasted until Round 2 and in some instances up to Round 3. This pointed to the fact that in-servicing if not done periodically may not be very useful. The reason was that, time lapse seemed to interfere with the teachers' ability to remember safety-care techniques imparted during in-servicing. To effectively curb accidents among children, it was therefore recommended that teachers be in-serviced regularly at least once a year if possible so that they retain knowledge gained during in-servicing workshops. The curriculum developers could also separate the subject on Safety from Health, Nutrition and Care so that it could be taught alone more comprehensively in order to give it the weight it deserves. This would ensure that children's safety right is provided adequately.

CHAPTER ONE:

INTRODUCTION

1.1 Background to the Study

Safety against accidents is an important basic right (G.O.K. & UNICEF, 1994); G.O.K 1999, 2006a, 2006b) that most world governments must endeavour to provide. Safety particularly to pre-schoolers is most important because they are more vulnerable to accidents compared to other school children due to their developmental level. A high number of accidents among the pre-schoolers however, continue to occur, thus jeopardizing the enshrined safety right for children. Accidents affect children's holistic development and specifically, they cost parents as well as the government huge sums of money in terms of treatment (SchoolMatch, 2008). They also contribute to children's school absenteeism and disabilities some of which are irreversible thus affecting their self-esteem and confidence (G.O.K. & UNICEF, 1994). In addition, they reduce opportunities for children to play thus hindering their creative and exploration skills (Erikson, 1963; Freud, 1965; KIE., 1995). Consequently, the Government of Kenya in a bid to ensure child safety has provided basic guidelines to be followed in all pre-schools (K.I.E., 1995, 1999, G.O.K., 2006a, 2006b) in order to reduce accidents. However, despite the government's efforts to ensure safety, accidents to pre-schoolers continue to persist.

Global and local studies show that accidents among children in both developed and developing countries are high. In USA, for example, 73 school children out of 983 (McFayden et. al., 1988) were injured in 1983. In Milan, Italy, Pagano et. al. (1987)

reveal that accidents among school children and particularly those in pre-school were very high compared to other age groups and in Jordan, Janson et. al. (1994) also indicate that a high number of pre-school children were involved in various accidents due to environmental hazards.

Another study in the U.K conducted by Kamel, et. al (1999) indicates that about 700 children are involved in accidents yearly. In Egypt, Kamel et al, (1999) further reveal that 72% of the accidents occurred within the school compound. Locally, in Kenya, Oloo (1992), Obara (1998) and Gakuru et. al. (1995), report high number of accidents among children in the home environment. Muriithi et. al. (2008), similarly in a study in Kenya points out to high number of children (182) in pre-school and school in Nairobi, with eye injuries. In yet another study on accidents among children in pre-schools within Westlands Division of Nairobi Province Kenya, Mugo (2005) indicates that teachers and parents reported bruises to be highest followed by swellings, then human bites and finally cuts/stubs. Foreign bodies in the eyes, ears and nose, insect bites, choking, sprains, burns/scalds and poisoning are other accidents reported. In overall, there were a total of 3277 accidents, reported by teachers and 1445 by parents respectively. Most accidents were due to human factors and factors in the play and learning environments in that order, which also concurs with the Domino Theory by Heinrich (1959), used in this study.

One of the ways of reducing accidents might be re-training teachers on safety-care of children. In-service courses in New Zealand (Zeegers, 1995); USA (Cutler & Ruopp,

1999; Borko & Putnam, 2006); Zimbabwe (Dzivimbo, 1992) and South Africa (Ball, 2000) have shown that re-training teachers motivated them to improve their performance and that of children. In other studies, (Atkinson et al., 1983; Sdorow, 1993; Waithaka, 2003 and Gumo, 2003) also concur that staff inducement and motivation play an important role in the improvement of their performance. Staff in-service training enhances workers' knowledge, beliefs as well as practices towards accidents and enables them to perform their duties more efficiently and satisfactorily, thus ensuring children the safety-care they deserve. The above information on positive impact of in-service training appears to have focused more on Mathematics and Language curriculum areas but not safety-care and yet accidents among pre-schoolers are very high.

In Kenya, Ayot (1980) and Karugu & Kuria (1991) have conducted in-servicing of primary school teachers in curriculum areas such as mathematics and language among other areas in the past and the teachers in turn displayed positive success rates in their schools. K.I.E. (1999; 2000a; 2000b), equally reveal that Kenya Institute of Education trains as well as in-services pre-school teachers in the pre-service and in-service programmes respectively with positive outcomes in teachers' performance in their pre-schools. The subjects taught to the teacher trainees include pre-school curriculum areas and Health, Nutrition and Care which has a small component on child safety-care (K.I.E., 2005; 2006). Opportunities for in-servicing already trained pre-school teachers in safety-care, let alone curriculum areas however, are limited (Adams, 1995; Ngome, 2002).

UNICEF similarly in-services teachers on specific content but only does so in selected districts and seem not to have done anything on safety care. Aga Khan and Bernard Van Leer Foundations (K.I.E., 1995) are other organisations also that fund pre-school teacher in-service training. However, like Kenya Institute of Education, more emphasis is given to curriculum areas taught to pre-schoolers as opposed to safety-care and yet accidents among children are very high. The lack of adequate safety-care in-service training could thus be contributing to the high number of accidents in pre-schools reported.

The Ministry of Education was to conduct a safety-care in-service training for pre-school teachers in December, 2007 through City Centre for Early Childhood Education (CICECE), which is under the National Centre for Early Childhood Education (NACECE). In-servicing could be conducted using the traditional mode also referred to as the face-to-face, and/or the modern e-learning mode. The traditional mode requires the presence of a teacher and classroom (McKeachie, 1999; Mackenzie et al, 2001). The e-learning mode on the other hand, does not require use of a classroom Merril (2002); Swan (2003); Clark & Mayer (2003) and can thus be conducted anywhere, but requires a computer for the users to access learning content. Although e-learning is the modern mode that should be embraced, it appeared that the traditional in-servicing was the most suitable mode for the intended in-service workshop since most of our local primary and pre-schools do not have computers for teachers' use, let alone children's (Begi, 2007).

A good in-service training programme however could be hampered by poor organization and transmission of the learning content. Roling & Ascroft (1971; Mills (1991); Bennaars et al (1994); K.I.E. (1995) indicate that to ensure maximum comprehension of learning content by the learners, a good in-service programme must observe logical steps. The steps entail good preparation, use of appropriate methodology/resources, ensuring learners assimilate learning content through practice/encouragement, evaluating their understanding of the content and clarifying their misconceptions through feedback. It was therefore hoped that, the City Centre for Early Childhood Education (CICECE) charged with responsibility to in-service the teachers in the intended safety-care workshop would observe the above processes for proper conceptualization of learning content by learners. However, even if they did, it was not known whether the safety-care in-service training could have a positive effect as other in-service courses have indicated elsewhere. There was therefore a need for research to find out if it would lead to reduced number of accidents among pre-school children.

1.2 Statement of the Problem

Accidents are an increasing public health problem. Every year, a number of school children seek health services among other interventions. Studies in UK, USA, Italy, Jordan and Egypt (Pagano et. al. 1987; Janson et. al. 1994; Kamel et. al.1999) have reported high incidents of accidents in pre-schools. These findings have also been confirmed in Westlands Division of Nairobi Province, Kenya (Mugo, 2005). Most of the accidents reported are due to human factors, which may indicate the need to in-

service pre-school teachers to boost their morale. Zeegers (1995), Cutler & Ruopp (1999), Ball, (2000), Borko & Putnam (2006) have cited staff in-servicing as an effective tool in improving teachers' performance but the studies are not on safety-care.

In Kenya, Oloo, (1992), Gakuru, Koech & Nduati (1995), Obara (1998), Mugo (2005) show that accidents among children of pre-school age are high and although Ayot (1980), Karugu & Kuria (1991) and K.I.E. (1999, 2000a, 2000b) have shown positive effect of in-service training on teachers' performance in mathematics and language curriculum areas among other subjects. Adams (1995), Ngome (2002), Mugo (2007) however, point out that pre-school teachers have limited in-service training opportunities. This strongly suggested that their knowledge and skills in accident management may be in-adequate and safety-care in-service workshop hence needed. The City Centre for Early Childhood Education (CICECE) was to conduct a safety-care workshop for pre-school teachers. However, it was not known, whether this safety-care in-service workshop would have the same impact on teachers' performance as in mathematics, language and other curriculum areas. There was therefore need to conduct a research to determine whether the in-service safety-care workshop conducted for pre-school teachers was effective in improving their safety-care skills in order to reducing the high frequency of accidents among children.

1.3 Purpose of the Study

The purpose of the study was to determine the effect of an in-service safety-care workshop for teachers on pre-school children's accidents attributed to human factors

pertaining to teachers personal attributes, knowledge, beliefs and practices towards accidents as well as factors in the learning and play environments in selected divisions of Nairobi, Kenya.

1.4 Objectives of the Study

i) To identify the number of pre-school teachers by their personal attributes.

ii) To establish the frequency of pre-school children's accidents by teachers' personal attributes.

iii) To find out the effect of the safety-care in-service workshop on teachers' Knowledge, beliefs and practices towards pre-school children's accidents.

iv) To establish the effect of the safety-care in-service workshop on frequency of pre-school children's accidents due to human factors and factors in the play and learning environments.

1.5 General Hypothesis

H_1 In-service training on safety-care will reduce the frequency of accidents among pre-school children by enhancing pre-school teachers' knowledge on accidents and Their prevention.

H_2 In-service training on safety-care will reduce the frequency of accidents among pre-school children by enhancing teachers' beliefs towards prevention of accidents.

H_3 In-service training on safety-care will reduce the frequency of accidents among pre-school children by enhancing teachers' practices towards prevention of accidents.

H_4 In-service training of teachers will reduce the frequency of pre-school children's accidents attributed to human factors in pre-schools.

H_5 In-service training of teachers will reduce the frequency of pre-school children's accidents attributed to factors in the pre-school play environment.

H_6 In-service training of teachers will reduce the frequency of pre-school children's accidents attributed to factors in the pre-school learning environment.

1.6 Significance of the Study

The findings on the effect of safety-care workshop has suggestions to policy makers in ensuring child safety, curriculum developers, trainers, teachers, pre-school managers and parents/other ECD stakeholders. Specifically, policy makers may be motivated to formulate a more comprehensive policy on safety-care embedded in provision of compulsory and regular safety-care in-service training for new teacher recruits as well as those already trained periodically. They would also be motivated to put in place modalities to facilitate quality assurance officers to conduct routine inspections in order to ensure that the pre-school safety guidelines are strictly followed in schools. This in turn would ensure that the safety right of children is protected.

The curriculum developers and specifically the National Centre for Early Childhood Education (NACECE) and the District Centre for Early Childhood Education

(DICECE) under the umbrella of Kenya Institute of Education (KIE) could also use the study findings to improve their in-service teacher training programmes and specifically in child safety-care among other curriculum aspects. They could come up with safety-care training resources for tutors, teachers and other child caregivers to use.

The tutors or pre-school in-service teacher trainers in government institutions may also find the results of this study useful since it touches the young child for whom they are key advocates. They may thus be motivated to stress or give more emphasis to the subject on child safety-care during their contact time with teacher trainees or those already trained. Through them, pre-school children would in turn receive their safety right. Pre-school teacher trainers under the Kenya Early Childhood Education Private Teachers' Institutions Association (KECEPTIA) could also use the findings to emphasise the subject on child safety. They could also introduce refresher courses for pre-school teachers on safety-care prevention against accidents among children in pre-schools. This may enhance partnership with the government thus helping to realize the national motto, "Harambee or working collectively towards a common and desired goal."

The findings of this study may also motivate teachers to see the need to ensure maximum protection against accidents among pre-school children who were the main beneficiaries in the study. They may see the pitfalls that lead to children's accidents and how to prevent them. Children would in turn grow well physically, mentally and socio-emotionally.

The study findings may similarly serve to create awareness to pre-school managers and the entire school administration on their role in enhancing safety among children in their schools. They would be motivated to ensure that they provide children with a safe play and learning environment since unsafe play and learning environments were observed to be major causes of children's accidents. They could also be motivated to organise for their teachers to receive regular in-service training in safety-care and curriculum areas. They could also follow up teachers who were in-serviced in child safety were to see if they were applying skills acquired during in-servicing in order for them to prevent accidents among children in their pre-schools more effectively.

Parents and other ECD stake holders will be able to use the findings of the in-service workshop by ensuring that teachers of their children are in-serviced in safety-care regularly, apart from the curriculum areas in order to have reduced number of accidents in pre-schools. They will also be motivated to support facilitation of in-service training programmes for the teachers of their children.

1.7 Delimitations and Limitations of the Study

1.7.1 Delimitations

The study confined itself to accidents among children in pre-schools only. Other research studies can target older children in other school levels such as primary school or secondary schools.

The study also delimited itself to 54 pre-schools from selected divisions in Nairobi

Province, Kenya and focused on the effects of teachers' in-service workshop on children's accidents in 27 pre-schools which formed the Experimental Group while another 27 pre-schools formed the Control and did not receive training. Specifically, the study only covered pre-schools in Starehe, Kasarani and Westlands Divisions of Nairobi Province and as such cannot be necessarily used for generalization to other divisions or provinces that have different characteristics. However, the methodology can be used as a basis for research in other Kenyan provinces and the rest of the world.

Although accidents in waiting are just as important as injurious accidents (Heinrich, 1959), the study delimited itself to injurious accidents only. Accidents in waiting were thus beyond the scope of this study.

This study considered children's accidents according to their causes rather than their types. This allowed the researchers to identify which factors caused most accidents to children with a view to shed light on appropriate preventive measures by cause.

1.7.2 Limitations

Data collection, analysis and report writing for Round One of the study were scheduled to begin in January 2008 and end in April to pave way for Round Two in May but had to be postponed until February when schools opened following post election violence. This made it difficult because report writing of Round One, overlapped with data collection in Round Two which started in May to August. Nevertheless, a lot of effort and sacrifice was made to finish report writing of Round One and also data collection,

analysis and report writing of Round Two before embarking on Round Three which was the final phase. Another limitation was in the available research funding. Considering that the study employed the test retest technique in five different phases: (Piloting, Baseline Study, Round 1, Round 2 and Round 3), the funding was too little. However, other well-wishers came in to help thus bringing the study into successful completion.

1.8 Study Assumptions

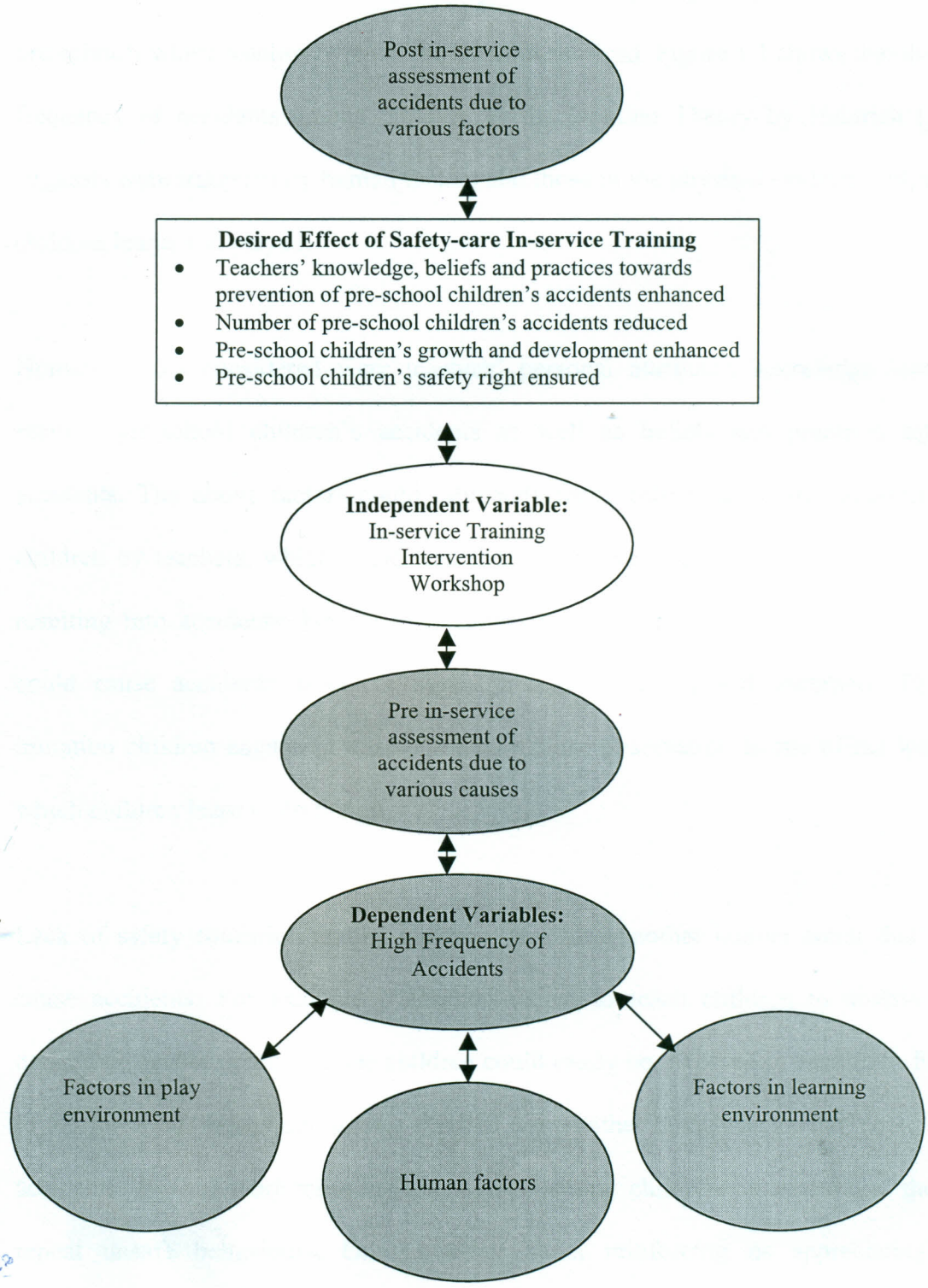
It was assumed that accidents among pre-schoolers do occur but they are preventable. Heinrich (1959) clearly shows that only 2% of accidents must occur and therefore it means that 98% of them could be prevented and efforts must be made to ensure this status quo. Another assumption was that pre-school managers or administrators and teachers would see the need for safety-care in-service training of teachers in their schools. In-service training of teachers in child safety could minimize accidents as was seen among teachers who were in-serviced on child safety in the study findings, as opposed to where teachers were not in-serviced.

1.9 Conceptual and Theoretical Framework

1.9.1 Conceptual Framework

The problem in the study was whether or not in-service workshop conducted by the City Centre for Early Childhood Education, could have a positive effect on teachers' knowledge, beliefs and practices towards pre-school children's accidents in order to minimize them (Figure 1.1).

Figure 1.1 In-service Workshop for Teachers to Reduce Accidents Among Pre-School Children in Selected Divisions of Nairobi Province



To establish the effect of the in-service workshop by the City Centre for Early Childhood Education, the researcher compared the frequency of children's accidents in pre-schools where teachers were or were not in-serviced. Figure 1.1 shows that the high frequency of accidents among children as the Domino Theory by Heinrich (1959) suggests were triggered by human factors and those in the physical environment, where children learnt and played.

Human factors considered were teachers' personal attributes, knowledge levels in relation pre-school children's accidents as well as beliefs and practices towards accidents. The above factors could ultimately result into in-adequate supervision of children by teachers, which could lead the children to committing dangerous actions resulting into accidents. Failure to demonstrate safe behaviour by teachers similarly could cause accidents among children through watching and imitation. Through imitation children engage in unsafe practices since observation is one of the ways by which children learn to do things.

Lack of safety education among children, was also another human factor that could cause accidents. For example if teachers failed to teach children to abstain from dangerous acts or conditions the children could easily be involved in accidents. Failure to reinforce safe behaviour among children was another human factor that could cause accidents. By not reinforcing safe behaviour among children, it encourages them to repeat unsafe behaviours. On the other hand, reinforcing or appreciating safe behaviours among children makes other children to put effort to display or engage in

safe behaviour so that they can earn credit or praise from their teachers. Not giving children appropriate answers to their questions regarding safety was similarly another human contributory cause of accidents that could lead children to engage in unsafe behaviours due to ignorance. A child could for example sustain an insect or snake bite if he/she asked the teacher whether it was safe for him/her to put a finger in a hole in the playground and the teacher responded by asking the child to try.

Factors in the pre-school environment could entail those in the outdoor play environment and the indoor classroom environment. In-adequate size of the playground for instance could lead to collisions amongst children. Other factors in the play environment were poor condition of the playground as well as play materials/equipment, which could lead to accidents among children. In addition, some other factors were wrong use of the play materials/equipment and provision of in-adequate play materials/equipment to children that could lead to scrambling for them by children thereby resulting in accidents.

In the learning environment, in-adequate size of the classroom similarly could lead to accidents such as collisions. Poor condition of the classroom as well as learning materials/facilities was other factors that could be responsible for accidents. Wrong use of learning materials/equipment as well as provision of in-adequate learning materials for use by children which could lead them to using them in unintended ways thus resulting into accidents were also other factors that could exist in the learning environment. During the study, human factors such as teachers' knowledge on

accidents, beliefs and practices that could lead to accidents as well as all the above factors in the play and learning environments that could similarly lead to accidents, were observed.

It was expected that after the safety-care in-service workshop for pre-school teachers conducted by the City Centre for Early Childhood Education (CICECE), the in-serviced teachers' knowledge on accidents among children as well as positive beliefs and practices towards prevention of accidents would improve. As a result, the frequency of children's accidents due to human factors and those in the play and learning environments in their pre-schools would go down. The children would ultimately grow and develop in a healthy manner with their safety right ensured.

1.9.2 Theoretical Framework

The Domino Theory of Accidents (Heinrich, 1959) guided the study on refresher or in-service training workshop for pre-school teachers in order to reduce accidents among children in pre-schools.

- **The Domino Theory of Accident Causation and Prevention- Heinrich (1959)**

The theory focused on accident prevention in industrial set up by addressing causes emanating from human factors and or mechanical as well as physical factors before they actually occurred. The theory was adapted to pre-school context and therefore only focused on human factors and physical hazards in the pre-school play and learning environments (see Table 1.1).

Table 1.1 Factors Leading to Accidents

Human Factors:	Factors in Play Environment:	Factors in Learning Environment:
-Poor knowledge of types, causes & prevention of accidents in learning or play environments	-Size of playground	-Size of classroom
-Negative beliefs towards accident in play or learning environments	-Condition of play facilities	-Unsuitable learning facilities
-Poor practices towards accident prevention in play or learning environments	-Condition of play materials	-Condition of learning materials
	-Inadequate play materials	-Inadequate learning materials
	-Incorrect use of play materials	-Incorrect use of learning materials

The Domino Theory of Accident Causation and Prevention (Heinrich, 1959) derives its name from the domino game. A domino is a small rectangular block marked with dots whereby the player matches two halves of dominoes by laying them side-by-side. The theory works in the same way as in the System's Perspective Theory (Bertalanfay, 1976) whereby all stages in an accident sequence are dependent on each other, thus they compare to a chain or row of domino-blocks placed on an end in alignment and if one falls, all the rest follow. Each domino therefore represents a linked cause. By removing any one of them the sequence cannot run its course, and therefore damage or injury will be prevented. According to the theory, injuries thus result from a completed series or chain of factors in levels or stages which begin or start in a specific environment like in the factory (work-place) described as the ancestry and social environment.

The second level/stage in the accident sequence is fault or unsafe acts in the industrial or work-environment. Situations like in-adequate management control, unsafe systems design, lack of suitable standards, fault of equipment or poor human relations emanating from the organizations' top management, could lead to accidents. Other

faults such as insufficient skill or knowledge by workers' failure to follow procedures or to perform well due to personal problems and lack of motivation, inattention or forgetfulness to ensure the right processes are in check are factors that could lead to accidents. Unsafe human acts could be error in processing products, taking short cuts, taking unnecessary risks, removal or stealing of safety equipment or ignoring to use safety equipment, which could also lead to accidents.

The third level/stage is the mechanical and/or physical hazard whereby the machines themselves, buildings or working area could get faulty, thus increasing the possibility of an accident occurring. Level/stage four is the accident in waiting stage. This stage could be described as the non-injurious accident where no damage to persons or property, befalls the industrial organisation. Finally, the fifth level/stage which is the last is the accident stage where damage to persons or property occurs. The theory further states that 88% of accidents occur due to unsafe human acts or behaviours and 10% by unsafe physical or mechanical conditions which Peterson (1998; 2006) in his accident/incidence theory describes as overload (overworking machines) and ergonomic traps (working environment/situation). The implication is that most accidents in the industrial set up, except for 2% which occur by chance are due to human actions by the management, or workers and that they could be prevented.

Heinrich (1959) therefore appears to have two central points. First, injuries are caused by action of preceding factors. For instance, if machines are not serviced or workers do not take necessary measures such as wearing protective clothing when handling

harmful products or even failure by the top management officials to provide a safe work-environment, could lead to accidents. Secondly, interrupting the sequence of accident or removal of the central factor, act or condition, prevents the accident from occurring. If the machines for example were serviced at the right time, workers wore protective clothing or managers improved on the unsafe work environment, the possibility or process of an accident occurring, could be halted altogether.

By effectively applying the Domino Theory to pre-school context, teachers, managers, support staff, and children have to be viewed like the industrial firm where managers and workers interact within the work environment or pre-school premises in this case. The above is stage one, where the accident sequence begins. Level/stage two in the pre-school environment could be situations like in-adequate management control of teachers or children, lack of suitable working standards, unsafe buildings, faulty or inadequate play or learning equipment and work pressures coming from the pre-school top management like in the factory or industrial firm, which could lead to accidents. The second stage could thus be viewed as the commission or omission of human faults/unsafe acts by workers and in this case, teachers. Peterson (1998; 2006) describes the above acts as "decision to err." In pre-school, the decision by the teacher not to supervise children keenly for example could lead children in similarly deciding to engage in unsafe actions like rough or dangerous play, leading to accident.

Stage three of the accident sequence which is hazards in the physical environment could be described as any unsafe factors in the outdoor or indoor physical

environments. The play environment for example might be unleveled while presence of unsafe equipment that is broken, may lead to accident. In the classroom, presence of splintered furniture or wrong size of tables and chairs which K.I.E. (1990b) recommends must be about 51.0 to 63.5 cm in height and 25.4 to 35.5 respectively, could similarly lead to accident.

The accidents in waiting or non injurious stage where no physical harm occurs to children, is the fourth level/stage. Negligence, fault or unsafe actions by the pre-school teachers in not providing appropriate play and learning facilities or supervising children, may therefore lead to accidents in waiting which are without injury, but this may be by sheer luck.

The fifth and final stage is the point when an injurious accident occurs. However, the accident sequence need not get to the fifth stage as it could be prevented by interrupting its' sequence through safe practices at all stages since the injurious accident could even be fatal or involve great physical and psychological trauma. It is therefore important to note that the accident sequence should not be allowed to complete its cycle, because it is never known whether an accident will or will not be injurious.

The theory was chosen because it has been effectively used in factories to reduce accidents and it was thus anticipated that by adapting it to pre-school context it may have the same effect since pre-school teachers also interact with fellow teachers, children other people within the school, physical facilities like classroom and play

equipment some of which could be mechanical. Curbing the faults and unsafe actions as the theory suggests could therefore minimize children's accidents. During the pre testing study phase (Baseline) and post testing phase in Rounds One, Two and Three, an attempt was made to find out if by interrupting the sequence of pre-school children's accidents as the Domino theory suggests, accidents could be prevented.

1.10 Operational Definition of Terms

Pre-school	Educational set up serving age three to six children before joining primary school.
Pre-schooler's	Children between three to six years and attending pre-school.
Accident:	Any physical injury incurred by children while in pre-school as a result of human factors and those by facilities in the play and learning environments.
Accident in waiting/potential accident	Any factor, action or event that led to accident or jeopardized children's safety in pre-school.
Safety-care:	Any actions which ensured that accidents in-waiting as well as injurious accidents did not occur.
Level of safety-care:	Its equivalence is number of accidents or judged from number of children's accidents

	in pre-school.
Teacher experience	Duration by number of years a teacher has taught.
Teacher education	Teacher's level of education attained, either primary, secondary or university.
Teaching experience	Duration by number of years
In-service workshop/in-service training or in-servicing	Short courses where already trained teachers, also referred to as refresher course.
Pre-service training:	Training of new teacher recruits persons who have never worked as teachers before.
Human factors:	Teachers' knowledge, beliefs as well as practices pertaining to safety-care against accidents in terms of supervision of children, safety education, demonstration of safe behaviour, reinforcing safe behaviour and giving correct/honest answers to children's questions regarding safety.
Knowledge:	A cognitive component involving teachers' understanding of types of common accidents among children in pre-school, their causes and prevention.
Belief:	A principle or what the teachers regarded to be true about the causes and prevention of

accidents among children in pre-school.

Practice: Teacher's actions towards accidents among children in pre- school.

Factors in play environment: Outdoor play state consisting playground in terms of size, condition, use and adequacy of play facilities.

Factors in learning environment: State of indoor learning area including classroom size, condition, use and adequacy of learning facilities.

CHAPTER TWO:

LITERATURE REVIEW

2.1 Accidents

The term accident is a complex one in terms of its scope, and is an important subject because accidents occur to human beings everyday, anywhere and anytime. They are unplanned Heinrich (1959), Peterson (2006) and involve or affect people of all ages and particularly pre-school children who may not be aware of dangers that could lead to serious accidents nor their prevention. Despite the enormous scope of accidents, this study endeavoured to explore all the diverse components related to it, since it affects peoples' and children's lives in different areas.

2.1.1 Definition of Accident

According to Grandison (2006), an accident is an unexpected and undesirable event, especially one resulting in damage or harm. Strasser et al (1973) define accident as an unplanned act or event resulting in injury, death to a person, or damage to property. A scholar on accident prevention, Heinrich (1959) describes an accident as both non injurious or injurious phenomena. Wikipedia (2007) states that an accident is a disaster which is specific, identifiable, unexpected, unusual and unintended external event which occurs in a particular time and place, without apparent or deliberate cause but with marked effects. Although the above definitions provide an insight to the meaning of accident, in this study, accident has been defined more appropriately in relation to causes in pre-school. It has therefore been defined as any physical injury incurred by

children while in pre-school as a result of human factors or those in the pre-school play and learning environments.

2.2 Children and Accidents

Children sustain many types of accidents Johnson (2007) and according to Shatnawi (1995); Gesundheitswesen (2001) the Consumer Safety Unit (2002); Hyder et al (2007) and BBC (2008), accidents among children are on the increase. In most industrialized countries, including Canada and the United States of America, unintentional injuries rank as the number one cause of death and a leading cause of hospitalization for children older than one year (Morrongiello et al., 2000). Krug et. al. (2000) also confirm that accidents among children in Britain, are high. In the year 2004, they reported 230 child fatalities due to accidents in England and Wales, the highest numbers being in 5-14 year olds.

2.2.1 Types and Causes of Accidents among Children

According to Krug et al (2000), the commonest accidental injury in children presenting to UK hospitals was falls. A recent report by the Audit Commission and the Healthcare Commission in UK indicates that each year there are 2 million attendances to accident and emergency departments by children as a result of accidents (Government of United Kingdom, 2009). United Nations (2008) also reveals that road crashes, drowning, burns, falls and poisoning were among the five commonest accidents among children and a leading cause of death among 10-19 year olds. Road crashes kill 260,000 children a year, and injure about 10 million. Approximately 175,000 children die through drowning yearly. About 96,000 others, suffer from burns, 47,000 sustain falls while about 45,000

are involved in unintentional poisoning. Regional differences showed that Africa, in which Kenya belongs, has the highest rate of unintentional injurious deaths. Its rate was ten times higher than in higher-income countries in Europe, which have the lowest rates.

In Middle East Jordan, Shatnawi (1995) indicates that the types of accidents among children under five years of age were cut wounds (52.4%) and that in male children, cuts were common at the age of two years (26.7%). In females, they were common at the age of three (24.7%). Another common accident was burns (20.0%). For male children, burns were common at the age of three years (32.7%), and at the age of two years in females (33.3%). Shatnawi (1995) further states, the highest common accident in general was falls (47.1%). In male children, (29.5%) of falls occurred at five years of age and for females (25.8%) at age of two years. The second highest type of accident was cut wounds (33.1%). The other types of accidents were foreign bodies inserted in orifice (6.5%) and accidental poisoning (6.4%). Falls, foreign bodies inserted in orifice and accidental poisoning were more common in boys than girls, at the second and third year of age, except for foreign bodies which were common at age of five years. All types of accidents were common in summer except for burns, which were common in winter at (39.5%).

In the Boblingen District of Germany, Gesundheitswesen (2001) reveals that falls were the most common accident in homes, and that they are the leading cause of death in childhood as well as a significant cause of morbidity. Boys had 33% more accidents than girls and as Schwebel et. al. (2002) also state, boys are more prone to accidents than girls due to their biological make up. About 3/4 of all accidents took place at home or in its direct environment. Concerning the age

distribution, a peak was seen at age 2. The most common causes of the falls were: falling from stairs (10.2%), falling from playground equipment (9.5%), falling from a bicycle (8.9%), falling from a high bed (6.0%), falling from a high chair (3.9%), falling from a nursery table (3.2%). In Damascus, Bashour et al (2008) conducted a study on home accidents covering two main areas of residence from Kaissa and Al-Adawi, where a total of 1125 children were involved. The children were drawn from four areas of residence namely: agricultural rural, non-agricultural rural, peri-urban and urban. During the year preceding the study, 261 injuries were reported, an incidence of 23%. The most frequent injuries were falls (52.0%).

In another study, Hyder et al (2007) focused on the incidence and mortality rates caused by injuries from falls in children below five years of age for 19 years in 56 studies in three developing countries. The sample consisted of twenty one (21) children from Asia, twenty (20) from Africa and fifteen (15) from South America. Results indicated that on an average, 52 575 (36%) of injuries among the children sampled were falls. The overall average incidence rate for childhood falls was highest in South America at 1315 followed by Asia at 1036 and Africa at 786 per 100 000, respectively. Average mortality rates were highest for Asia at 27 followed by Africa at 13.2 per 100 000, respectively. In Kibera, Kenya falls were due to slippery surfaces (Gakuru et. al., 1995). Most accidents involving falls among children could also occur from climbing on windows, furniture or stairs. Others could be caused by tripping hazards from items such as children's toys, torn/damaged carpets or objects left in the wrong place (Stoppard, 2001).

Odero (2004) on incidence and characteristics of injuries in Eldoret, Kenya, also indicates that a good number of children sustain falls. A greater proportion of children aged 0-4 years however, mostly sustained burns (34.4%) while older ones aged 5 years and above (30.8%) were involved in falls. In another study conducted among children in Marigat District in, Kenya, Oloo (1992) reports that burns and scalds accounted for 82.8% accidents among children and youth below 20 years. Among the accidents, falls were 53.3% and that most victims were below 4 years old.

Due to the increased use of glass within children's environment, glass related accidents have become common thereby resulting in cuts (Government of United Kingdom, 2009). Use of furniture which incorporate glass such as coffee tables, wall units, and utensils like glass tumblers and bottles are responsible for many accidental cut injuries among children. Broken glass can cause serious problems particularly if it lodges itself in children's body. According to Gakuru, et. al. (1995) accidents among under five year old children were also common in Kenya. The most frequent types of accident in order of occurrence were falls, cuts, burns and scalds. Cuts were caused by broken glass and use of knives or blades.

Domestic fires also pose one of the greatest risks to children particularly in rural families. In Kisumu, Kenya Obara (1998) reveals that the cause of burns/scalds among children was cooking activities in the home being conducted with fire on the ground and within children's reach. Other causes of burns could be children playing with matches and lighters or from contact with cooking stoves, irons and many other hot metal surfaces.

Sometimes they come into contact with them after they have been left to cool down. Scalds are often from hot drinks or hot water bath. Hot drinks or liquids could also pour on children if they unintentionally knock over them. Panhandles and cooking pots containing hot food stuffs on fire or on the dining table may also cause scalds.

Poisoning is also one of the most common accidents among children. The most common causes involve medicines, household products and cosmetics (Merck, 2003). Snake bites and thorn pricks were also cited as common causes of poisoning in Marigat, Kenya Oloo (1992) most probably due its semi arid state. Some poisoning agents can cause breathing difficulties. Chemicals stored in wrong containers such as soda bottles can mistakenly be ingested by children. Potted plants with poisonous leaves or berries are also some of the commonest causes of poisoning in children (Stoppard, 2001). Accidents involving airways such as suffocation and choking in children usually occur through swallowing or inhaling on items like small toys, peanuts and marbles are a good cause for choking while infants can suffocate themselves with curtains and blinds if the pull cords are not kept short and out of their reach. In addition, pets, especially cats, if allowed in children's bedrooms can irritate the child's respiratory system leading to failure to breathe.

Accidents related to drowning are also common among children due to the fact that they are naturally fascinated by water. Uncovered bowls or buckets of water around the home, bath tubs and paddling pools are responsible for accidents related to drowning (Stoppard, 2001). Assaults were other accidents which were also common among children (Oloo, 1992).

Although the types of accidents among all children might be similar, gender could influence the type of accident among them. According to Ezewu (1983); Seifert et. al. (1987); Shatnawi (1995) and Odero (2004) accidents among children could be influenced by gender or age. Boys for example are biologically stronger in physique and are thus more daring to venture into discovery activities. They therefore naturally love activities involving use of large muscles which make them more susceptible to serious accidents involving falls and bangs. The Government of United Kingdom (2009) concurs with the above statements and further reveals that boys are more at risk from accidents than girls due to their inherent love for rough tumble play. Girls on the other hand prefer quiet activities involving use of fine finger muscles such as cooking and cutting. They are therefore more likely to sustain burns and cuts.

Age has also been cited as a factor for accident occurrence. Younger children in age tend to suffer burns while older ones seem to suffer more from falls (Shatnawi, 1995, and Odero, 2004). Children with early disruptive behavior are also accident prone and more likely to suffer from various types of accidents (Tomlison-Keasey, 1985; Seifert et. al., 1987; Ndurumo, 1993; KISE, 2002; Schwebel, et al 2002). Some accidents among children could similarly be influenced by weather (Shatnawi, 995). In a study among children in Jordan, Shatnawi (1995) reveals that burns were more common in winter while other types of accidents were more common in summer. Children for example are more likely to be involved in accidents during the hot or dry season due to the fact that the weather is conducive for outdoor activities. In the cold season burns and scalds may

be common since children might naturally gather around fire to keep warm. They could also sustain scalds from hot drinks meant to warm them up.

According to the Consumer Safety Unit (2002) the majority of accidents among children occur during summer, school holidays at home or in holiday accommodations and week ends particularly between late afternoon and early evening. The Consumer Safety Unit (2002) further reveals that factors such as stress, death in the family, chronic illness and homelessness, or moving to a new home increase the likelihood of children having an accident. Accidents also occur when people are in a hurry or when the usual routine is changed or has been neglected as Stoppard (2001) also states. Distractions and in-adequate supervision are also often the cause of accidents.

Children could also be involved in accidents because they are often absorbed in their own immediate interests and therefore, they can be oblivious to their surroundings. The Government of the United Kingdom (2009) points out that children could be involved in accidents because they have a limited perception of the environment due to their lack of experience or development. In addition, they are also curious and not aware of the consequences of the many new situations they encounter daily that could lead to accidents.

Elsewhere, Villalba-Cota et. al. (2004) indicates that variables in parents such as mother's age, history of alcoholism, maternal/paternal education level, time mother spent at home

with the child, presence or absence of parents at the time of the accident and parents' occupations were major factors that could contribute to accidents among children. The Consumer Safety Unit (2002) also reveals that poor housing, overcrowded conditions or social deprivation in general, leads to increased number of accidents. Children from poorer backgrounds were five times more likely to die as a result of an accident than those from better off families. In Kenya, most citizens live below the poverty line (G.o.K. and UNICEF (1994). The study of accidents among pre-school children in Westlands, Kenya is thus timely in order to find out how the accidents could be minimized.

The above accidents cost a lot of money to treat and although it is difficult to give a true cost of treating children's accidents as outpatients and inpatients, Hogg (1996) reveals that accidents were estimated to be over £200 million a year during his study period but currently, it could even be twice as much. This figure does not reflect the long-term costs of prolonged treatment and rehabilitation or the cost of pain suffered by the child. In addition, the lifetime disfigurement or disability and the financial loss to the family or work hours lost while caring for the injured child have not been factored in the above figure. Accidents should therefore not be allowed to occur due to the financial implications they involve.

Although various types and causes of accidents have been covered in this section, the main focus of the above accidents was the home. However, in the current study, the main focus was on accidents to children in schools and specifically in pre-schools in Westlands division of Nairobi province. The above types and causes of accidents to children were

also important because they were used as a basis to study types and causes of children's accidents in schools but more specifically in pre-schools. The next section discusses the prevention of accidents among children.

2.2.3 Prevention of Accidents among Children

Accident prevention is an enormous and difficult task that requires multi disciplinary approach in order to minimize them. To guard against road accidents for example, Wikipedia (2009a) recommends use of safety belts, child lock in car doors or helmets when cycling. In accidents related to falls among children Stoppard (2001); Steve (2008) and Demayo (2009) state that tripping hazards on floors and stairways can be avoided. Damaged or worn carpets should therefore be repaired or removed. Stairs should always be well lit and well secured to prevent or avert falls. Where there are young children of pre-school age, stairs should be made secure by use of balustrades and fitting a safety gate at the top and bottom of stairs if possible. The balustrades used should be strong but should not have any footholds for climbing. Pre-school aged children love to climb on various structures and hence care should be taken not to leave them alone. Objects that they can climb on should not be left under windows since they are a good source for accidents involving falls.

Windows should also be made secure by fitting child resistant window locks. However, care should be taken to ensure easy exit incase of an emergency. Furniture and tall kitchen appliances may also be pulled down by younger children and can fall on them

resulting in serious accidents. Such objects should therefore be kept securely in lockable cupboards or kept in such a way that children cannot reach them.

Domestic fires are another category of accidents that pose great risk to children of all ages (Stoppard, 2001, Consumer Guide Unit, 2002 and Government of United Kingdom, 2009).Younger children enjoy playing with matches and lighters and could start a fire unintentionally, ending up in serious accidents. Matches and lighters should thus, be kept out of children's sight or reach. Older children on the other hand could be involved in fire related accidents when left to cook on their own or if they are not aware of appropriate measures to guard themselves against fire related accidents.

To prevent such accidents, children should not be left to cook unsupervised. Loose or hanging pan holders on the cooker could also catch fire and be the source of a big fire (Consumer Guide Unit, 2002 and Government of United Kingdom, 2009). Rear hotplates on the cooker should consequently be commonly used so that young children do not reach out for them thus sustaining burns or scalds. Panhandles should also be turned away from the front of the cooker and items like hot irons, curling tongs and hair straightners be kept out of reach even when cooling down (Consumer Guide Unit, 2002 and Government of United Kingdom, 2009). Obara (1998) also reveals that our rural homes could also pose danger of fires which could lead to burns among young children in particular, because cooking is done on the ground with firewood. To prevent such accidents children should similarly not be left unsupervised.

Hot drinks or fluids also cause accidents related to scalds. To guard against scalds caregivers should never hold hot drinks and the child at the same time. Hot drinks should also be put out of children's reach and away from the edges of tables and worktops (Stoppard, 2001). Use of a coiled flex or a cordless kettle that cannot be easily tugged by children thereby spilling hot contents should also be used. The domestic hot water system should also be moderated or fitted with a thermostatic mixing valve to taps. When running a bath cold water should be turned on first. Caregivers should check the water temperature with the elbow before letting a child get into the bath or shower. In addition, children should never be left alone in any environment. They should always be supervised but without interfering with their independence, unless danger is sensed when they are working with fire.

To guard against accidents from glass related items or equipment, toughened glass which passes the impact test should be used (the Consumer Guide Unit, 2002). Safe laminated glass should also be used in windows and doors especially those at low level. Already existing glass for doors or windows which may not be safe could also be made safer by applying shatter resistant film. When buying furniture which incorporate glass, ensure they bear approval from authorities (the Consumer Guide Unit, 2002). If glass breaks, it should be quickly removed and disposed of safely.

In the area of poison related accidents, medicines and chemicals should be kept out of sight and reach of children Merck (2003) and preferably in a locked cupboard. Wherever possible, caregivers should buy products or medicine in child-safe medicine bottles or

child resistant containers to reduce the rate of accidents. Chemicals should always be stored in their original containers and any unwanted medicines or chemicals disposed safely (K.I.E., 2004). Poisonous leaves or berries or those that can irritate the child's skin should be avoided. Many poisoning agents can affect the entire body while some may cause breathing difficulties or even death (K.I.E., 2004). Children should thus be guarded against poison related accidents.

Suffocation and choking through swallowing or inhaling on items are other accidents that could cause instant death among all age groups. Younger children however are more at risk as they like to play with objects that they can easily swallow such as peanuts, buttons, marbles and toys (Oloo, 1992; Obara, 1998 and Government of United Kingdom, 2009). If possible, such objects should be kept out of reach of children below three years of age and appropriate choice of toys according to age be done. Older children should be encouraged to keep their toys away from their younger playmates. Pull cords on curtains and blinds should be kept short and out of children's reach. Pets, especially cats, should be kept out of children's bedroom (Stoppard, 2001).

Accidents related to drowning are also common among children and to prevent them, constant supervision should be ensured when they are in or near any water since children are naturally fascinated by water (Stoppard, 2001). They should for example never be left unsupervised particularly in the bath even for a moment. Bowls or buckets of water around the home should not be left uncovered. Paddling pools should be emptied and stored away when not in use. Garden ponds should be filled in where there are small

children or securely fenced off (United Nations, 2008). Special care should be taken when visiting other people's gardens. During the study, it will be explored whether or not teachers in the sampled pre-schools, use some of the above preventive measures where relevant in pre-school.

2.3 School Accidents

Accidents among children in school are not very different from those at home but due to the fact that in school there is a larger number of children concentrated therein, knowledge of the different types of accidents among children in pre-school, their causes and prevention is important. Knowledge of the types of accidents in school for example is necessary in order to be able to make correct identification of the type of accidents among children. On the other hand, knowledge of the factors that cause accidents among children in pre-school could help to prevent them. This would also help to cut down the cost of treating injured children and legal pursuits filed by parents in order to acquire compensation SchoolMatch (2008). In this section, efforts were made to find out the types of accidents among children in schools, factors causing them and their prevention, with particular emphasis to pre-school. The types of accidents are discussed first, followed by their causal factors and lastly their prevention.

2.3.1 Types of accidents Among Children in School

School accidents generally occur outdoors within the school compound or in the classroom. Older children in primary and post primary schools may be more involved in sporting activity-related accidents such as falls, sprains, fractures and drowning in

swimming pools, while those in pre-school may be more involved in accidents such as stuffing of foreign bodies in their body parts, human or insect bites, poisoning from ingestion of some play and learning materials within the school environment or cut wounds during cutting lessons (Stoppard, 2001 and Government of United Kingdom, 2009). In a study on accidents among school children in U.S.A., McFayden et. al. (1988) recorded 73 different types of injuries among 983 children in one year and a total of 9695 school absences with a range of 0-65 absences per child. The accidents ranged from falls to collisions. In Britain, Kamel et al. (1999) also state that accidents kill an average of 700 school children every year from various accidents, but if the non-fatal accidents are accounted for, the number of accidents is much higher. Among some of the types of accidents reported are burns, fractures, falls and collisions. In Sweden, Schelp, Ekman & Fahl (1991) also show that most injuries in children at school are due to falls and bangs while in Australia, Jones and Olam (1995) reveal that bruises and fractures are some of the accidents sustained by children in school due to falls.

In Middle East and specifically in Iran, Nouri et. al. (2004) on accidents at primary schools during the period1999 to 2003 reveals that many children are injured in traffic related accidents on their way to school. However, he further adds that falls from a height and burns were also common injuries at school and that boys were much more at risk than girls as they were more inclined to take risks during play.

In Uganda, Africa, Nakitto et. al. (2004) on a survey of injury risk due to the physical environment in schools within Kawempe division in Kampala, with a pupil population of

8489 in 19 schools, 90% of which were located within 100 meters of a main road, reveals that children faced risk as they walked to school. Schools had policemen to guide children while crossing roads. One out of 17 schools with a kitchen where firewood was used to prepare meals had a fire extinguisher. Three schools had steep slippery slopes, seven had sharp tree stumps, one had unprotected windows, five had broken stairs and four had incomplete sports structures. The perimeter of seven schools were enclosed with open barbed wire, five with sharp hedges, six with broken walls and two with wired wooden poles. School playgrounds were simply bare grounds in 70% of them and play areas not clearly defined. Half the schools had injurious materials in the playgrounds. Seventeen schools had unprotected open water sources. Nineteen schools had a teacher as the person in charge of health, 15 out of those had no training in basic health education or first aid and only 14 schools had a first aid box.

From the above description, it was evident that the teachers were not well prepared to prevent accidents. Safety-care in-servicing of teachers in the above schools could be probably the remedy in helping to minimize the high number of children's accidents, among other approaches. The above accidents however, are on middle aged and teen aged children in school and do not cover pre-school children who are the most vulnerable group due to their tender age.

On pre-school children's accidents in Milan, Italy, Pagano et. al. (1987) collected data regarding 11,541 cases of accidents among children in kindergartens including older ones till senior high school requiring hospital attention. Pagano et. al. (1987) reveal that the

frequency of accidents was highest (about 2%) among kindergarten pupils, while in senior high school the lowest frequency (less than 1 %) was accompanied by the greatest percentage of hospitalizations. It appears that most accidents occurred during games (around 50%), and that the percentage of sprains and fractures was high. The play area could therefore be considered as a primary target for any prevention activity.

In Jordan, Janson et. al. (1994) in a study on accidents among pre-school children in the suburb area, reveal that children were exposed to fire, drugs, and chemical agents daily, and played in dangerous places. Children under 2 years of age were frequently burned, and those slightly older injured through falls and cuts. Boys were more accident-prone than girls as most studies on children indicate. Although the above accidents involve pre-school children, they are neither in African context, nor Kenyan.

In Africa, Egypt, empirical studies on accidents among children in pre-school show that accidents are a concern. In the above study, Kamel et. al., (1999) indicate that 72.6 % of injuries to children occurred in the pre-school compound while 27.4% took place elsewhere. Falls accounted for 49.2% accidents and were the most common followed by collisions at 25.2% while bruises accounted for 51.6% injuries and fractures 23%. Other types of injuries were burns and joint dislocation. In Kenya however, systematically obtained data on pre-school children's accidents were scanty and most available information mainly focuses on fires in some boarding secondary schools (Gicheru and Mumo, 1998; Murigi, Wabala and Waithera, 1999; King'ori, 2001; Nzia and Kavila, 2001).

Murithi et. al. (2008) specifically on eye injuries among pre-schoolchildren in Nairobi, Kenya reveal that eye injuries in Kenyatta National Hospital are high. There were a total of 182 pre-school aged children including older ones up to 15 years reported with eye injuries. Male: female ratio was 2:1 and the median age was seven years with bimodal peaks at four and seven years. The most common cause (35%) was sticks. One hundred and twenty seven cases (70%) were open- globe injuries. One hundred and fourty one (77%) seven year olds had visual acuity worse than (6/60). The eyes were so severely damaged and had to be removed. Ninety five children (52%) were referred from Central and Eastern provinces while 87 (48%) were from Nairobi province. Most children or cases 26 (31%), were from low-income areas including Kibera, Dandora and Kariobangi areas in Nairobi. The situation may generally affect children's education, careers as well as quality-of-life and hence injury-prevention programmes were deemed necessary. In the above study however, Murithi et. al. (2008) only emphasize eye injuries and yet high number of accidents such as falls, cuts and bruises have been cited to occur in pre-schools elsewhere (Pagano et. al., 1987 and Kamei et. al., 1999).

In yet another study conducted in Kenya, Mugo (2005) covers a range of pre-school children's accidents in Westlands Division Nairobi where teachers reported 3277 cases of accidents and 1445 by patents. Bruises were highest at 1245 (37.9%) and 657 (45.8%), swellings at 572 (17.5%) and 179 (12.5%), human bites at 486 (14.8%) and 124 (8.6%), cuts/stubs at 390 (11.9% and 211 (14.7%), foreign bodies in eyes at 216 (6.6%) and 57 (4.0), insect bites at 100 (3.0%) and 59 (4.1%), choking at 87 (2.7%) and 33 (2.3%), Sprains at 46 (1.4%) and 24 (1.7%), foreign bodies in ears at 39 (1.2) and 24 (1.7%),

fractures at 33 (1.0 %) and 20 (1.4%), burns/scalds at 12 (0.4%) and 11 (0.8%), poisoning at 11 (3%) and 3 (0.2%). The above study by Mugo (2005) mainly focused on causes of accidents among children in pre-school. The current study however focused more on prevention of accidents, through in-servicing of pre-school teachers on child safety-care but the causes of accidents are first revisited as a base for prevention.

2.3.2 Factors that Cause Accidents Among Children in School

Empirical studies on the factors that cause accidents among children in schools are not as vast as home accidents. Nevertheless, a large number of accidents among children do happen in schools. SchoolMatch (2008) reveals that despite efforts by educational leaders to ensure student and employee safety in schools, an increasing number of accidents during education-related activities have been reported. Some occur within the school premises while others happen outside as children travel to or from school. Accidents could also occur during school trips. Heinrich (1959) classifies accidents by three main causes namely: human factors, mechanical and or physical hazards. In this study, accidents have been classified according to human factors and those in the play and learning environments.

- **Human Factors Contributing to Pre-school Children's Accidents**

Human factors cause majority of the accidents among children (Heinrich, 1959). According to Stoppard (2001) accidents to children usually occur, when routine procedures are neglected or the caregivers are stressed, or disturbed and unable to give full attention to

supervision of children. Neglecting routine procedures and stress could be an indication that teachers are de-motivated, leading to dissatisfaction in their job and reduced enthusiasm to carry out their duties effectively. Waithaka (2003) concurs with these sentiments and suggests that paying teachers their salaries in time among other motivators increases their level of job satisfaction and in this case it could be postulated that paying them at the right time could improve their performance in supervising children. Gumo (2003) similarly states that the teachers' level of training is related to how well or not they perform. In addition, in-servicing of already trained teachers has also been cited as a strong motivator to increased productivity in school (Vallerand, et. al. 1991; Gusky and Huberman, 1995; Ball, 2000; Borko and Putnam, 2006). Lack of safety-care in-servicing of teachers could thus interfere with provision of safety-care service to pre-school children

In-adequate supervision of children by teachers also contributes to accidents. In school, children use different types of materials which could result in injuries such as bangs to them if there is inadequate supervision (K.I.E., 1992a; Stoppard, 2001). To enhance effective supervision, K.I.E. (1999) advocates for a teacher-child ratio of 1:25-30 for 3-4 year olds and 1:35 or less for 5-6 year olds. Failure to supervise children could also lead to in-discipline and although pre-school children can be easily moulded to follow school rules, some are defiant and could engage in activities which could result in injuries to themselves or others if discipline is not ensured (Olembo & Wanga, 1992). At mealtime, choking could occur in children while exposure to hot food or drink could result in burns or scalds (K.I.E., 1992a and Obara, 1998). Medicine carried to school by sick children could also cause poisoning through taking incorrect dose Stoppard (2001), if there is in-adequate

supervision. During the study, an attempt was made to find out the number of accidents among pre-school children attributed to in-adequate supervision.

Another human factor that could contribute to accidents among pre-school children is lack of clear instruction. In outdoor lessons for example, children use different play equipment and some equipment like the swing requires to be used by only a limited number of children at any one time, while the seesaw requires instruction on how to hold on to the rails and also sit in order to balance. For children to use the slide, they need to be in a single line and take turns. During cutting activities with scissors children need to be instructed on how to handle them. Reported accidents, which could occur due to lack of clear instructions, are: falls, cuts, stubs (Beaver, 1984; K.I.E, 1992a). During the present study, efforts were made to find out whether after in-servicing of teachers in safety-care, the number of pre-school children's accidents related to teachers' lack of clear instructions declined.

Failure to demonstrate as well as role model safe behaviour could also cause accidents in children. According to Bandura (1977) and K.I.E (1995), children learn by observation and imitation. Pre-school children could therefore learn behaviours like pinching and beating from teacher's habits such as corporal punishment thereby inflicting harm to others or themselves. Failure by the teacher to reinforce safe behaviour in children could also be another cause of accidents. Skinner (1956) emphasizes reinforcement as an important tool for shaping human behaviour. Teachers could reinforce safe behaviour in children through use of safety education stories where

by an obedient character or child was awarded or escaped serious accident due to practicing safe behaviour the caregiver had taught. K.I.E. (1999) cites story telling as an effective teaching tool for pre-school children. In addition, children take pride in competition to undertake new tasks or challenges during learning and praise for doing it safely and correctly encourages them to attempt. During the study, safety-care in-service training of teachers in order to curb pre-school children's accidents was put to test in order to establish whether or not it would have a positive impact in reducing all accidents attributed to the various human factors discussed.

- **Factors Causing Accidents to Pre-school Children in the Play Environment**

The pre-school play environment if not safe can contribute too many accidents. According to Mugo (2005), the play environment comes second after human factors in accident causation. Safety in the play environment includes the size of the play space, its condition and that of the equipment used for play, the way children use them and quantity of the materials based on the number of children. The play space for example must allow for $3m^2$ space per every individual child (K.I.E. 1995). This is because if it is too small accidents involving collisions, could easily occur. The play space if not taken care of could also cause accidents (V.A.S., 1987, K.I.E., 1992b; K.M.A., 1988). Beaver (1984) further reports that falls due to various causes such as in-correct use account for 70% of accidents sustained.

The condition of the play space if not well maintained could similarly lead to accidents. Potholes, sharp objects and uneven playground for example could lead to falls, sprains

and fractures while materials used to fence the compound such as the thorny k-apple, rough edged iron sheets or splintered wooden off cuts could also result into accidents. Long grass in the play area on the other hand could harbor snakes ending up with snake-bites among the children. Insects such as wasps and bees could also hide in nests or un-kept live plant hedges and cause bites or stings to children. The sap from some poisonous plants like rhubarb, tomato leaves and lily of the valley could similarly be harmful to children's eyes or cause discomfort if ingested (Stoppard, 2001). At the same time, animals kept in the school compound for learning purposes like cats and dogs could also bite, scratch or cause allergies among children K.I.E. (1992); Stoppard (2001). At the sandpit, dry sand could also cause eye injuries, while tyres used for play if worn out or with exposed wires could cause cuts to children and teachers need to be aware of such factors causing accidents in the play environment.

Poor condition of play materials or facilities due to lack of care or maintenance Hobbert & Frankel (1995), could also lead to accidents. Bolts could get loose or the facilities could break down due to wear and tear thus endangering users and in this case pre-school children. Improperly fixed play equipment on the other hand could snap off thereby causing injuries (Hobbert and Frankel, 1995). The condition of play facilities like play equipment being wet Mugo (2005), could also lead to skids and falls while sun-scorched metallic play equipment could burn children's tender skin. Un-cushioned landing surfaces and use of non-standard size equipment by local carpenters or manufacturers Stoppard (2001) are all possible causes of injuries in children examined during the study.

Apart from the poor condition of play materials/equipment or facilities, their wrong use could also be a source of accidents. Mugo (2005) states that incorrect use of play equipment like sliding head first, or jumping from the climbing frame or swings could for example lead to injuries like sprains or fractures. Use of open swings for young children without ensuring the chain has been fastened to secure them could lead to falls and bangs. Provision of Inadequate play materials or facilities could also lead to children fighting for them due to their egocentric nature Piaget (1984) resulting into accidents. Some common injuries that could be sustained include swellings and bruises (Stoppard 2001).

Play is one of the most important learning methods in pre-school, which provides the children with an opportunity to move about freely K.I.E. (1994). Children should therefore be provided with a safe play environment without any compromise. The study sought to establish whether after in-service training of teachers in the Experimental Group of teachers, some of the various factors that contribute to pre-school children's accidents in the play environment discussed herein, would be minimized.

- **Factors Contributing to Pre-school Children's Accidents in the Learning Environment**

The learning environment includes size of the buildings or classrooms, their condition and that of the materials, tools and equipment in there. In-adequate classroom space or size in terms of the number of children could for example lead to collisions. According to K.I.E, (1990) each child requires $1m^2$ learning space to allow for free movement and

use of tables, and chairs but the way the furniture is arranged could create restriction leading to accident as children try to move about in or out of class (Hobbert & Frankel, 1995). In addition to classroom space, inappropriate size of furniture could also lead to injuries. K.I.E, (1990) thus recommends that the height of pre-school children's chairs should be between 24.5 – 35.5 cm while tables should be 50 -63.5 cm to guard against accidents.

The condition of the classroom could also cause accidents. Broken windows and doors as well as broken glass for window panes, un-even classroom floors and cracked walls are conditions that could lead to accidents (Government of United Kingdom, 2009). Broken windows or glasses could for example lead to cuts, while un-even floors could cause falls. Cracked walls could harbor insects leading to insect bites in the classroom. In addition, areas used for burning litter if designated on the windward side could blow and cause burns to children particularly if children are un-supervised.

Wrong use of learning materials or facilities could equally lead to accidents. Practices among children such as chewing or swallowing small objects used during learning for example beads, buttons, pieces of rubber and crayons or inserting them into the nose or ears could lead to accidents. Obara (1998); Bruce & Meggit (1999) & Stoppard (2001) have all shown the dangers of wrong use of some of the above learning materials. Other accidents could emanate from learning tools like pencils whereby children poke or stub their colleagues. Some learning materials such as play-dough, paints and plastic paper bags used for storing of learning materials could lead to accidents (K.I.E., 1992; Obara,

1998 and Stoppard, 2001). Play dough if eaten by pre-school children could result in choking, paints could lead to lead poisoning while plastic paper bags if worn over the head could cause suffocation and teachers need to be aware of such factors that can cause accidents in the learning environment. During the study an attempt was made to establish whether or not after in-servicing of teachers in the Experimental Group, the number of children's accidents attributed to any of the above factors in the learning environment in their pre-schools would reduce.

In the next section, the possible prevention measures of accidents attributed to human factors and those in the play and learning environment are discussed.

2.3.3 Prevention of Accidents among Children in School

School children, live, learn and play in different environments where accidents are likely to occur and prevention is necessary. The prevention measures are organized starting with human factors followed by those in the play and learning environments.

- **Prevention of School Children's Accidents Due to Human Factors**

Accidents among children could be prevented by ensuring simple precautions. According to Peterson (2006; 1998) & Heinrich (1959), unsafe human behaviours or practices cause the highest number of accidents. To prevent accidents among children in school, teachers therefore need to be aware of how to reduce human factors that could lead to majority of the accidents. Zanna and Rempel (1988) further reveal that knowledge, beliefs and practices strongly influence the way humans think, feel and do.

In pre-school, human factors such as teacher's personal attributes such as age or gender, little knowledge on common types of accidents among pre-school children, negative beliefs about accidents as well as poor accident prevention practices are possible accident contributory factors of both injurious accidents and those in waiting. Unsupervised children for example could fight and hurt one another. Not guiding children on how to use or store learning/play facilities safely or in the right place could also lead to accidents (K.I.E., 1992, 1995 and Stoppard, 2001). A ball left in a wrong place for example can be trampled on, causing a bad fall and subsequently an injury like a sprain or fracture. Specifically, aspects that could prevent accidents such as keen supervision of children by teachers, teaching children safety education, constantly reminding them to follow safety rules always and reinforcing/demonstrating safe behaviour among children, are factors that teachers needed to be aware of.

Lack of safety education apart from in-adequate supervision and reinforcing safe behaviour in using learning materials like scissors, shells and beads or other materials used as counters could lead to accidents such as cuts and even inserting the small objects into body parts (Gregori et. al., 2002). Human factors are not the only causes of accidents among pre-school children as there also exists other factors outside the teacher that require prevention. The size of the play/learning space, their condition and that of the play/learning facilities, their wrong use, as well as their in-adequacy in terms of quantity, are other factors within the play and learning environments that could cause accidents. The prevention of the above specific factors are discussed below.

- **Prevention of School Children's Accidents Due to Factors in the Play Environment**

In the pre-school play environment, torn bean-bags for instance should be stitched because they could injure children's eyes if their contents spill out, while adequate play space ($3m^2$ per child) if provided guards against collision related accidents (K.I.E., 1990b; 1994; 1995). To prevent accidents among children, leveled playgrounds should be provided for children, open holes/pits in the play area sealed, and sharp objects like stones, thorns, sticks, broken bottles, nails or long grass cleared away. Metallic play facilities should not be located directly under scorching sun because they can get too hot and injure children's delicate bodies (Stoppard, 2001; Nakitto et. al., 2004). Burning of litter as well as any fires lit in the school compound should be supervised until the fire dies off to guard against burns amongst children. Dry sand used for play which may fly into children's eyes thus causing eye injury should also be made safe by wetting while use of closed swings with fasteners for beginners or younger children should be used to prevent falls (Stoppard, 2001).

Dangerous practices and rough games such as pushing, not isolating younger children from older ones who can knock them over and not walking in an orderly manner in a line when leaving or entering class as a group should also be observed (Mugo, 2005) to guard against collisions. Unavailability of a suitable fence to ensure children remain safely in school and use of inappropriate fencing materials like thorny hedges, torn corrugated iron sheets or splintered off cuts, K.I.E. (1995) & Nakitto et. al. (2004) should be equally guarded against since they could lead to accidents. In addition, insect

nests and long grass should be cleared from the school compound to avert accidents such as insect bites as well as snake bites. During the study the school compound was explored to find out whether or not, the in-serviced group of teachers ensured some of the above discussed safety measures, to prevent pre-school children's accidents in the play environment.

- **Prevention of School Children's Accidents Due to Factors in the Learning Environment**

Provision of suitable or good condition of classroom learning facilities can prevent many accidents. Classroom walls and learning facilities such as desks, windows and doors therefore should be intact, K.I.E. 1995 to guard against children's accidents. Floors should be well leveled and kept dry to prevent accidents such as sprains or fractures due to falls (Stoppard, 2001). Adequate learning space per child i.e. $1m^2$ indoors as recommended by KIE (1990b; 1994; 1995) could prevent accidents like physical collisions, and is important to ensure. Adequate learning materials or facilities should also be ensured to guard against children competing for them leading to fights, biting, pinching or scratching one another because they are bound to fight for in-adequate materials as already mentioned due to their egocentric nature (Piaget, 1984; Ingule, Rono and Ndambuki, 1996).

Appropriate furniture should also be availed for children's use to guard against accidents. The furniture should neither be too heavy nor too light. Too heavy furniture can hurt children if it falls on them while too light furniture could topple over them easily (Government of United Kingdom, 2009). Provision of correct size of furniture

also guards against falls while good arrangement of tables and chairs prevents accidents like collisions. K.I.E. (1990b; 1995) thus advocates for proper classroom arrangement and also recommend that children's tables should be 25.4 to 35.5 cm in height and chairs 25.4 to 35.5 cm high. Use of stoppers or pads for doors and windows, Stoppard (2001) ensures that children's fingers are not slammed. Safe use of plastic paper bags meant for storage should also be ensured because they could lead to suffocation among children and the bags should be perforated to minimize chances of suffocation. Similarly, safe storage of medicine for sick children should be ensured to guard against children poisoning themselves through over dose (Stoppard, 2001; Merck, 2003) without the teachers' knowledge.

During meal-time, children should be cautioned against undesirable table manners such as talking with food in the mouth, to prevent choking. Teachers should also reward children's safe behaviour in pre-school in order to encourage them to engage in safe behaviours. Skinner (1956) has shown the importance of reinforcement in form of rewards and punishment to help children learn desired behaviour. The reward could simply be recognising them through verbal appreciation of their attempt to practice safe behaviour or clapping for them. At the same time, children who consistently defy rules of safe behaviour or use of materials should also be punished in order to discourage them from such behaviour. As Decay Theorists like Altmann & Gray (2002); Goldstein (2005) show, children also can forget what is expected of them in as far as ensuring safety is concerned. Children therefore need constant reminders of safe behaviour and also teaching them safety tips to prevent accidents. During the study, attempts were

made to find out whether or not in-serviced group of teachers managed to keep pre-school children's accidents attributed to the various factors causing pre-school children's accidents in the learning environment. However, to ensure accidents among children are prevented reasonably, a combination of other factors, are required.

In the next section, some of these factors such as teachers' personal attributes, training/in-servicing or re-training of teachers are examined as tools for accident prevention.

2.4 Teachers' Personal Attributes and Training/In-servicing as Accident Prevention Initiatives

Education scholars consider teachers' personal attributes and training as well as re-training as important tools in ensuring that teachers are well equipped to ensure children learn well Ayot, (1980); Karugu Kuria, (1991); Mills, (1991); Bennaars et. al., (1994); Farrant, (1997); McKeachie, (1999); Merril, (2002), and also in a safe environment Teachers' personal attributes that can help in preventing accidents among children in school, are discussed first.

2.4.1 Teachers' Personal Attributes as Accident Prevention Initiative

According to Farrant (1997), teacher's personal attributes are important factors in ensuring how well they discharge their duties. Personal attributes in the teacher such as educational level, age, gender, teaching experience, drive for choice of career, and training are among the important prerequisites that can contribute to how well or not they perform their duty.

- **Teachers' Educational Level and Training**

  Educational level is an indicator on how much potential the teacher/caregiver has in understanding issues (Government of Kenya, 1999). The higher the teachers' or caregivers' educational level, the more knowledgeable and capable they are in their ability to perform their duties properly. Training on the other hand ensures that the teacher is equipped with the necessary teaching skills and how to relate with other persons within the school (Farrant, 1997). During the study, teachers' educational level was established in order to find out whether or not they had the capacity to ensure child-safety in pre-schools.

- **Teachers' Age and Gender**

  On age and gender, Piaget (1984), Goode (1989) & Seifert et. al. (1987) show that these attributes have influence in the way people act. Mature people in age are more likely to make the right decisions in regard to their work and to uphold the expected professional values. The argument behind this supposition is their maturational level (Piaget 1984). Gender on the other hand influences our personal preferences and what we do (Goode, 1989; Seifert et. al., 1987). Women for example are more likely to be gentle and tender to children and those around them due to cultural expectations. In school and particularly pre-school, female teachers would be more likely to feed children, clear up and clean children easily if they soil themselves than would their male counterparts. During the study, teachers' maturity in terms of age and also gender were established as pre-requisites that may boost their performance in dealing with children.

- **Teachers' Experience**

  Teaching experience relates to how long and often the teacher/caregiver, practices the required skills needed by children and is an important attribute that was considered. The longer the teachers' years in service the more chances they have to practice teaching/learning skills or techniques (Farrant, 1997). Practice therefore, not only helps teachers to do well in their job but also to perfect their work. Best (1963) emphasizes the importance of practice in achieving good results. Decision to pursue or choose a specific career willingly, also determines how well or not we work. Workers who enroll for their career willingly have natural love for their job and can work beyond the expected limits without being pushed (Atkinson, 1983 and Sdorow, 1993). The love for the job becomes a motivator in itself. The next section explores in detail whether training/in-servicing of teachers can boost their performance in child safety-care in order to prevent or minimize accidents among children in school but most importantly, in pre-school.

2.4.2 Teacher Training/In-servicing as Accident Prevention Initiative

Training is an important factor that determines how well or not the recipient learns to perform in his/her professional job. During training one is exposed to work expectations and techniques to ensure quality service delivery (Benaars et al., 1994 and Okumbe, 1998). Training if done once without further advancement later on in form of re-training may not be very useful since human beings tend to forget (Reitman, 1974; Bouston & Swarzentruber,1991; Altmann & Gray, 2002 and Goldstein, 2005). Trained workers thus require constant re-training or in-servicing in order to refresh their minds

and to ensure they acquire new skills and knowledge. A preliminary study conducted in 2007 to find out how often pre-school teachers were in-serviced revealed that majority of them have never been in-serviced since they graduated from teacher training colleges and this could be the reason why accidents among children are high. There was therefore need to conduct the safety-care in-service training workshop for pre-school teachers in order to find out whether or not in-servicing could be an effective way in preventing accidents among children in pre-schools.

Both training and in-servicing of teachers in Kenya is the responsibility of the Kenya Institute of Education (KIE 1986, 2005, 2006). The training initiatives culminate in various awards such as P1 for primary school teachers and diploma for teachers in secondary schools. For pre-schools, there has been a 2-weeks as well as 5-weeks in-service course for tutors of pre-school teachers and 2-years in-service as well as pre-service alternative/regular certificate courses for pre-school teachers (KIE 1986; 1999; 2000a; 2000b; 2001a; 2001b; 2001c; 2001d; 2005; 2006) but there are also other weaknesses. During pre-school teacher training, for example, safety care is minimally or superficially taught under a broad unit entitled, "Health Nutrition and Care," and it may not be possible to adequately give it the weight it deserves.

Specific studies on refresher courses for teachers have been done globally in mathematics and language. Research in New Zealand (Zeegers, 1995), USA (Vallerand et. al., 1991; Gusky & Huberman, 1995; Cutler & Ruopp, 1999; Ryan & Deci, 2000;

Borko & Putnam, 2006), in Zimbabwe, Africa (Dzivimbo, 1992) and South Africa (Ball, 2000) have all shown positive outcomes in motivating teachers to increase their work output. However these courses and workshops were not on safety-care and research on effects of in-service training on safety issues seems lacking.

In Kenya, the Kenya Institute of Education (K.I.E.), UNESCO, Aga Khan and Bernard Van Leer Foundations conduct teacher in-service programmes (KIE, 1995). Ayot (1980); Karugu & Kuria (1991) also reveal that in-service training of teachers has been done locally with positive results, but the courses mainly targeted primary school teachers and were neither on safety-care. A preliminary study in 2007 by the researcher on in-service training for already trained pre-school teachers also revealed that majority of them have never been in-serviced since they left teacher training colleges ten or fifteen years ago. This is likely to result in de-motivation in their work and loss of valuable knowledge, positive beliefs as well as practices in regard to accident prevention acquired during training. Reitman (1974); Bouston & Swartzentruber (1991) concur that lack of reinforcement or motivation can lead to loss of valuable information by extinction or decay and in this case it may lead to low child safety-care and thus high number of accidents. To enhance teachers' performance, Waithaka (2003) and Gumo (2003) also emphasize the importance of motivation of teachers. This may be possible through organising in-service training or refresher courses for them regularly. Lack of in-service training opportunities for pre-school teachers however, has been pointed out as a major set back in quality delivery of services (Adams, 1995 and Ngome, 2002). The high number of accidents among pre-school children could thus be

possibly due to lack of regular in-service training.

Other organizations like Kenya Red Cross Society and St John's Ambulance conduct in-service courses for teachers on first aid but their main focus is treatment and not prevention. In-service training of pre-school teachers on child safety-care therefore appeared necessary and the City Centre for Early Childhood Education (CICECE) which is under the National Centre for Early Childhood Education (NACECE) conducted the in-servicing. In-service training can be transmitted using the oldest or traditional mode also referred to as the face-to-face and/or the contemporary e-learning mode.

The traditional mode of in-servicing requires the physical presence of an instructor, classroom and/or learning materials to deliver instruction through various methods among them discussion, project, lecture, question and answer, use of materials, simulations, games, drill and practice (Bonwell and Eison 1991; Mills, 1991; Bennaars et. al., 1994; KIE 1995; Farrant, 1997; McKeachie, 1999; Mackenzie, O'Brieen, and Guiney, 2001). A major strength of the traditional mode of in-servicing is that it allows for interaction through discussions, use of question and answers, provides exchange of ideas and improves the learner's understanding and analytical skills (Bonwell and Eison 1991; Mills, 1991; Bennaars et. al., 1994; Farrant, 1997; McKeachie, 1999). Learners are for example engaged in large, small and panel group discussions where a team of four or five learners form a group and each of them assigned a specific topic within a related subject to tackle within a given time limit. However, bright learners can easily

monopolize discussions or encourage trivial arguments, hence the need to set rules for participation, observing general respect for other speakers and allocating them equal time. The traditional mode however, has one major disadvantage in that it over exerts the instructor's energy unlike in the e-learning where computers are used and lessons could be re-played as desired for use with ease.

In-service training must however be a dynamic process embracing new technology for more efficiency which therefore makes the e-learning in-servicing mode appropriate. The e-learning mode may not require the physical presence of an instructor, classroom and or learning materials but occurs in a virtual classroom (Allessi and Trollip 2001, Hirumi 2002; Merril 2002, Swan 2003, Clark and Mayer, 2003). This mode therefore allows for instruction anywhere, any time or to many students in different venues. It provides a good opportunity for individualized teaching and in a comfortable manner. It also eases the instructor's workload since preparation and presentations are easier by use of computer technology (Buckingham-Shum, Marshal, Brier and Evans, 2001; Clark and Mayer, 2003; Meredith & Newton, 2003; Swan, 2003). Most local schools however, do not have computers (Begi, 2007). Computer unavailability in most schools therefore pause a major limitation towards choice of e-learning mode and so it may not be the best choice in our local set up. It was therefore anticipated that during the in-service training, the City Centre for Early Childhood Education would use the traditional in-service training mode.

The focus of the in-service workshop or the way learning content is transmitted

however is most important in order to ensure learners comprehend the learning content or the attainment of the learning objectives as described below.

2.4.3 Focus of In-service Training

The success of any instruction depends on its focus on the learning content and how it is passed to the learner. According to Roling & Ascroft (1971; Mills (1991); Bonwell & Eison (1991); Davis (1993); Bennaars et al (1994), success in instruction entails skill in logically organizing the learning content and its transmission as described below:

a) Good Preparation:

It covers the entire implementation process and begins with highlighting the goal or objective, which helps in its attainment when everybody is aware of the direction to move. Preparations will thus be done in regard to lecture outlines, content to be taught, selection and procurement of materials/resources needed, venue for training/its appropriateness, timing, transport, estimated budget/funding of training, establishing trainees suitable training period/time and their values among other requirements. The learning content for safety-care in-service training for example may include: the types, causes and prevention of the common accidents among children in school.

b) Methodology/Resources used in Transmitting Learning Content:

This has to do with how and by use of what resources the learning content has to be presented or passed to the learners. The instructors/trainers therefore have to be

ready with outlines of lecture proceedings, be creative, use learning aids and be lively during lecture transmission. A good presentation and particularly use of variety of learning resources help to capture the learners' or trainees' interest since they summarize the learning content to be taught apart from stimulating their sensory perception. It also helps them to remember main concepts easily (Harris, 1979; Bonwell and Eison, 1991; Farrant, 1997; McKeachie, 1999).Over-head projectors, tape recorders, flip charts and handouts are some of the useful resources particularly in the Traditional Mode of delivering learning content that could be used.

c) Assimilation of Learning Content by Trainees:

Assimilation or understanding of learning content by trainees is an important aspect. Unless learners understand and apply new knowledge taught, then it is deemed that learning has not taken place. Assimilation of learning content by learners/trainees may be done through encouraging active participation between them and the instructor and provision of ample time for learners and instructor to establish whether learning content has been conceptualized.

d) Assessment/ evaluation Method:

In order to further determine whether trainees have understood the learning content or not, lesson evaluation is necessary. To evaluate learners, well planned activities need to be used. Learners for example may be assessed through quizzes, tests and progress reporting. Assessments are most important and effective in disclosing

strengths and weaknesses that may exist in instruction in order to make any improvements.

e) Feedback:

Feedback is the continuous response from learners to the instructor. Continuous response is important in making improvements and re-evaluating the success of the programme (Mills, 1991; Bennaars, Otiende and Boisver, 1994, Farrant, 1997; Ginsberg & Wlodkowski, 2000). Through feedback, learners' doubts are cleared promptly.

During the study, it was not possible to predict how well or not the City Centre for Early Childhood Education, prepared for and conducted the safety-care in-service training. Efforts were thus made through research, to establish the overall effectiveness of the safety-care in-service training. This was done by comparing the in-serviced and non in-serviced teachers in their knowledge, beliefs and practices towards accidents in order to see whether or not, they were able to minimize the causes of accidents and ultimately the occurrence of accidents, among children in their pre-schools.

In conclusion, it is incumbent on school managers and administrators to ensure they sponsor their teachers for in-service training workshops on safety-care and also follow them up to ensure they make use of knowledge and skills imparted during in-servicing. Okumbe (1992) & Mwaura (2009) point out the importance of follow up

by administrators in order to ensure teachers execute their roles as they should. For teachers to ensure their safety-care duties properly as reinforced during in-servicing it is thus important for school administrators or heads of schools to ensure consistent follow up of teachers under them, as a key strategy in school management.

As a matter of importance, they should also wholly comply with safety standards set for schools and if possible apply to be certified as quality service providers by the International Standards Organization (ISO) through the Kenya Bureau of Standards as modern trends require (KEBS, 2002 and ISO, 2009). Parents and other ECD stakeholders would be more motivated to send children to their schools when they are publicly known to be ISO certified. Prevention of accidents among pre-school children particularly due to their tender age could reduce serious injuries some of which may be irreversible. Physical as well as psychological pain among injured children could also be reasonably prevented. Prevention of accidents could similarly minimize school absenteeism McFayden et. al. (1988); G.O.K. & UNICEF (1994); Kamel et. al. (1999) which contributes to poor class-performance due to failure to attend school, while recuperating from accidents. In addition, prevention of accidents could cut down cost of treatment as well as legal fees filed against schools by parents of injured children which are on the increase as reported by SchoolMatch (2008). During the study, it was hoped that school administrators would ensure follow up of their teachers after personnel from the City Centre for Early Childhood Education in-serviced them during the intended safety-care workshop.

CHAPTER THREE:

METHODOLOGY

3.1 The Research Design

The study used the quasi-experimental research design using a time series pre test - post test control and experimental group approach. A quasi-experiment is a scientific research method primarily used in social sciences to explain relationships and/or clarify why certain events happen (MacDonald and O'Brien, 2008; Shuttleworth, 2008 and Wikipedia, 2009b). Quasi experimental means "as if or almost a true experiment". However, it has characteristics of true experiment which seek interventions. A disadvantage of the design is that it lacks absolute control of an experimental design since random selection of the sample is usually not possible (Dawson, 1997; Barry and Joan 1997; Trochim 2006; Shuttleworth, 2008 and Wikipedia, 2009b). However, in this study, efforts were made to randomly select the sample. The sampled groups were also equal in number (see Table 3.1, page 71).

The method was appropriate because it allows for subjects to be observed in their natural settings (Trochim, 2006 and Wikipedia, 2009b). Barry & Joan (1997) & Shuttleworth (2008) also reveal that repeated measures prior and after the treatment by use of the time series, provide a general overview or trends of the problem under study over time and rich information about the sample. It is similarly likely to provide a more reliable picture of achievement and allows for follow up to be made after the study, to rectify or control the problem. In addition, the design has an inbuilt control system

because it allows for examination through experimentation. It was therefore possible to find out the impact of the in-service training over time, by comparing the frequency of children's accidents in pre-schools where teachers were or were not in-serviced prior and after the in-service workshop.

3.1.1 Study Variables

The study variables as elaborately and operationally defined in section 1.10 were:

a) Independent Variable:

It was the in-service safety-care workshop offered to pre-school teachers in December 2007 by the City Centre for Early Childhood Education (CICECE), which is under the umbrella of the National Centre for Early Childhood Education (NACECE). According to the research design, half of the teachers sampled attended the workshop and acted as the Experimental Group while the other half did not attend and acted as the Control Group.

b) Dependent Variables:

The dependent variables were frequency of accidents occurring to children due to:

i) Human factors in relation to:

- Teachers' knowledge on accidents among children
- Teachers' beliefs on accidents
- Teachers' practices towards accidents

ii) Factors related to the play environment namely:

- the playground in regard to size and condition
- play materials/equipment in terms of condition, use and adequacy

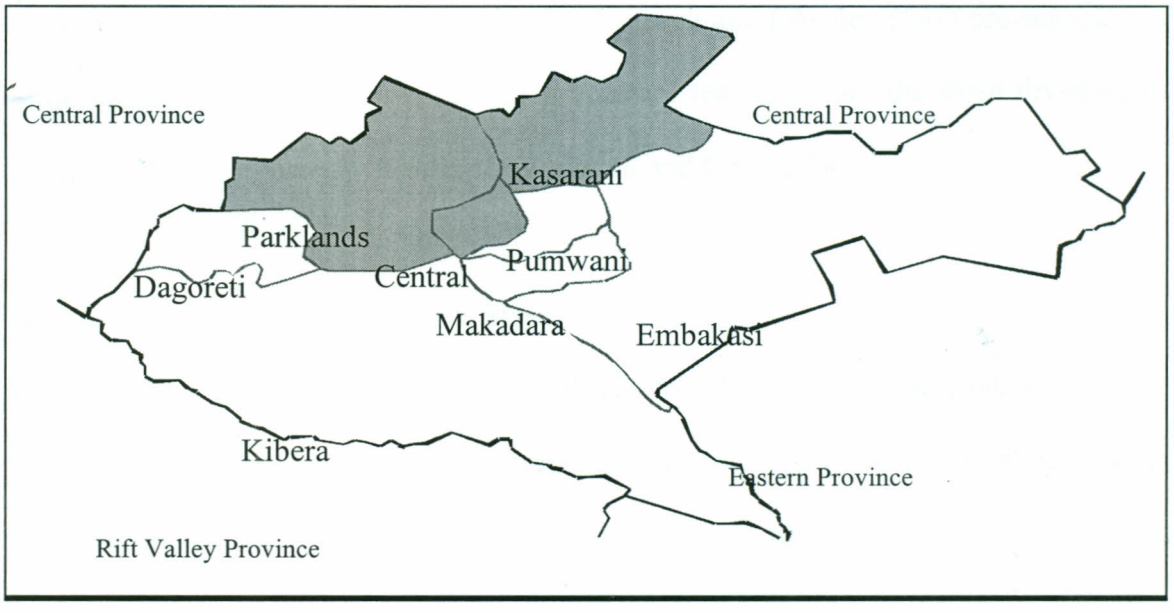
iii) Factors related to the learning environment namely:

- the classroom in terms of size and condition
- children's furniture as well as learning materials/tools in terms of condition, use and adequacy

3.2 The Location of Study

Nairobi Province (see Figure 3.1), was the location of study selected for follow up of a previous study by the researcher Mugo (2005), on "Causes of accidents among pre-school children in Westlands Division, Nairobi.

Figure 3.1: Map of Divisions of Nairobi Province



Source: K.I.E. 1990a, p. 6

The province has a large population of pre-schools, within a small area. Nairobi province also cuts across schools located in all socio-economic types of background. Examples are the slum areas such as Mathare, Korogocho, Kibera, Kibagare, Soweto and semi urban areas like Langata, Kangemi and Kawangware where accidents are likely to be high due to poor play and learning facilities as well as less knowledgeable staff. It also has rural like areas such as Upper and Lower Kabete as well as the posh Runda, Muthaiga, Westlands, Karen, Woodley, Yaya, and Lavington residential areas, where accidents might be fewer due to availability of adequate as well as appropriate learning facilities and more knowledgeable staff. Nairobi Province and its eight divisions therefore give a better representation of the Kenyan pre-schools and children since it has a cross section of all types of families in Kenya. Specifically, three divisions of Nairobi Province: Westlands Division also referred to as (Parklands), Starehe Division (Central) and Kasarani Division (Mathare) which are all on the northern side of the province, formed the locale for the study.

3.3 Target Population

The population targeted for study was five hundred and fifty one (541) pre-schools and one thousand and eighty two (1,082) pre-school teachers from the three divisions of Nairobi Province, namely Westlands, Kasarani and Central Divisions.

3.4 Sampling Procedures and Sample Size

Multistage sampling techniques were employed to select the divisions, pre-schools and teachers. The technique involved selecting the sample using various methods and in different stages from the beginning to the end, thus the name multi-stage. It was

appropriate because the sample included various divisions, pre-schools and pre-school teachers that required to be sampled in stages as described below.

3.4.1 Sampling Techniques

a) **Nairobi Province:** It was purposively selected for follow up of a previous study by the researcher in 2005, on "Causes of accidents among pre-school children in Westlands Division of Nairobi".

b) **Divisions:** Westlands Division also referred to as Parklands with 187 schools, was also purposively selected for follow of the above mentioned study in 2005, which established high incidence of accidents among children in pre-schools in the division. Starehe Division also referred to as Central with 170 schools and Kasarani Division (Mathare) with 184 were randomly selected. Nairobi Province has 8 divisions and the decision to select randomly these two divisions was made to remove bias.

c) **Schools:** Random listing of all the 541 pre-schools that were purposively selected from the Starehe, Kasarani and Westlands divisions was first done. From the 541 pre-schools in the three divisions, fifty-four (10%) of them were randomly selected and matched according to socio-economic placement of the school. They were then evenly distributed ending up with eighteen (18) pre-schools in each division (stratum). The eighteen schools in each stratum were again evenly stratified ending up with nine (9) pre-schools each to represent the Experimental Group to be trained

and nine (9) pre-schools to consist of the Control Group that was not to receive training (see Table 3.1). The schools were not matched in any criteria except for equal numbers in the two strata and that they were evenly distributed according to socio-economic status. Ary & Razevicoh (1972); Gay (1981); Mugenda & Mugenda (1999); Fraenkel & Wallen (2000) show that 10% sample size is adequate for an experimental design.

d) **Teachers:** Fifty-four (54) teachers or one teacher per school were randomly selected as in the pre-schools above, to participate in the study.

3.4.2 The Sample Size

From Starehe, Kasarani and Westlands Divisions of Nairobi, 54 pre-schools and a similar number of teachers formed the sample size. Half of the teachers were in the Experimental Group and were trained while the other half was in the Control Group and were not trained (Table 3.1).

Table 3.1 Sample Distribution of Pre-schools and Teachers

Divisions	**Number of Schools**		**Number of Teachers**	
	Exp Gp.	**Control Gp**	**Exp Gp.**	**Control Gp**
Starehe (Central)	09	09	09	09
Westlands (Parklands)	09	09	09	09
Kasarani (Mathare)	09	09	09	09
Sub-total	27	27	27	27
Total	**54**		**54**	

3.5 Research Instruments

The following two instruments were administered repeatedly before the in-service workshop as a baseline and again after the in-service workshop to compare effects of training on teachers' level of accident prevention.

i) **Teacher Interviews:** Knowledge of accidents, beliefs about accidents as well as practices regarding accidents were established.

ii) **Observations:** The teachers' level of safety-care based on number of accidents due to human factors as well as those in the play and learning environments were observed.

3.5.1 Interview Guide for Teachers

It was used due to its appropriateness in collecting information on teachers' knowledge, beliefs and practices towards accidents since both the interviewee and interviewer could clarify or elaborate their answers or questions. More information from the interviewee could also be obtained through probing. The interview guide had four sections starting with the introductory part which also included teachers' personal attributes. It was followed by part A, B and C with five questions in each part. Each of the sections carried 25 marks or a total of 75 marks for the whole interview guide in the three sections. Part A contained information regarding teachers' knowledge on types of accidents among children, the causes of accidents and their prevention. Part B focused on teachers' beliefs on accident causation and prevention, while part C focussed on teachers' practices towards safety-care against accidents. The teachers were supposed

to answer all the questions in a span of given time, during the different phases of the study.

3.5.2 Scoring of Interview Guide

a) **Knowledge:** The section on knowledge contained 5 questions in 5 parts and therefore a total of 25 questions (see Appendix D). Where the teacher showed good knowledge of accidents, 1 (one) point was assigned for each question or a total maximum of 25 points for the entire section in Part A and nil for incorrect answer where the following aspects were evident:

- Ability to know the types of common accidents among children in pre-school
- Ability to know the causes of accidents
- Ability to know how to prevent accidents among children due to above causes

b) **Beliefs:** A belief is what one regards to be true. Teachers' beliefs like accidents among children are preventable, adequate supervision and completely safe school facilities prevent most accidents among children were considered, starting with the most favourable response below being assigned the highest score and the most un-favourable the lowest score as follows: 5 points = Strongly Agree [SA], 4 points Agree [A], 3 points Neutral [N], 2 points Disagree [D] and 1 point Strongly Disagree [SD] (see Appendix D). However, for negative favourable responses like, "in-adequate supervision is not the major cause of most accidents to pre-schoolers" or "accidents must occur when children interact", the reverse applied as follows: 1 point = Strongly Agree [SA], 2 points Agree [A], 3 points Not Sure [NS], 4 points

Disagree [D] and 5 points Strongly Disagree [SD] (see Appendix D). Finally, the points were added up to find out the teachers' final score.

c) **Practices Towards Accidents:** Points were assigned according to teachers' positive practices, regarding accident prevention among children as follows: Very Often = 5 points, Often = 4 points, Not sure = 3 points, Sometimes = 2 points and Never = 1 point (see Appendix D). The points were finally added up to find the total score for each respondent.

3.5.3 Observation Checklist

The instrument was appropriate because of its benefit in gaining first hand information on the number of children's accidents in order to determine teachers' level of safety-care due to human factors and those in the play as well as learning environments. It had two parts 1 and 2.It was administered during pre and post in-service workshop in order to compare the effects of in-service training of teachers' on children's accidents as well as their safety-care levels (see Appendix D).

3.5.4 Scoring of Observation Form on School Accidents

The observation form was used to record number of accidents among children in the pre-school per factor.

i) Number of Accidents:

Tallies were used to record the number of accidents among children due to the

factors listed below in a thirty minute session divided into three ten minute sessions per day in outdoor play and indoor learning activities in the pre-schools sampled, in order to establish the trend of teachers' safety-care levels before and after the in-service training workshop.

On the form, the tallies for accidents were made in relation to the following factors.

ii) Human Factors:

Accidents among children due to the following human practices were observed and tallied according to the following categories:

- In-adequate supervision of children
- Failure to demonstrate safe behaviour to children
- Failure to give children safety education
- Failure to reinforce safe behaviour in children
- Failure to give children appropriate answers in regard to their questions on safety

iii) Factors in the Play Environment:

Number of accidents due to the factors in the play environment were equally observed and tallied according to the following categories:

- In-adequate size of playground: one that did not offer approximately 3 m^2 space per child which is ideal by K.I.E., (1990a) or where there was organised use.
- Poor condition of playground: one that was not well levelled or with sharp

objects.

- Poor condition of play facilities: broken or splintered.
- Wrong use of play facilities: i.e. incorrect/unsafe use by children.
- Use of in-adequate play facilities: not allowing for 50% and comfortable use by children or where there was no organised turn taking in case of inadequacy.

iv) Factors in the Learning Environment:

Accidents due to the factors in the learning environment were similarly observed and tallied according to the following categories:

- In-adequate size of Classroom: less than 1 m^2 space per child (ideal size K.I.E., 1990b; 1994; 1995).
- Poor condition of classroom: in terms of floor, walls, windows or doors being cracked, broken or splintered.
- Poor condition of chairs/tables: broken or splintered.
- Wrong use of learning facilities: use that was unsafe or not in intended ways.
- Use of in-adequate learning materials: that do not allow for 50% and comfortable use by children or where there was no organised turn taking in case of inadequacy.

3.6 Pilot Study

The purpose of piloting Gay (1981); Koul (1984); Cohen & Manion (1989) is to pre-test the tools to check their adequacy in order to ensure they yield accurate and consistent results. Twelve (12) pilot pre-schools or four (4) per division obtained from

the study location and one research assistant per division were used during the one week pilot study but the above schools were exempted from the main study. The researcher carefully trained the research assistants on how to administer the interview guide for teachers and observation checklist before data collection during the main study (see 3.7).

3.6.1 Validity

Validity is the extent to which the research instrument measures what it is supposed to measure and entails how accurate data collected is (Gay, 1981; Sdorow, 1993; Fraenkel and Wallen 2000). Content validity, which means that items in the research instruments must contain a representative sample of what is being tested was used. This was done by use of similar questions to all respondents, and adapting as well as modifying some of the items in the observation checklist and interview guide from Oloo (1992) and Obara (1998). The questionnaire items were also carefully constructed and administered under professional guidance of supervisors in order to capture and answer the study objectives in relation to level of safety-care on number of accidents. They were also pre-tested and any necessary adjustments made in order to ensure that the instruments gave accurate and reliable information.

3.6.2 Reliability

The test-retest technique was used to test for reliability of instruments using the Cronbach's alpha co-efficient to measure internal consistency. The model calculates measures of scale reliability and provides the average inter-item correlation or

information about the relationships between individual items in a scale in order to determine how items correlate amongst themselves. According to Mugenda & Mugenda (1999), Fraenkel & Wallen (2000), reliability is the extent to which a measure eliminates variable errors. The test retest technique was thus used in order to reduce error thereby increasing reliability of the instruments. The test retest involves use of similar tests/questions administered to the sample at different times. Reliable instruments are stable in whatever they measure and yield comparable scores upon repeated administration.During the study, the tests were administered to 12 teachers twice in two separate occasions within an interval of one week using observation and questionnaire. An alpha coeffient above 0.8 was deemed reliable see the Cronbach's Alpha Coefficients in Table 3.3 below.

Table 3.3 Reliability Test Results

	Cronbach's Alpha Coefficients	
Instruments	**1st Administration**	**2nd Administration**
Knowledge on accidents	0.805	0.925
Beliefs on accidents	0.915	0.824
Practices relating to accidents	0.964	0.973
Accidents due to human factors	0.775	0.961
Accidents due to factors in play environment	0.944	0.950
Accidents due to factors in learning environment	0.874	0.898

As Table 3.3 above shows, the alpha coefficients of the scales were 77 - 97% reliable and the coefficients of the first administration were highly correlated with coefficients on the second administration, except for that on accidents on human factors. However, after adjusting the questionnaire item on human factors, the alpha coefficient improved to 96%.

3.7 Data Collection Techniques

There were five phases of data collection. Gathering of data was first done during a one week long pilot study for two hours daily (9.30 – 10.30 and then 11.00 – 12.00) in October, 2007. Data collection for one-month followed during pre in-service intervention phase (Baseline Study/Pre-testing) in November 2007, before in-servicing being conducted in December 2007. After in-servicing was done, subsequent data collection followed during post in-service intervention phases (Rounds One, Two and Three) for one year during term one, two and three of the school calendar in the year 2008, using an interview guide for teachers and observation checklist. The interview guide was divided into three sub sections: knowledge, beliefs as well as practices, regarding accidents and each part contained questions that carried 25 marks each. The observation guide on the other hand was meant to find out the number of accidents among children in pre-schools in order to gauge the teachers' levels of accident prevention against accidents due to: human factors and factors in the play and learning environments. Data were collected for a maximum of one hour per day, divided into three ten minute sessions between 9.30 am and 10.30 am for a whole month per term whereby a tally per accident and cause in every session was made.

During the post in-service intervention phase data were collected for a month in every school term by the researcher, assisted by eighteen (18) research assistants per division and an extra research assistant who served as group co-ordinator for each division, making a total of fifty eight (58) persons. The research assistants were second year certificate level pre-school teacher-trainees, drawn from various public and private

colleges in Nairobi. They were carefully trained on how to use the instruments before the main study, which involved the researcher reading through and providing detailed explanation of the questionnaire items before the instruments were administered. The researcher and the assistants then collected data together as a team during piloting for one week in every division. The team consistently compared notes to help in ensuring there were no significant deviations in observations made by each one of them before and during piloting, in preparation for the main study.

3.8 Logistical and Ethical Considerations

Logistical preparations such as acquisition of the research permit from the Ministry of Education, recruitment, training of the researchers and familiarization to the study area were done. Ethical considerations such as creating rapport with the respondents as well as getting their consent to participate were also done before the main study. All information obtained for the study purposes was kept confidential and respondents assured of this protection.

3.9 Research Hypotheses

The following were the research hypotheses to be tested.

H_1 There is no significant difference between in-serviced and non in-serviced teachers knowledge on pre-school children's accidents.

H_2 There is no significant difference between in-serviced and non in-serviced pre-school teachers' beliefs on children's accidents during the pre and post testing phases.

H_3 There is no significant difference between in-serviced and non in-serviced pre-school teachers' perceptions on practices related to children's accidents.

H_4 There is no significant difference between the number of children's accidents due to human factors in pre-schools where teachers were or were not in-serviced.

H_5 There is no significant difference between the number of children's accidents due to factors in the play environment in pre-schools where teachers were or were not in-serviced.

H_6 There is no significant difference between the number of children's accidents due to factors in the learning environment in pre-schools where teachers were or were not in-serviced.

One-Way ANOVA was used to test the above six hypotheses. It was appropriate because it simultaneously establishes significant differences amongst and between the various variables of study where there is one independent variable (in-service training) and various dependent variables like human factors and those in the play and learning environments (see the next chapter).

CHAPTER FOUR:

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Methods of Data Analysis

Descriptive and inferential statistics were used to analyse data. Frequency tables, means and percentages were used for the descriptive analysis. The inferential statistics show the results of hypotheses testing in order to indicate the direction and significance of the relationship between the independent variable (in-service training) and the dependent ones (accidents) due to human factors related to teachers' knowledge, beliefs and practices towards accidents and factors in the play and learning environments. Results pertaining to descriptive statistics are presented first followed by inferential statistics.

4.2 Results of Descriptive and Inferential Statistics

4.2.1 Descriptive Statistical Results

The descriptive analysis are presented according to the four study objectives which covered:

- Number of teachers' by their personal attributes
- Frequency of pre-school children's accidents based on teachers' personal attributes
- Teachers' knowledge, beliefs and practices towards pre-school children's accidents
- Frequency of pre-school children's accidents due to human factors and those in the play and learning environments

4.2.1.1 Teachers' Personal Attributes

This section presents results for teachers' personal attributes based on the first study objective that stated, ***"To identify the number of teachers by their personal attributes"***.

Table 4.1 presents the findings on teachers' educational and professional levels.

Table 4.1 Distribution of Teachers by Educational and Professional Level

Teachers' Educational Level	No. of teachers in control gp.		No. of teachers in experimental gp.		Total no. of teachers	
	N	%	N	%	N	%
primary school & ecd certificate	3	11.1	2	7.4	5	9.3
secondary school & ecd certificate	11	40.7	12	44.4	23	42.6
secondary school & ecd diploma certificate	8	29.6	10	37.0	18	33.3
secondary school & university degree in ecd	5	18.5	3	11.1	8	14.8
Total	**27**	**100**	**27**	**100**	**54**	**100**

The total number of teachers from both the control and Experimental Group was 54. Five of them (9%) had primary school education and ECD teacher certificate, 23 (43% secondary education and ECD teacher certificate, 18 (33%) with secondary education and ECD diploma teacher certificate and 8 (15%) with secondary education and university degree in ECD. Out of the 27 teachers in the control, 3 (11%) had completed primary school and trained in ECD teacher certificate course. Another 11 (41%) had secondary education and trained in ECD at certificate level. Apart from secondary school education, 8 (30%) had diploma teacher training in ECD while 5 (19%) had Bachelor of Education in Early Childhood degree. In the Experimental Group, 2 (7%) had primary education with ECD teacher certificate, while 12 (44%) had secondary education with ECD teacher certificate. Those with secondary education and either

diploma teacher training or degrees were 10 (37%) and 3 (11%) respectively. Teachers' academic and professional education, are key components that can enhance their understanding of issues or learning content during in-servicing (4.7) and hence the reason why they were sought.

From the above results in Table 4.1, it is clear that all the teachers interviewed had at least formal education and had an understanding of how to offer child safety-care, since they had undergone training. It was therefore anticipated that education and training would influence the teachers' child safety-care performance during in-service training or workshop hence reduced number of accidents (see Table 4.8 for results on accidents attributed to this particular attribute).

Table 4.2 below gives the distribution of teachers by the next attribute which was age.

Table 4.2 Distribution of Teachers by Age

Teachers' Age	**No. of teachers in control gp.**		**No. of teachers in experimental gp.**		**Total no. of Teachers**	
	Freq	%	Freq	%	Freq	%
20 – 29 years	13	48.2	8	29.6	21	38.9
30 - 39 years	11	40.7	12	44.4	23	42.6
40 - 49 years	3	11.1	5	18.5	8	14.8
Above 50 years	0	0.0	1	7.4	2	3.7
Total	**27**	**100**	**27**	**100**	**54**	**100**

Out of the 54 teachers in the control and Experimental Group, majority were above 30 years of age. In the Control Group almost half (49%) were young, ranging between 20 and 29 years. Another 11 (41%) were between 30 and 39 years while 3 (11%) were about 40 to 49 years. In the Experimental Group, 8 (30%) were between 20 and 29 years while 12 (44%) were between 30 and 39 years. Those who were between 40 and 49

years were 5 (19%), while 2 (7%) were above 50. From the Table above, all teachers were above twenty years and therefore able to ensure childcare. Literature reviewed however, seemed to suggest that the older members of the teaching staff could be better in childcare compared to their younger counterparts due to their maturational level (Piaget, 1984. Majority of them had children of their own too and therefore they could possibly be keener in their child-care role. It was however not very possible to ascertain that older members were more keen in child-care. To justify this supposition, accidents among pre-school children are thus provided in Table 4.8 to see which age group was able to keep number of pre-school children low.

The next attribute presented in Table 4.3 is teachers' gender.

Table 4.3 Distribution of Teachers by Gender

Teachers' Gender	**No. of teachers in control gp**		**No. of teachers in experimental gp.**		**Total no. of Teachers**	
	Freq	%	Freq	%	Freq	%
Male Teachers	05	18.5	03	11.1	8	14.8
Female Teachers	22	81.5	24	88.9	46	85.2
Total	**27**	**100**	**27**	**100**	**54**	**100**

As the table above shows, 8 (15%) of the teachers were males while majority 46 (85%) were females. The Control Group had 5 (19%) men and 22 (82%) women. The Experimental Group had 3 (11%) male and 24 (89%) female. Literature reviewed suggests that gender has influence on peoples' knowledge, beliefs or practices particularly due to societal socialization (Seifert, et. al. 1987 and Goode, 1989). In the African set up, child-care is also the women's domain and this could be the main reason why more females than males, enrolled for ECD teacher training courses. However,

since the male teachers were ECD trained as were their female counterparts, it was expected that they had the ability to compete with the ladies in offering child safety-care thus curbing accidents among pre-school children (see Table.4.9 for results on accidents).

Distribution of teachers by number of in-service or refresher courses/workshops attended is the next attribute presented (Table 4.4).

Table 4.4 Distribution of Teachers by Number of Refresher Courses Attended

No. of Courses Attended	No. of teachers in control gp		No. of teachers in experimental gp		Total no. of Teachers	
	Freq	%	Freq	%	Freq	%
0	24	88.9	25	92.6	49	90.7
1	3	11.1	2	7.4	5	9.3
Total	**27**	**100**	**27**	**100**	**54**	**100**

Of the 54 teachers from the control and Experimental Group, majority 49 (91%) had not attended any refresher course with 24 (89%) being from the Control Group and 25 (93%) from the Experimental Group. Only 5 (9%) had the privilege to attend with 3 (11%) being from the Control Group and 2 (7%) from the Experimental Group. This may be taken as a confirmation that most pre-school teachers as reviewed literature shows have had no access to professional or teacher development in-service training after graduating from their colleges. Farrant (1997) emphasizes the importance of staff development through in-service training or refresher courses in order to influence their discharge of duty and in this case safety-care against pre-school children's accidents (see Table 4.10 for results of children's accidents in relation to the above attribute).

Table 4.5 below gives the distribution of teachers by duration of years in service or experience.

Table 4.5 Distribution of Teachers by Duration of Years in Service

Duration of service	No. of teachers in control gp		No. of teachers in experimental gp		Total no. of teachers	
	Freq	%	Freq	%	Freq	%
0 – 5 yrs	4	14.8	3	11.1	7	13.0
6 – 10 yrs	6	22.2	5	18.5	11	20.4
11 – 15 yrs	6	22.2	7	25.9	13	24.1
16 – 20 yrs	7	25.9	9	33.3	16	30.0
21 – 25 yrs	2	7.4	2	7.4	4	7.4
26 yrs+	2	7.4	1	3.7	3	5.6
Total	**27**	**100**	**27**	**100**	**54**	**100**

From Table 4.5 above, it can be seen that over 47 (87%) out of the 54 teachers had taught for more than five years. In the Control Group, 19 (70%) of the teachers had taught for between 6 and 20 years. Only 4 (15%) were young in the job with 0 to 5 years. In the Experimental Group, those teachers with 6 to 20 years experience were 21 (78%) while new employees with 0 to 5 years were 3 (11%). Teachers' working experience Farrant (1987), Best 1963) can influence their performance and also compliments in-service training. From the above results, majority of the teachers had adequate experience and were capable of ensuring safety-care among children. However, to establish whether their experience had any influence on safety-care against pre-school children's accidents, the numbers of accidents among children based on teachers' years in the teaching profession were established (Table 4.11)

The last attribute amongst teachers that was sought was the drive for choice of career (Table 4.6).

Table 4.6 Distribution of Teachers by Drive for Choice of Career

Choice of Career	No. of teachers in control gp.		No. of teachers in experimental gp.		Total no. of teachers	
	Freq	%	Freq	%	Freq	%
Personal Choice	25	92.6	24	88.9	49	90.7
External Pressure	2	7.4	3	11.1	5	9.3
Total	**27**	**100**	**27**	**100**	**54**	**100**

Over 49 (90%) teachers out of 54 (100%) had chosen the teaching career out of their own accord with 25 (93%) of them being from the Control Group and 24 (89%) from the Experimental Group. Only 5 (9%) had been coerced into it with 2 (7%) of the teachers being from the Control Group and 3 (11%) from the Experimental Group. From the above results, majority of the teachers could be described as having chosen the teaching career willingly. Voluntary choice of the teaching career by teachers, creates positive drive towards good performance in the job and such teachers can ultimately ensure that their children are safe from accidents. When other people or circumstances dictate the kind of job one should take, there may be more likelihood that performance will not be good since the motivation is not intrinsic but extrinsic (Sdorow et. al. 1987).

To see the performance of teachers who voluntarily chose their career in reducing accidents amongst children in their pre-schools, see Table 4.12). The next section discusses frequency of children's accidents in the pre-schools sampled according to the teachers' personal attributes.

4.2.1.2 Pre-school Children's Accidents per Teachers' Personal Attributes

The 2nd objective stated, ***"To establish the frequency of pre-school children's accidents by teachers' personal attributes".***

Table 4.7 presents results of pre-school children's accidents in relation to teachers' educational and professional level.

Table 4.7 Distribution of Pre-school Children's Accidents by Teachers' Educational and Professional Level

			Baseline Study				Main Study			
Teachers' Edu. & Prof. Level	**No. of teachers**		**No. of accidents**				**No. of accidents**			
	Contr. gp.	Exp. gp.	Control gp.		Exp. Gp.		Control gp.		Exp. Gp.	
	N	N	N	Av	N	Av	N	Av	N	Av
Primary & Ecd cert.	3	2	15	5.0	12	6.0	10	3.3	5	2.5
Secondary & ecd cert.	11	12	101	9.2	105	8.8	93	8.5	73	6.1
Secondary & ecd dip.	8	10	35	4.4	46	4.6	30	3.8	22	2.2
Ecd degree	5	3	32	6.4	24	8.0	27	5.4	9	3.0
Total	**27**	**27**	**183**	**25.0**	**187**	**27.4**	**160**	**21**	**109**	**13.8**

Table 4.7 above shows that during the baseline study before the in-service workshop, the Control and Experimental group of teachers, with primary and ECD certificate contributed to (5.0, 6.0) accidents respectively, those with secondary and ECD certificate (9.2, 8.8), those with secondary and diploma in early childhood (4.4, 4.6) and those with degree in early childhood (6.4, 8.0). After the in-service workshop for the Experimental group of teachers, those with primary school and ECD certificate managed to reduce pre-school children's accidents to 2.5 and 3.3 in the Control group. Teachers with secondary school and ECD certificate had (6.1, 8.5), those with

secondary school and diploma certificate (2.2, 3.8) while those with ECD degree had (3.0, 5.4).

From the above results it is clear that after the in-service workshop, the Experimental group of teachers improved in their accident reduction initiatives more than their non in-serviced counterparts. Teachers with secondary education plus ECD diploma award and those with primary school and ECD certificate did best. This shows that although teachers' educational and professional training may impact in influencing teachers' performance Benaars et. al. (1994); Farrant (1997), in this study even teachers with lower educational and professional excellence may excel in offering child safety-care. On the other hand in-servicing of teachers contributed more to the better performance in the main study since all groups of in-serviced teachers worked hard to reduce accidents among children in their pre-schools. In-servicing in itself is one way of providing teacher education and should therefore be given the importance it deserved.

Table 4.8 Distribution of Pre-school Children's Accidents by Teachers' Age

			Baseline Study				**Main Study**			
Teachers' Age	**No. of teachers**		**No. of accidents**				**No. of accidents**			
	Contr. gp.	Exp gp.	Control gp.		Exp. Gp.		Control gp.		Exp. Gp.	
	N	N	N	Av	N	Av	N	Av	N	Av
20 – 29	13	8	79	6.1	74	9.3	78	6.0	42	5.3
30 – 39	11	12	88	8.0	85	7.1	69	6.3	46	3.8
40 – 49	3	5	16	5.3	23	4.6	13	4.3	19	3.8
50+	0	2	0	0.0	5	2.5	0	0.0	2	1.0
Total	**27**	**27**	**183**	**19.4**	**187**	**23.5**	**160**	**16.7**	**109**	**14.6**

Pre-school children's accidents attributed to teachers' age (Table 4.8) shows that during the baseline study, the Control and Experimental group of teachers aged between 20

and 29 years contributed to (6.1, 9.3), those between 30 and 39 years (8.0, 7.1), those between 40 and 49 years (5.3, 4.6) while those above 50 years contributed to (0.0, 2.5) accidents. After the Experimental group of teachers were in-serviced, the number of pre-school children's accidents declined to (5.3) and (6.0) in the Control group of teachers aged 20-29 years, (3.8 and 6.3) for the 30-39 year olds, (3.8 and 4.3) for the 40-49 year olds and (1.0, 0.0) for those above 50 years. The results seem to concur with reviewed literature Piaget (1984) that indeed age influences performance of teachers in as far as child safety-care against accidents was concerned. However, it is also evident that in-servicing of the teachers influenced teachers' performance in reducing accidents. Age therefore does compliment in-service training.

Table 4.9 Distribution of Pre-school Children's Accidents by Teachers' Gender

			Baseline Study				Main Study			
Teachers' Gender	**No. of teachers**		**No. of accidents**				**No. of accidents**			
	Contr. gp.	Exp. gp.	Control gp.		Exp. Gp.		Control gp.		Exp. Gp.	
	N	N	N	Av	N	Av	N	Av	N	Av
Male	5	3	22	4.4	20	6.7	20	4.0	10	3.0
Female	22	24	161	7.3	167	7.0	140	6.4	99	4.1
Total	**27**	**27**	**183**	**11.7**	**187**	**13.7**	**160**	**10.4**	**109**	**7.1**

Table 4.9 shows that accidents attributed to the male category of teachers in the Control group during baseline were (4.4 and 6.7) in the Experimental group while female teachers registered (7.3 and 7.0) respectively. After the in-service workshop, the scores changed to (4.0, 3.0) for the male teachers and (6.4, 4.1) for the female teachers. From the above results, male teachers contributed to fewer accidents in comparison to the female teachers which contradict what Seifert et. al. (1987) and Goode (1989) suggest

that gender and cultural inclinations influence our performance. The above differences could be due to the fact that the male teachers though too few were equally trained in child-care like their female counterparts and hence the good performance.

Table 4.10 Distribution of Pre-school Children's Accidents by Teachers' Prior Opportunity to In-servicing

			Baseline Study				Main Study			
Teachers' in-serviced prior to workshop	**No. of teachers**		**No of accidents**				**No. of accidents**			
	Contr. gp.	Exp. gp.	Control gp.		Exp. Gp.		Control gp.		Exp. Gp.	
	N	N	N	Av	N	Av	N	Av	N	Av
In-serviced	3	2	18	6.0	12	6.0	13	4.3	8	4.0
Not in-serviced	24	25	165	6.9	175	7.0	147	6.1	101	4.0
Total	**27**	**27**	**183**	**12.9**	**187**	**13.0**	**160**	**10.4**	**109**	**8.0**

Baseline results for pre-school children's accidents based on teachers' prior opportunity to in-servicing show that teachers who had prior opportunity to in-servicing before the current workshop in the Control group and Experimental group contributed to similar number of accidents (6.0) while those who had not received prior opportunity to in-servicing registered (6.9, 7.0). After the Experimental group of teachers were in-serviced, the two groups of teachers contributed to (4.3, 4.0) and (6.1, 4.0) accidents. The results confirm that indeed prior opportunity to in-service workshop Zeegers (1995), Ball (2000) motivates teachers to do well. The effect of the current in-service workshop is equally evident since the in-serviced group of teachers improved more than their counterparts in the Control group.

Table 4.11 Distribution of Pre-school Children's Accidents by Teachers' Experience

Teachers' Years of Service	No. of teachers		Baseline Study				Main Study			
			No. of accidents				No. of accidents			
	Contr. gp.	Exp. gp.	Control gp.		Exp. Gp.		Control gp.		Exp. Gp.	
	N	N	N	Av	N	Av	N	Av	N	Av
0-5 yrs	4	3	29	7.3	24	8.0	24	6.0	14	4.7
6-10 yrs	6	5	45	7.5	39	7.8	38	6.3	21	4.2
11-15 yrs	6	7	41	6.8	49	7.0	38	6.3	28	4.0
16-20 yrs	7	9	44	6.3	58	6.4	39	5.6	36	4.0
21-25 yrs	2	2	12	6.0	12	6.0	11	5.5	7	3.5
26+ yrs	2	1	12	6.0	5	5.0	10	5.0	3	3.0
Total	**27**	**27**	**183**	**39.9**	**187**	**40.2**	**160**	**34.7**	**109**	**23.4**

Table 4.11 above on pre-school children's accidents in relation to teachers' experience or years in service during baseline study indicates that the longer the teachers' years in service the more they ensured accidents among children were controlled. Teachers with fewer years in service tended to be associated with higher number of accidents. This revelation concurs with Best (1963) and Farrant (1997) that experience improves teachers' performance or mode of delivery of services.

Table 4.12 Distribution of Pre-school Children's Accidents by Teachers' Choice of Career

Teachers' Choice of Career	No. of teachers		Baseline Study				Main Study			
			No. of accidents				No. of accidents			
	Contr. gp.	Exp. gp.	Control gp.		Exp. Gp.		Control gp.		Exp. Gp.	
	N	N	N	Av	N	Av	N	Av	N	Av
Own choice	25	24	166	6.6	164	6.8	147	5.9	91	3.8
External Pressure	2	3	17	8.5	23	7.7	14	7.0	18	6.0
Total	**27**	**27**	**183**	**15.1**	**187**	**14.5**	**160**	**12.9**	**109**	**9.8**

Results on pre-school children's accidents attributed to the teachers who joined the teaching profession willingly or voluntarily (Table 4.12) indicate that during baseline study, the Control group of teachers contributed to (6.6) accidents and the Experimental group (6.8) while those who were coerced or compelled by external forces to join the profession contributed to (8.5 and 7.7) respectively. During the main study or after the in-service workshop, the accidents in the prior group registered (5.9 and 3.8) accidents while in the latter group they registered (7.0 and 6.0) accidents respectively.

From the above results it is clear that teachers who joined the teaching profession on their own accord were intrinsically motivated to do their work well and most likely the reason why they performed better in accident prevention than those who joined due to external pressure. This also concurs with the revelations of Sdorow (1993); Waithaka 2003 and Gumo 2003 that motivated workers tend to do well in their job.

The next section discusses results for teachers' level of knowledge, beliefs and practices regarding children's accidents in the pre-schools sampled.

4.2.1.3 Teachers' Knowledge, Beliefs and Practices towards Children's Accidents

Section 4.2.1.3 presents results as per the 3rd objective that stated, ***"To find out the effect of the safety-care in-service workshop on teachers' Knowledge, beliefs and practices towards pre-school children's accidents".***

In this section, a scale of 1 to 5 was used to rate teachers from the Control and Experimental Group in their knowledge, beliefs and practices towards accidents. The

higher the mean they scored, the better their performance was and the lower the mean the lower their performance. Table 4.13 below provides the overall mean distribution for the Control and Experimental Groups in their knowledge, beliefs and practices in regard to accidents.

Table 4.13 Overall Mean Distribution of Teachers' Levels in Knowledge, Beliefs and Practices Towards Accidents

Phase	Knowledge		Beliefs		Practices	
	Contr Gp	Exp Gp	Contr Gp	Exp Gp	Contr Gp	Exp Gp
Baseline	2.56	2.59	2.53	2.47	2.51	2.53
Round 1	2.76	4.23	2.56	4.24	2.58	4.10
Round 2	2.96	3.73	2.56	3.69	2.72	3.47
Round 3	2.34	2.98	2.46	2.86	2.57	2.87
Av Group Mean	**2.66**	**3.38**	**2.53**	**3.32**	**2.60**	**3.24**
	Grand Mean = 3.02		Grand Mean = 2.92		Grand Mean = 2.92	

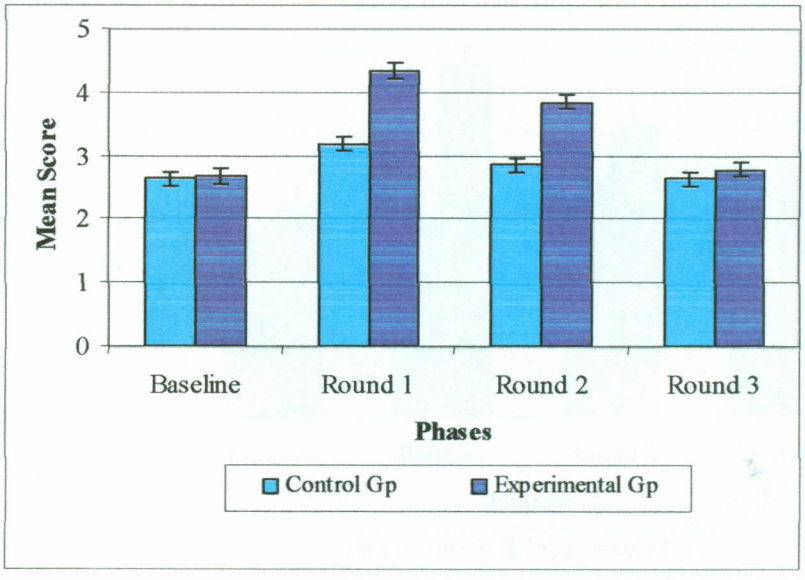
Although the schools were not matched in any criteria except for equal numbers in the two strata, results in Table 4.13 below show that the levels of knowledge, beliefs and practices towards accidents among teachers in the Control and Experimental Group were almost similar (2.56 and 2.59, 2.53 and 2.47, 2.51 and 2.53) during Pre-test or Baseline study. After in-service training in Round One however, the Experimental Group of in-serviced teachers' levels in knowledge, beliefs and practices in regard to accidents rose tremendously although their performance seemed to decline in Round Two and Three. However, they were still ahead of their non in-serviced colleagues in the Control Group with a total group score of (3.38, 2.66) for knowledge, (3.32, 2.53) for beliefs and (3.24, 2.60) for practices towards accidents against a grand mean of (3.02), (2.92) and (2.92) respectively. The above results further indicate decay in levels of knowledge, beliefs and practices towards accidents with passage of time. The possibility of the decline could be attributed to forgetfulness as the theory of extinction reviewed in this study suggests (Reitman, 1974; Bouston & Swartzentruber, 1991).

More detailed results for the specific individual variables on knowledge, beliefs and practices are further provided beginning with teachers' knowledge levels.

a) Teachers' Knowledge on Children's Accidents

Results pertaining to teachers' knowledge on accidents included: Knowledge on common types of accidents, knowledge on human faults contributing to children's accidents, knowledge on factors contributing to children's accidents in the play environment, knowledge on learning factors contributing to children's accidents in the learning environment and knowledge on measures teachers could enforce to curb children's accidents. Knowledge of common types of accidents is discussed first (Figures 4.1 – 4.5).

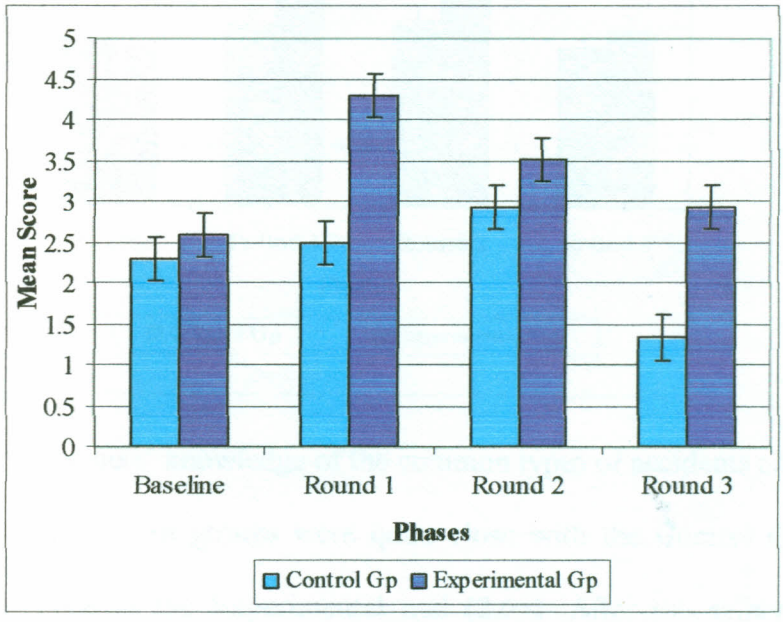
Figure 4.1 Means for Knowledge on Common Types of Accidents



From the above figure, teachers' knowledge of the common types of accidents among

children during Baseline in both groups were quite close with the Control Group scoring (2.63) while those in the Experimental had (2.67). After the safety-care workshop both groups of in-serviced and non in-serviced teachers improved in their knowledge levels. This shows that the Control Group had learnt from the repeated questioning during interviews. This could be attributed to the use of the test retest technique which was seen to be a weakness in that some subjects can remember the questions asked in the previous interview. However, the overall results show that the Experimental Group did much better in their knowledge of the different types of accidents with an average group mean of (3.41) which was higher than that of the Control Group (2.83). Results on knowledge of human factors attributed to teachers that could lead to pre-school children's accidents during Pre and Post testing are next.

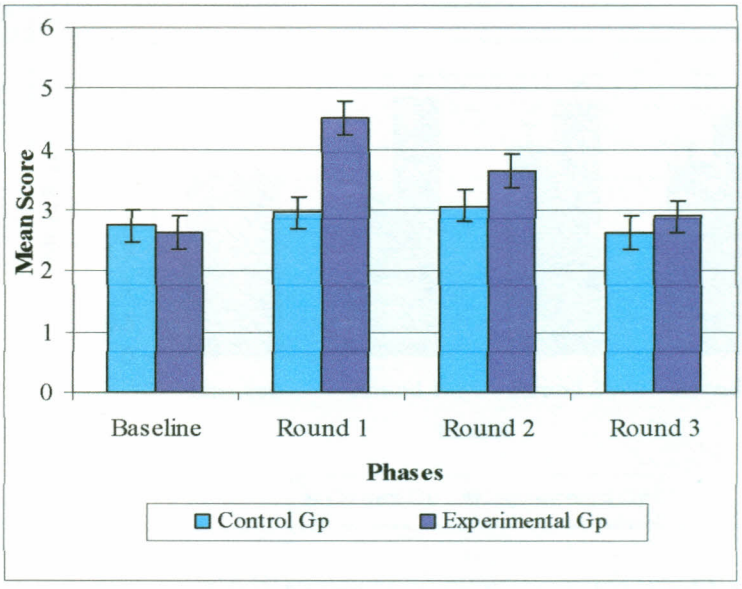
Figure 4.2 Means for Knowledge on Human Errors



Results in Figure 4.2 indicate that before the in-service workshop during Baseline

study, mean scores for the Control and Experimental Group of teachers were (2.30 and 2.59). After the in-service training however, the Experimental Group of teachers emerged better with a mean of 4.30 and although they dropped in Rounds Two and Three, they still maintained lead of their counterparts in the Control Group with a good margin. This shows that the in-service workshop as Cutler & Ruopp (199); Borko & Putnam (2006) had positive effect in improving teachers' knowledge. Results pertaining to knowledge on play materials/facilities that could contribute to accidents follow in the next section (Figure 4.3).

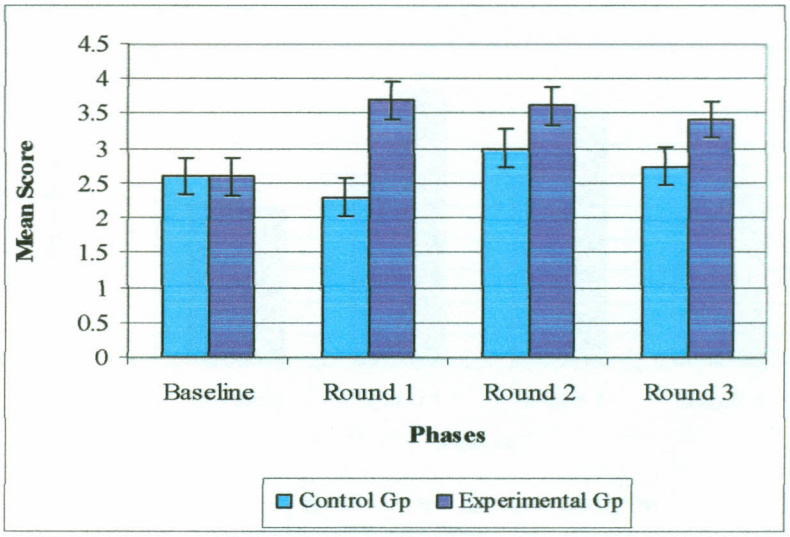
Figure 4.3 Means for Knowledge on Play Materials/Facilities that Could Contribute to Accidents



From the above figure, teachers' knowledge of the common types of accidents among children during Baseline in both groups were quite close with the Control Group scoring (2.74) while those in the Experimental had (2.63). After the safety-care workshop both groups of in-serviced and non in-serviced teachers improved in their

knowledge levels which shows that the Control Group had learnt from the repeated questioning during interviews. However, the overall results show that the in-serviced Experimental Group did extremely well in their knowledge of the different types of accidents with an average group mean of (3.43) which was higher than for the non in-serviced Control Group (2.85). Once again, the results concur with those of scholars reviewed like Zeegers (1995); Ball (2000) that in-servicing of teachers has positive effect and can not be under scored. Figure 4.4 presents teachers' results for knowledge on learning materials/facilities that could cause accidents.

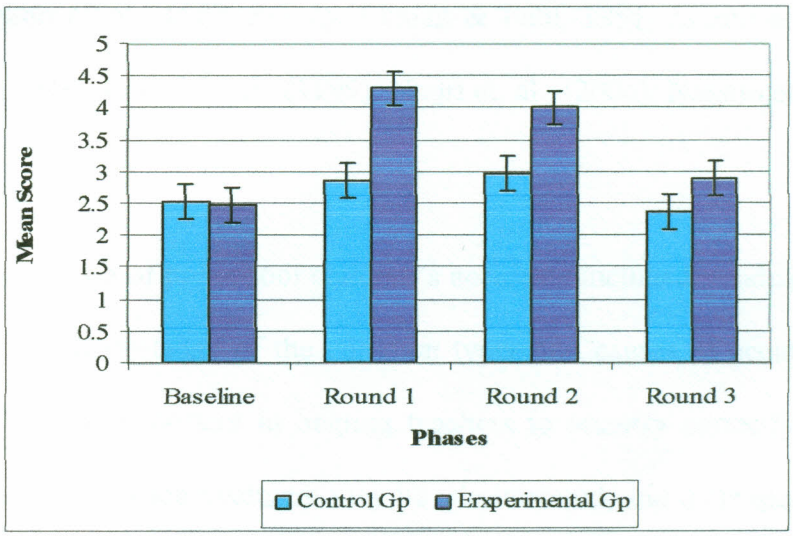
Figure 4.4 Means for Knowledge on Learning Materials/Facilities that Could Contribute to Accidents



Results above pertaining to teachers' knowledge on factors that could contribute to children's accidents in the pre-school's learning environment show that during baseline study the means for the Control and Experimental Groups were 2.60 and 2.59 respectively. After the safety-care workshop, results in Round One show that the Experimental Group improved upwards from 2.59 but in Rounds Two and Three, their

knowledge levels dropped even though they were still on the lead. Teachers in the Control Group also improved slightly upwards from 2.60 in Round one and Two but regressed in Round Three. The Experimental Group's overall score however indicates that teachers in the Experimental Group were much ahead with an average group mean score of 3.33 compared to their counterparts with 2.66. From the above results, it is clear that knowledge of the various factors that contribute to accidents Stoppard (2001); Nakitto et. al. 2004, Mugo (2005) contributes to minimal accidents among children. Figure 4.5 shows knowledge on safety measures that teachers could enforce to curb children's accidents.

Figure 4.5 Means on Knowledge of Safety Measures to Enforce



The results in Figure 4.5 above indicate that the Control Group had a mean of 2.52 which was almost similar to that of the Experimental Group during Baseline study. Teachers from the Control and Experimental Group scored upwards to 2.85 in Round One, 2.96 in Round Two then dropped to 2.37 while those from the Experimental Group improved greatly from 2.48 to 4.30, 4.00 but dropped greatly to 2.89 in Round

Three when knowledge gained seemed to have been forgotten as reviewed literature indicates. Results however show that on average the Experimental Group had done better with an average group mean of 3.42 and had exceeded that of the Control Group (2.68).

To conclude the section on teachers' knowledge of types, causes and prevention of accidents, teachers' in the Experimental Group were in-serviced in safety-care by the City Centre for Early Childhood Education (CICECE). Some of the common types of accidents indicated by the teachers during this study concur with those cited by scholars reviewed in this study such as bruises, cuts, bites, burns/scalds and swellings, sprains as well as fractures (Pagano et. al., 1987; Schelp, Ekman & Fahl, 1991; Janson et. al., 1994; Jones and Olam, 1995; Kamel et. al., (1999); Nouri et. al., (2004); Nakitto et. al., 2004; Mugo, 2005).

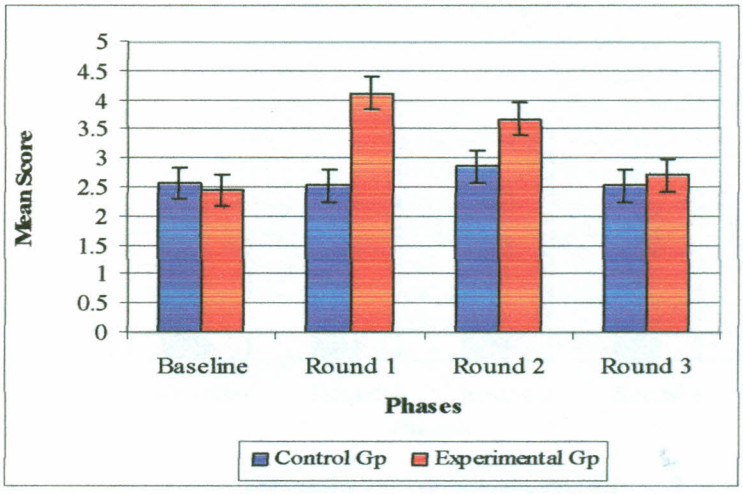
Teachers' knowledge of causes of pre-school children's accidents included in-adequate supervision among others. Knowledge of the common types and causes of accidents among pre-school children is important in helping teachers to identify correctly the kind of accidents so that appropriate treatment may be administered, and their specific causes prevented. Data on teachers' knowledge of common types of accidents prior to the safety-care in-service workshop indicates that their knowledge of the type of accidents was low. However, after in-servicing the teachers in the Experimental Group their knowledge on the common types of accidents among children in pre-school, improved particularly in Round One or the study phase that immediately followed in-

servicing. From the above findings, it can be precisely concluded that teachers could benefit more if in-servicing was availed to them more frequently, since human beings tend to forget information with passage of time. Reitman, 1974; Altmann & Gray (2002) have also shown that without the repeated exposure of information to the brain, memory decays.

b) Teachers' Beliefs on Children's Accidents

Teachers' beliefs considered (in Figures 4.6 – 4.10) were: most accidents among children are preventable, in-adequate supervision is not the major cause of children's accidents, rough play is not responsible for many accidents among children, their school facilities are completely safe for children's use and when children interact during play or learning activities, accidents need not occur. Figure 4.6 presents results on teachers' belief that most accidents were preventable.

Figure 4.6 Means for Belief that Most Accidents were Preventable

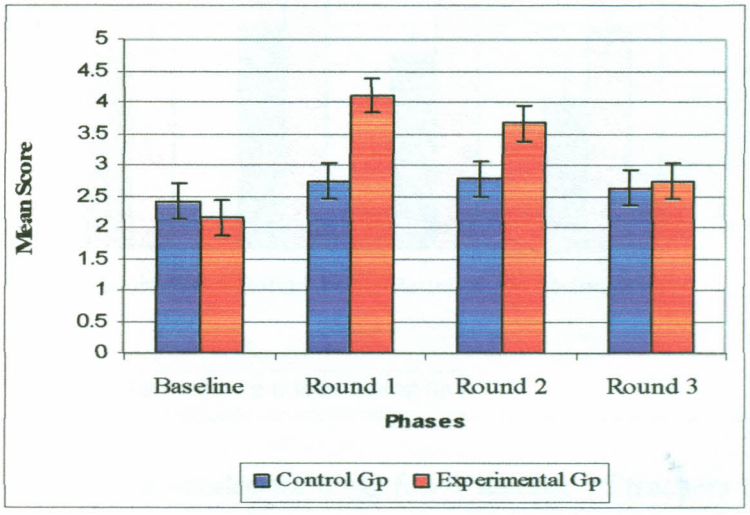


Means presented in Figure 4.6 show that during Baseline study, teachers from the Control and Experimental Group had little faith (2.56 and 2.44) that accidents were

preventable. In-service training however seems to have positively influenced teachers from the Experimental Group as their scores rose up tremendously to 4.11 in Round One while their counterparts dropped. In Round Two the Experimental Group was still ahead with 3.67 while the Control Group trailed behind. Although the Experimental Group of teachers seem to have gained from in-service training, their performance appeared to decline progressively in consequent phases thus the need to ensure regular in-servicing or follow up Okumbe (1998), to ensure teachers continue applying skills acquired during in-servicing.

Beliefs that in-adequate supervision was a major cause of accidents are presented in Figure 4.7 below.

Figure 4.7 Means for Belief that In-adequate Supervision was a Major Cause of Accidents



The above results show that prior to the training, teachers from both Control and the Experimental Group had almost similar belief (2.41 and 2.15) that adequate supervision

could prevent most accidents. This means that the teachers did not believe that in-adequate supervision was the cause of most accidents. However, after in-service training, teachers in the Experimental Group seemed to appreciate that in-adequate supervision may contribute to most accidents with an overall mean 4.11. The results concur with Bennaars et al (1994) that indeed supervision ensures orderliness in the classroom, and hence lack of it could lead to increased accidents.

Teachers' beliefs on rough play not being the cause of many of children's accidents were also sought during the study and the results are shown in Figure 4.8 below.

Figure 4.8 Means on Belief that Rough Play was not Responsible for Many Accidents

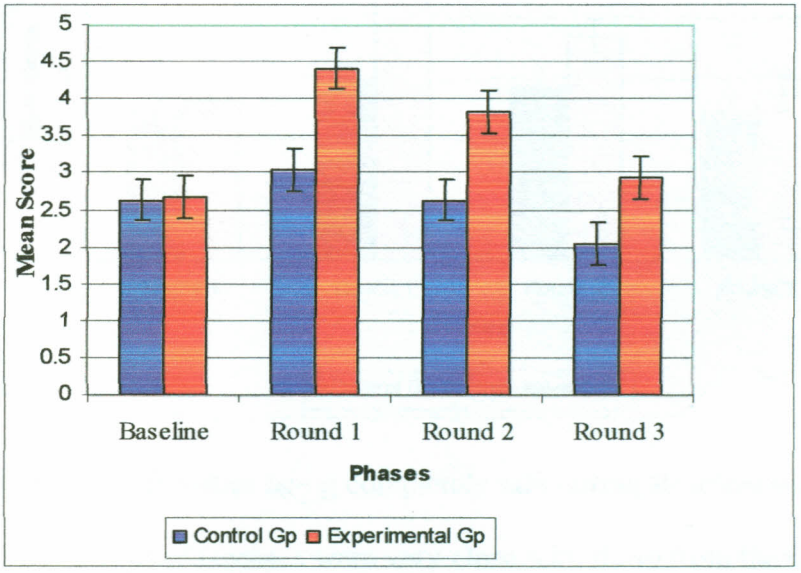
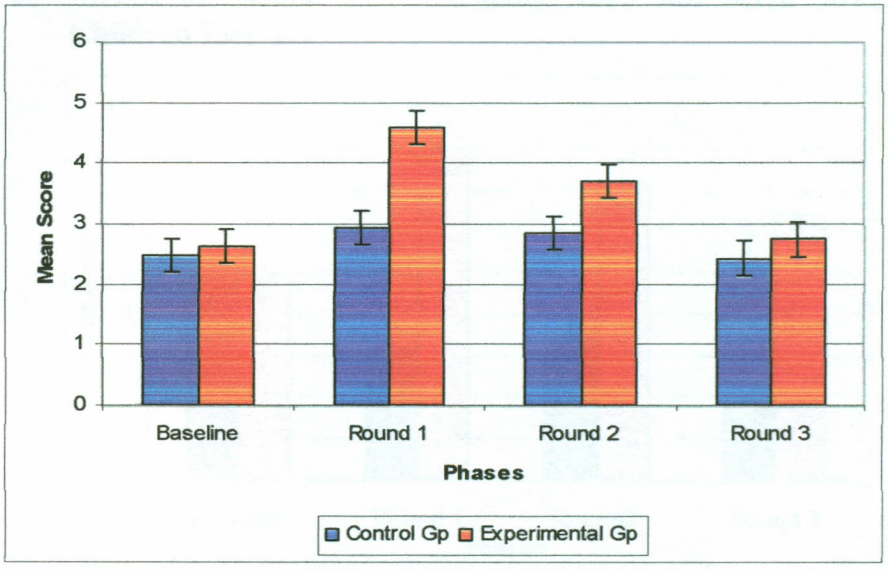


Figure 4.8 indicates that before in-service training, fewer number of teachers believed that rough play did not lead to many accidents. After in-servicing teachers in the Experimental Group in Round One however, a large number of them (4.41) seemed to believe that rough play did not contribute too many accidents since adequate

supervision ensures no rough play. The mean for the Experimental group rose and their overall score was also higher (3.46) than that of the Control Group (2.86). This implies that in-service training as suggested by Zeegers (1995) yielded positive influence on the in-serviced group of teachers, thus the good performance noted amongst the Experimental group of teachers.

Safety of school facilities was identified as key in the prevention of children's accidents and Figure 4.9 provides results of the findings.

Figure 4.9 Means on Belief that School Facilities Were Completely Safe

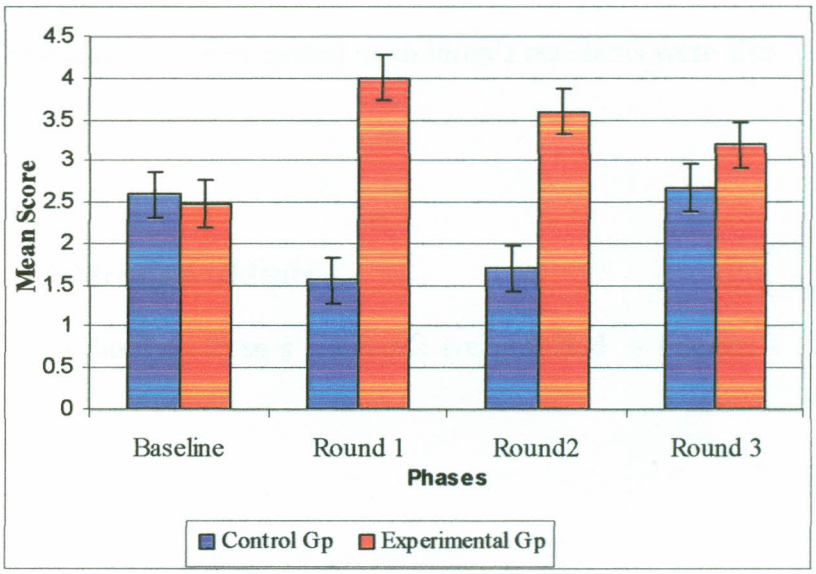


From Figure 4.9 on school facilities being completely safe during Baseline study, the scores from both groups of teachers were very close with those from the Control Group scoring 2.63 and the Experimental Group 2.48. After in-servicing teachers from the Experimental Group, their beliefs improved particularly in Round One with a mean score (4.59), which implies that they worked hard in ensuring that their school facilities were safer. Although teachers from the Experimental Group

developed positive beliefs in ensuring that their school facilities were safe for use by children with an overall mean of 3.42 compared to (2.68) by the Control Group, with time lapse however, their beliefs experienced erosion. This could be attributed to forgetfulness as indicated by Bouston & Swartzentruber (1991) which was also the case in teachers' knowledge of pre-school children's accidents.

The study also sought to know teachers beliefs that accidents needed not to occur when children interacted during play or learning time (Figure 4.10).

Figure 4.10 Means on Belief that Accidents Need not occur When Children Interact



The above results on teachers' beliefs that accidents need not occur when children interact in pre-schools show that the effect of in-service training was quite evident on the in-serviced group with their mean score rising to 4.00 after in-servicing while their counterparts in the Control Group dropped drastically. However as time moved on, their mean scores appeared to fade away as they declined in both Rounds

Two and Three but their counterparts in the Control Group lagged behind. A look at the two group's average means further shows that the Experimental Group's average score was 3.32 and was far higher than the Control Group's 2.13.

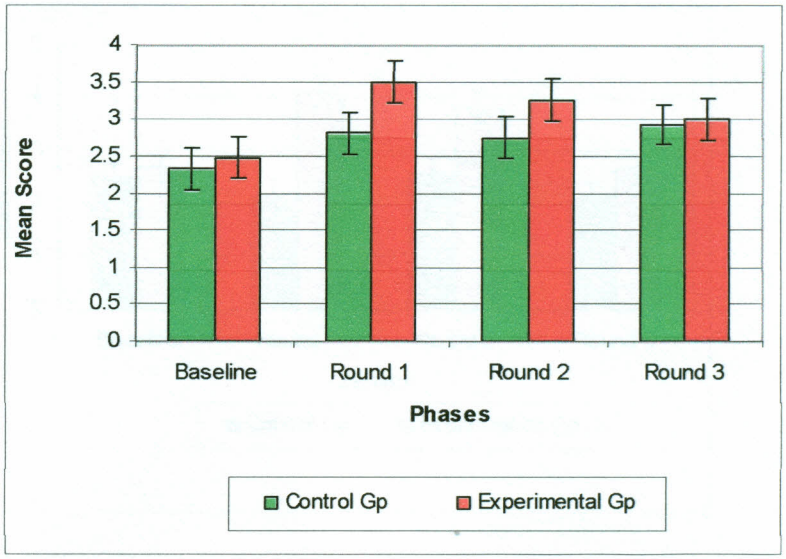
As all the results on teachers' beliefs towards apprehending accidents amongst pre-school children are concerned, they similarly show that in-servicing had a notable effect on teachers' beliefs on accidents in Rounds One, Two and three. Erosion of positive beliefs towards reduction of pre-school children's accidents was similarly noted in Round Three (Figures 4.6 – 4.10). This shows that human beings' memory fades away as forgetfulness sets in. Regular in-servicing of teachers is therefore a key aspect in ensuring they retain beliefs acquired during in-servicing.

In the next section, teachers' practices related to children's accidents were also established.

c) Practices Related to Children's Accidents

Practices related to pre-school children's accidents are provided in Figures 4.11 - 4.15.

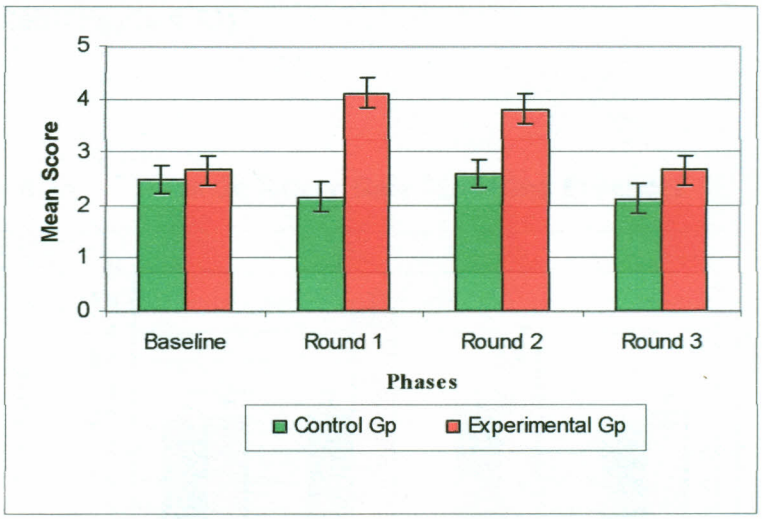
Figure 4.11 Means on Practices Regarding Reinforcement of Safe Behaviour



As Figure 4.11 shows, the mean scores on practices related to reinforcing safe behaviour among children for the two groups of teachers were almost equal in reinforcing children's safe behaviour during Baseline study. After the in-service workshop, teachers from the in-serviced Experimental Group improved to a mean of 3.50 in Round One, but dropped in Rounds Two and Three. In contrast, the Control Group lagged behind in Round One with 2.82, 2.74 in Round 2 to 2.93 in Round 3. As Ayot 1980; Karugu & Kuria 1991; Daimyo 1992 suggest, the above results on the in-service workshop must have borne fruit as the average mean scores for the in-serviced group exceeded those of the non in-serviced Control Group.

Supervision of children as a factor for minimizing children's accidents was considered in the study and Figure 4.12 provides the findings in this area.

Figure 4.12 Means on Supervisory Practices

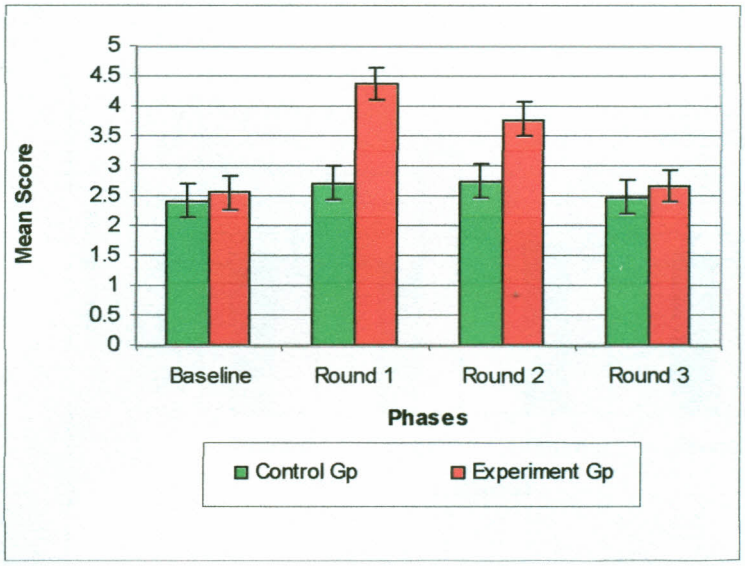


During the baseline study as Figure 4.12 shows, the Control and Experimental group of teachers were not very different in their supervisory practices. However, after in-servicing teachers from the Experimental Group, their average mean score rose to 4.11 in Round One against 2.15 by the Control Group. Although the Experimental Group's means fell to 3.82 in Round Two and 2.67 in Round Three, they were quite ahead of their non in-serviced counterparts. The average group mean scores also indicate that the Experimental Group score was higher (3.32) while the Control Group registered 2.33.

Results above regarding supervision as a means to prevent accidents indicate that the two groups of teachers were not very different in their child supervision practices during Baseline study. However after in-servicing the Experimental group of teachers, their positive practices were enhanced for the better. This improvement by the Experimental Group could only be attributed to in-servicing as Ayot (1980) and other scholars also noted in this study.

The study also sought to establish teachers' practices in modeling safe behaviour for children to emulate (Figure 4.13).

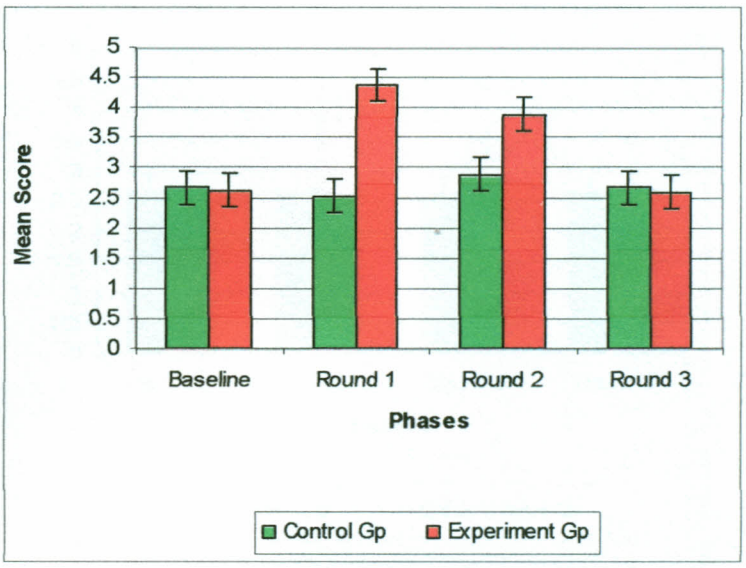
Figure 4.13 Means on Safety Role Modeling Practices



The results above show that before in-servicing, the Control and Experimental Group had a mean score of (2.67 and 2.63) respectively. After the safety-care in-servicing workshop however, the in-serviced Experimental Group's mean shot up in Round One. Their average mean score also rose to 3.37 which was higher than that for the Control Group which registered 2.69. From the above results, it could only be concluded that that the better performance by the Experimental Group of teachers must have been due to the in-service training they had received. This also concurs with the revelation of Zeegers (1994) that indeed in-servicing improves teachers' performance.

Figure 4.14 provides interview results on teachers' practices in ensuring organized use of materials by children.

Figure 4.14 Means on Practices Regarding Turn Taking/Sharing of Materials/Facilities



Results on Figure 4.14 show that both groups of non in-serviced and in-serviced teachers were not very different during Baseline study. However, from the average mean scores of each group it is evident that the Experimental Group did benefit from in-servicing with better progressive scores in Rounds One, Two and Three, compared to their counterparts in the Control Group. The average mean score for the Experimental Group was also higher (3.18) compared to 2.37 by the Control Group. However the main concern was that by the time the in-serviced group got to the final phase of the study, their scores seemed to decline, pointing to a gradual loss of the effect of in-servicing which Bouston & Swarzentruber (1994) assert is normal with human beings with passage of time.

Teacher's efforts in minimizing risky situations that could cause accidents by ensuring that children strictly adhered to safety measures were also considered and results presented in Figure 4.15.

Figure 4.15 Means on Practices Relating to Safety Measures Being Followed

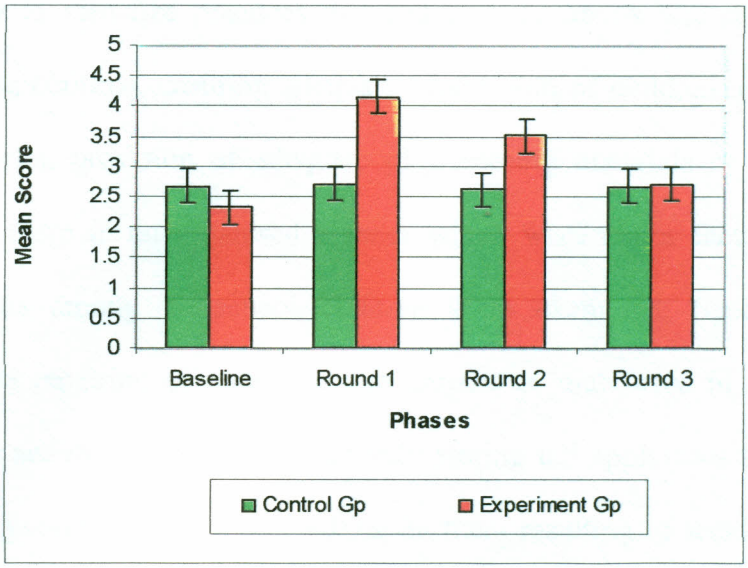


Figure 4.15 shows that before in-servicing, the Control Group was slightly better than the Experimental Group in ensuring that children strictly adhered to safety measures in order to minimize accidents. However results in Round One and Two show a big contrast indicating that the Experimental Group had improved from 2.33 to 4.15 before dropping consecutively in Rounds Two and Three after the in-service workshop while the Control Group registered a minimal change. The average mean scores were (3.18) for the Experimental Group against (2.67) by their non in-serviced counterparts in the Control Group. This means that even though the Experimental Group of teachers dropped, in-service training must have been responsible for their positive variations and

that it was an important factor in improving teachers output as reviewed literature strongly suggests.

As the overall results presented in this section on practices regarding pre-school children's accidents indicate, the in-service workshop yielded positive outcomes. The teachers' ability to visualize practices that can curb accidents like reinforcing safe behaviour among children, ensuring adequate supervision of children, modelling safe behaviour, ensuring provision of adequate play/learning materials or arranging for children to use them in an organised manner which were major factors that could prevent accidents among pre-school children were examined. Specifically, safe practices such as repairing or removing torn carpets or mats used in school during learning or play activities, carefully or securely storing tall appliances which may be pulled down by younger children thus falling on them resulting in accidents Stoppard (2001), Villalba-Cota et. al. (2004), were found to avert accidents.

In the next section, the overall distribution of the number of children's accidents attributed to the combined factors contributing to accidents namely human, play and learning environmental factors are presented first, then per each of the specific individual factors separately.

4.2.1.4 Pre-school Children's Accidents Due to Human Factors and Factors in the Play and Learning Environments

The 4th objective of the study was, ***"To establish the effect of the safety-care in-service workshop on frequency of pre-school children's accidents due to human factors and factors in the play and learning environments"***.

Table 4.14 presents the overall distribution of number of pre-school children's accidents.

Table 4.14 Overall Distribution of Number of Accidents Due to Human Factors and Factors in Play and Learning Environments

Causes	Number of Accidents															
	Baseline Study Phase				Round 1 Study Phase				Round 2 Study Phase				Round 3 Study Phase			
	Control Gp		Exp Gp		Control Gp		Exp Gp		Control Gp		Exp Gp		Control Gp		Exp Gp	
	Frq	%	Frq	%	Frq	%	Frq	%	Frq	%	Frq	%	Frq	%	Frq	%
Human Factors	120	10.2	122	10.4	81	6.9	61	5.2	98	8.3	72	6.1	109	9.3	78	6.6
Factors in play Envir.	42	3.7	44	3.4	35	3.0	20	1.7	38	3.2	28	2.4	40	3.4	32	2.7
Factors in Learning Envir.	21	1.8	21	1.8	18	1.5	9	0.8	25	2.1	12	1.0	37	3.1	15	1.3
Total	**183**	**15.7**	**187**	**15.6**	**134**	**11.4**	**90**	**7.7**	**161**	**13.6**	**112**	**9.5**	**186**	**15.8**	**125**	**10.6**

1178 accidents = 100%

Out of the 54 pre-schools sampled in Nairobi province (Table 4.14), there were a total of 1178 (100%) accidents that occurred amongst pre-school children and 664 (56.37%) of them were from children of teachers in the non in-serviced Control Group, while 514 (43.63%) were from the in-serviced Experimental Group. Accidents due to human factors or causes were 741 (62.90%) and the highest in number with 120 (10.19%) and 122 (10.36%) of them occurring in the Control and Experimental Groups respectively

during Baseline study. After the in-service workshop, there were 81 (6.88%) and 61 (5.18) accidents in Round One, 98 (8.34%) and 72 (6.11%) in Round Two while 109 (9.25) and 78 (6.62%) were observed in Round Three.

In the play environment, there were a total of 279 accidents with 42 (3.57%) and 44 (3.74%) occurring in the Control and Experimental Groups during Baseline study, 35 (2.97%), 20 (1.70) in Round One, 38 (3.23%), 28 (2.38%) in Round Two and 40 (3.40%), 32 (2.72%) in Round Three. The total number of accidents caused by factors in the learning environment were 158 (13.4%) and fewest in general, with a similar number or 21 (1.78%) occurring in both the two groups during Baseline study, 18 (1.53%), 9 (0.76%) in Round One, 25 (2.12%), 12 (1.02%) in Round Two and 37 (3.14%), 15 (1.27%) in Round Three. As can be seen from Table 4.13 above, after in-servicing the Experimental Group of teachers, accidents declined extremely in Round One, but there was a consistent rise in the number of accidents in Rounds Two and Three with passage of time since the in-service training workshop. This concurs with Reitman (1974) & Goldstein (2005) in reviewed literature that with passage of time, information stored in our minds, decays or erodes unless efforts to retain it by using reminders are employed. Despite forgetfulness, the number of accidents among children in the Experimental Group of pre-schools where teachers received in-servicing were noted to be much lower in comparison to those of children from their counterparts in the Control Group which appeared to have much higher number of accidents.

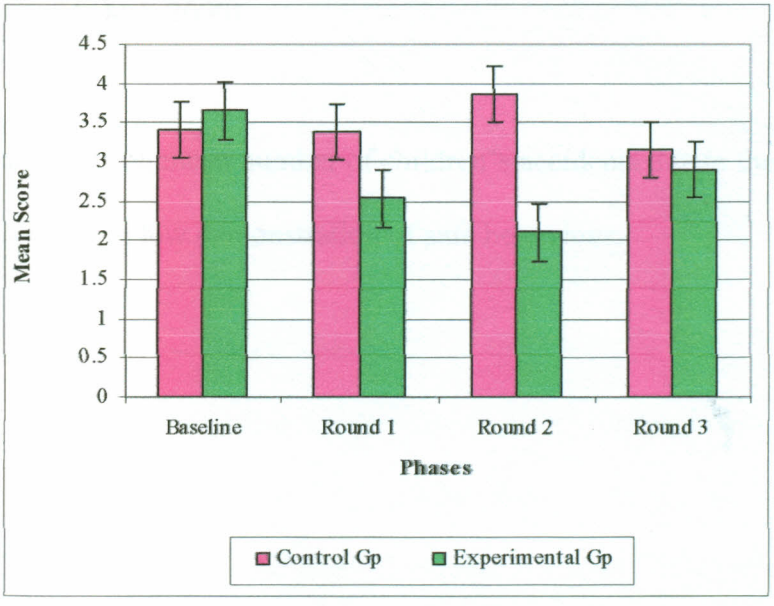
Further and more detailed analysis of frequency of accidents attributed to the specific causes of accidents are given below beginning with those by human factors and followed by those in the play and learning environments.

a) Accidents Attributed to Human Factors

Human factors which contributed to actual accidents among children were related to teachers' supervision of children, demonstration of safe behaviour, provision of safety education to children, reinforcing safe behaviour among children and type of answers the teachers gave in regard to children's questions regarding safety. Results for the specific human factors are presented beginning with accidents attributed to supervision.

Figure 4.16 provides the results for children's accidents attributed to supervision which is a human factor.

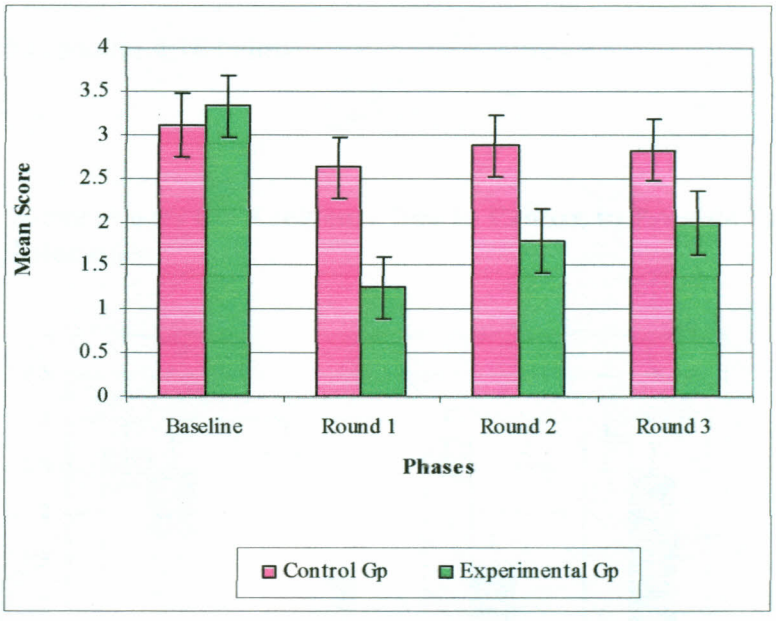
Figure 4.16 Mean Scores for Accidents Due to In-adequate Supervision



During Baseline study, the mean scores for accidents emanating from in-adequate supervision in the Control and Experimental Groups were (3.41) and (3.65). After the safety-care in-service training of teachers from the Experimental Group, the mean scores for accidents among children in their schools dramatically dropped from 3.65 to 2.531 in Round One, 2.75 in Round Two and 2.9 in Round Three. The mean number of accidents in the Control Group also decreased from 3.41 to 3.38 in Round One then rose to 3.86 in Round Two and down to 3.16 in Round Three, indicating that the non in-serviced group must have learnt from repeated questioning during interviews and worked to minimize accidents. However, accidents in the Experimental Group consistently dropped and they maintained lead of their non in-serviced colleagues in the Control Group. The only logical explanation for the difference in their performance could only be in-service training, which their counterparts did not receive. This also concurs with reviewed literature by scholars who hold the view that in-servicing of already trained teachers is a strong motivator to improved work output (Dzimbo, 1992; Zeegers, 1995; Ryan and Deci, 2000).

Figure 4.17 presents results on mean number of children's accidents due to their being provided with in-adequate or low demonstration of safe behaviour.

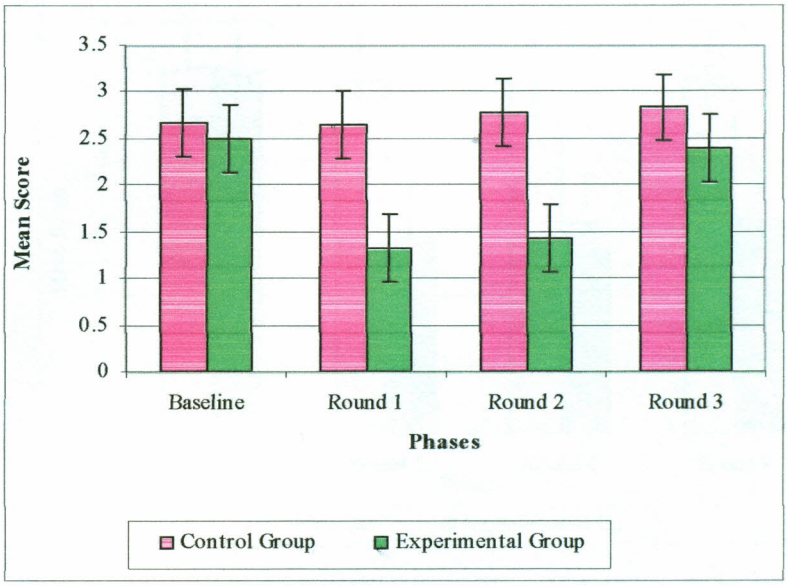
Figure 4.17 Mean Scores for Accidents Due to Failure to Demonstrate Safe Behaviour



Means on children's accidents resulting from teachers' failure to demonstrate safe behavior show that at Baseline, the mean score for the Control Group was 3.11 which was slightly lower than the Experimental Group's 3.33. After in-service training, the means for the non in-serviced Control Group dropped from 3.11 to 2.62 in Round One, 2.87 in Round Two and 2.82 in Round Three. On the other hand, after in-servicing teachers from the Experimental Group, the mean number of children's accidents in their pre-schools dropped from 3.33 during Baseline, to 1.25, 1.78 and 1.99 in Rounds One, Two and Three respectively. Results further show that the total group means for the in-serviced group was (2.11) compared to 2.86 by the Control Group, which means that accidents in the Experimental Group of teachers, were much lower. From the above findings it can be postulated that in-service training of the Experimental Group of teachers is the reason for the low number of accidents among children in their pre-schools as reviewed literature on in-servicing of already trained teachers shows.

The mean scores for children's accidents related to teachers' failure to provide safety education are presented in Figure 4.18 below.

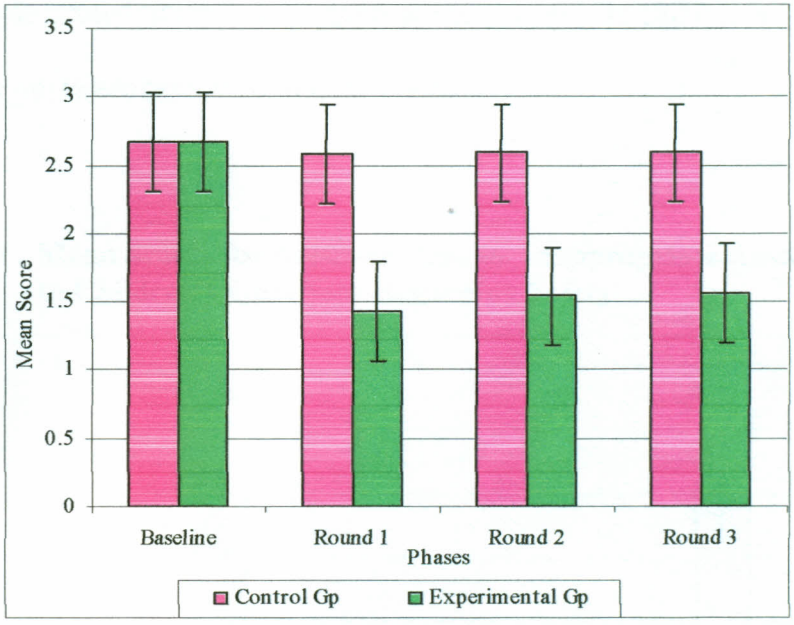
Figure 4.18 Mean Scores for Accidents Due to Failure to Provide Safety Education



The above results indicate that the mean scores for children's accidents in pre-schools where teachers were or were not in-serviced during Baseline were 2.67, 2.50. After the in-service workshop however, the in-serviced Experimental Group of teachers managed to minimize children's accidents in their pre-schools to 1.33 in Rounds One, 1.39 in Round Two and 1.43 in Round Three. Their non in-serviced counterparts could not match their performance as indicated by their high mean scores throughout the post testing period. As Vallerand et. al. (1991) & Ball (2000) have revealed, the Experimental Groups' performance points to the fact that in-servicing of teachers helps them to retain learning content imparted during in-servicing programmes.

Figure 4.19 presents mean scores for accidents due to teachers' failure to reinforce safe behavior among children.

Figure 4.19 Mean Scores for Accidents Due to Failure to Reinforce Safe Behaviour

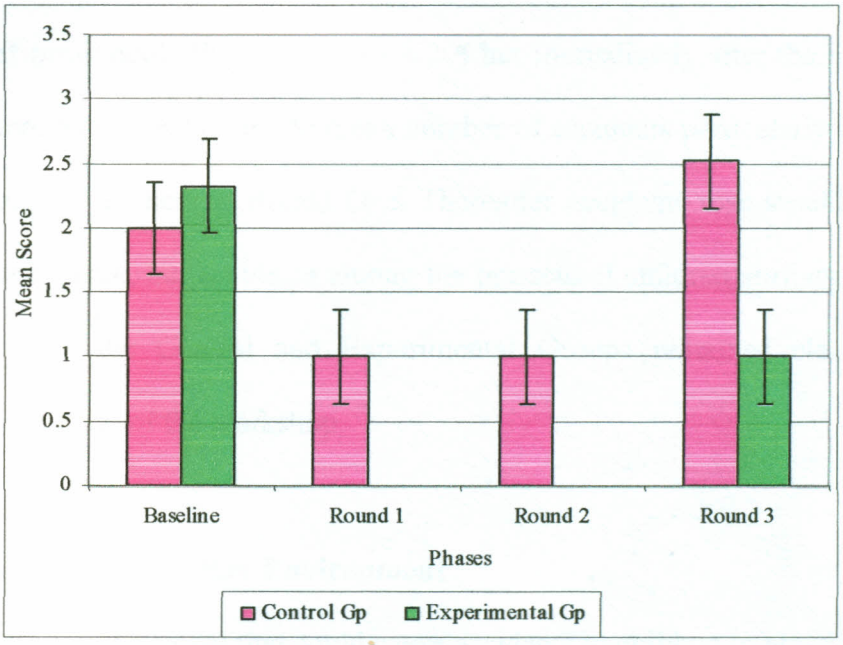


From Figure 4.19 above, the mean number of accidents related to teachers not reinforcing safe behavior among children shows that at Baseline, accidents in pre-schools where teachers were in-serviced (Experimental Group) and where they were not in-serviced (Control Group) were similar with both groups registering a mean of 2.67. After in-servicing the Experimental Group of teachers, they were able to minimize accidents among children in their pre-schools drastically to 1.43 in Round One, 1.54 in Round Two and 1.56 in Round Three. The mean scores for teachers in the Control Group also show that accidents among children in their pre-schools dropped. However, they trailed behind the Experimental Group. The difference once again could

only be due to the positive effect of in-service training that the experimental group received. At the same time, the results tend to agree with Memory Decay Theorists as memory of the in-serviced group tended to deteriorate showing that passage of time increases forgetfulness or ability to remember.

Results for accidents attributed to teachers' inappropriate answers to children's questions, regarding safety are presented in Figure 4.20.

Figure 4.20 Mean Scores for Accidents Due to Inappropriate Answers to Children's Questions Regarding Safety



Results from Figure 4.20 show that children's mean number of accidents for both the Control and Experimental Groups of teachers were almost at par (2.00 and 2.33). After in-servicing the Experimental Group of teachers, accidents in their pre-schools dramatically went down in Round One and Two, without a single accident occurring. However, in Round Three accidents in their pre-schools rose to 1.00, which shows

disintegration or loss of accident prevention techniques they had previously gained during the in-service workshop with passage of time as stated by Memory Decay Theorists (Reitman, 1974; Altmann and Gray 2002; Wikipedia, 2009c).

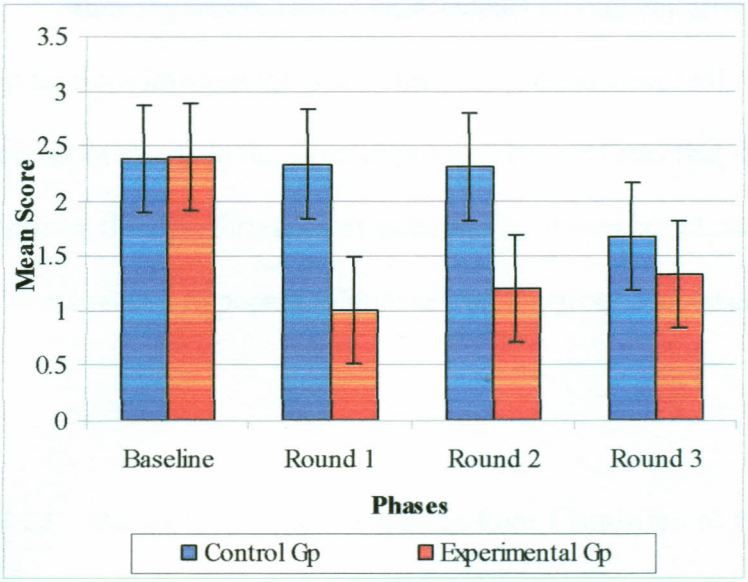
As the Domino theory of accident causation and prevention had suggested, majority of pre-school children's accidents observed were due to human factors. Indeed the change in teachers' knowledge, beliefs and practices regarding accidents, was dramatic and appeared to have had an effect on pre-school children's accidents attributed to the numerous human factors. Prior to the in-service workshop, both the Control and Experimental Groups had almost similar number of children's accidents caused by human factors in their pre-schools (Figures 4.16 - 4.20) but immediately after the in-service workshop, there was a decline in the mean number of accidents particularly in the Experimental Group of teachers in Round One. Thereafter accidents rose steadily during Rounds Two and Three, but accidents among the pre-school children attributed to the various factors in the Control and Experimental Groups remained clear, confirming the positive impact of the workshop.

b) Accidents Attributed to Factors in the Play Environment

Factors related to the play environment that could cause accidents to children in pre-schools included size and condition of playground, condition of play materials/ facilities, use of play materials/facilities and quantity of play materials/facilities provided for use by the children. The results are given below.

Figure 4.21 below provides results for children's accidents regarding size of pre-school playground.

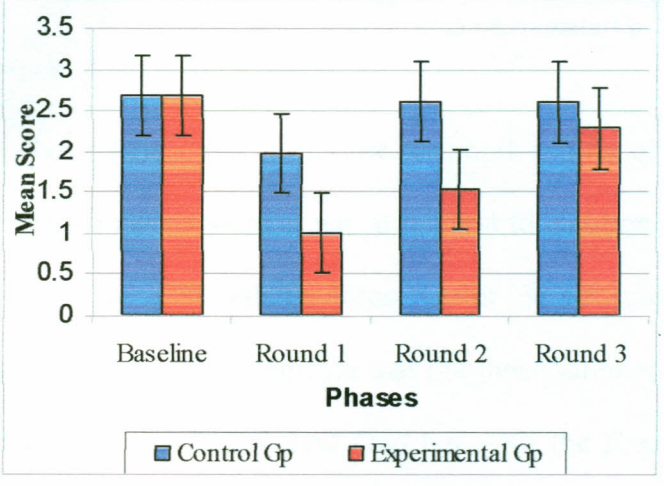
Figure 4.21 Means for Accidents Due to In-adequate Size of Playground



During Baseline study, the mean number of accidents related to in-adequate size of the playground indicate that the number of children's accidents were almost similar (2.38, 2.4) in both the Control and Experimental Group. After the safety-care workshop, the in-serviced Experimental Group of teachers, were able to reduce children's accidents in their pre-schools from 2.4 during Baseline to 1.00. However, the number of accidents were rising as time went on after Round One. This implies that safety-care in-service workshop for the Experimental Group of teachers was responsible for the positive change. Although accidents in the Control Group similarly decreased slightly in Round One, they shot up in the consequent Rounds and trailed behind the Experimental group of teachers during the entire study.

The above findings indicate that after in-servicing teachers in the Experimental Group, their safety-care levels as Memory Decay Theorists have shown, improved tremendously even though by the time they got to Round Three which was the final phase of the study, they regressed. However, accidents among children in their pre-schools emanating from in-adequate size of the play ground were still lower than those from their counterparts in the Control group. This confirms that in-servicing of teachers improves their performance as indicated by reviewed scholars. Mean scores for accidents related to poor condition of the playground are also presented in Figure 4.22.

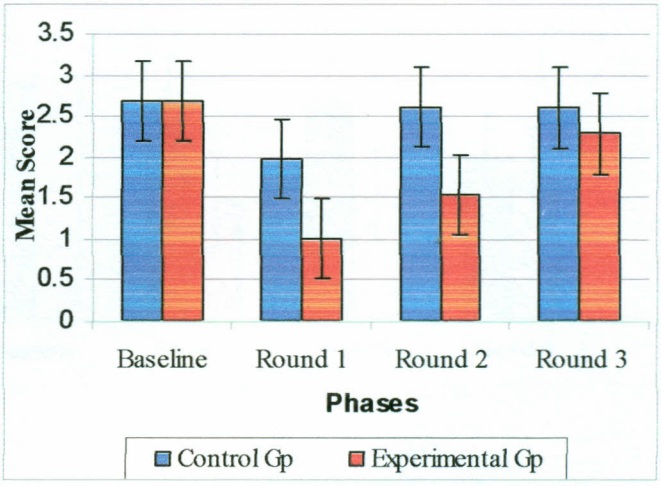
Figure 4.22 Means for Accidents Due to Poor Condition of Playground



The figure above shows that the mean scores for the Control and Experimental Groups of teachers were similar during Baseline study. In Round One, the Experimental Group reduced the number of children's accidents but those from the non in-serviced Control Group remained higher. This suggests that the better performance by the Experimental Group must have been due to in-servicing as reviewed literature shows.

Figure 4.23 below provides means for pre-school children's accidents emanating from poor condition of play materials and facilities.

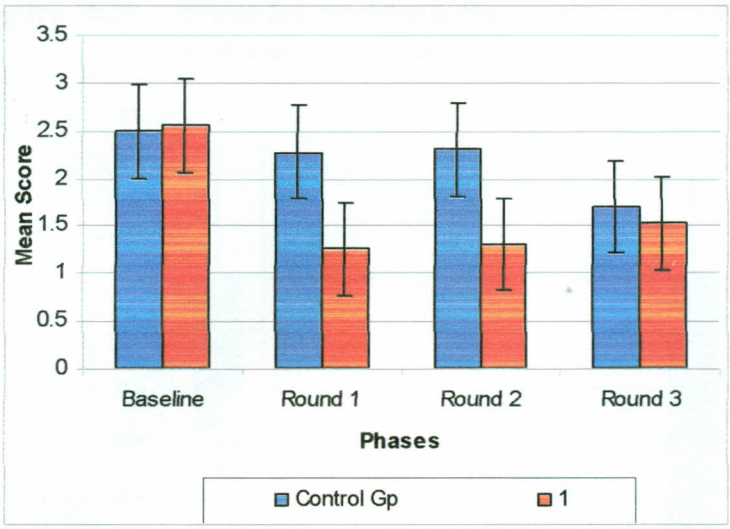
Figure 4.23 Means for Accidents Due to Poor Condition of Play Materials/Facilities



The graph above shows that during pre-test, both groups of teachers in the Control and Experimental Group were at par in relation to children's accidents due to poor condition of play materials/facilities. After in-servicing teachers from the Experimental Group, results indicate that the mean number of children's accidents in both groups declined in Round One but with the Experimental Group doing better. Although their mean number of accidents for the in-serviced Experimental group of teachers went up in Rounds Two and Three, their opponents in the Control Group trailed behind. The difference could clearly be attributed to in-servicing of the Experimental Group of teachers as this was the only logical reason (Dzivimbo, 1992; Zeegers, 1995 and Ball, 2000).

Means for pre-school children's accidents attributed to wrong use of play materials/ equipment are similarly presented in Figure 4.24 below.

Figure 4.24 Means for Accidents Due to Wrong Use of Play Materials/Equipment



As results above show, the Experimental Group of teachers managed to minimize children's accidents in their pre-schools in Rounds One, Two and Three, compared to their counterparts in the Control Group. However, although the Experimental Group of teachers were able to minimize accidents, the accidents rose in Round Three. This shows that in-service training must have contributed to the better performance by the in-serviced teachers from the Experimental Group. The results also concur with literature reviewed that indeed in-servicing is a catalyst in improving teachers' performance in delivery of their services and hence the reduced number of pre-school children's accidents in the Experimental Group of pre-schools. However, as memory decay theorists have shown, time lapse interferes with ability to remember and hence the need to in-service teachers regularly.

Mean scores for accidents resulting from provision of in-adequate number of play materials/equipment to children in pre-school are provided last in this section (Figure 4.25).

Figure 4.25 Means for Accidents Due to Provision of In-adequate Play Materials/Facilities

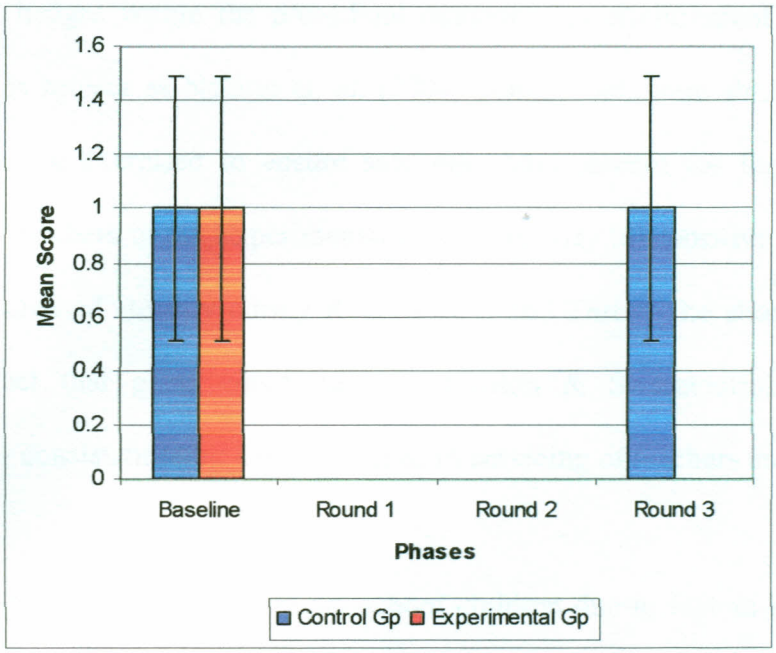


Figure 4.25 on means for accidents due to provision of in-adequate play materials/ facilities to children in the play environment, shows that during Baseline study, the two groups of teachers were equal in their fight against accidents. After in-servicing the Experimental Group on safety-care, they were able to completely guard against accidents in all the post-test phases. The low number of accidents for the in-serviced Experimental Group of teachers as scholars reviewed indicate, must have been precipitated by the in-service safety-care workshop they received.

From the above overall results on number of accidents among pre-school children attributed to factors in the play environment were lower in comparison to those by human factors (Figures 4.16 – 4.25). The above revelation once again concurs with the Domino Theory by Heinrich (1959) that majority of the accidents were due to human factors. Dangerous materials such as sharp tree stumps, thorns, poor fencing with open barbed wire and sharp hedges within the pre-school outdoor play environment which caused accidents such as bruises as Nakitto et. al. (2004) pointed out, were similarly observed and care should be exercised to ensure safe play environment for the children. In-servicing of the teachers in the Experimental group similarly had positive results though the accidents increased steadily during Rounds Two and Three. The above results thus point to the fact that gains could be lost Bouston & Swartzentruber (1991), if reinforcement or consistent reminders in form of in-servicing of teachers are ignored.

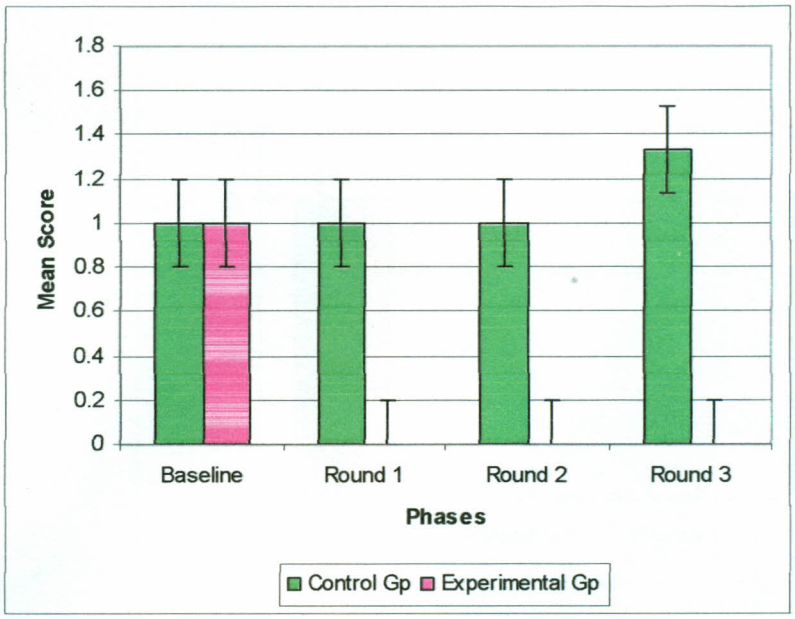
Observed number of accidents among pre-school children due to factors in the learning environment, were also assessed during the study and the results are presented in Section 4.2.3.3 below.

c) Accidents Attributed to Factors in the Learning Environment

The factors that could cause children's accidents in the learning environment in pre-school consisted of in-adequate size and poor condition of the classroom, the condition of children's chairs/tables, incorrect/unsafe use of learning materials/facilities and provision of in-adequate learning materials or facilities for use by the children. Results for accidents due to in-adequate size of the classroom are presented first.

Figure 4.26 presents means for pre-school children's accidents due to in-adequate size of the classroom.

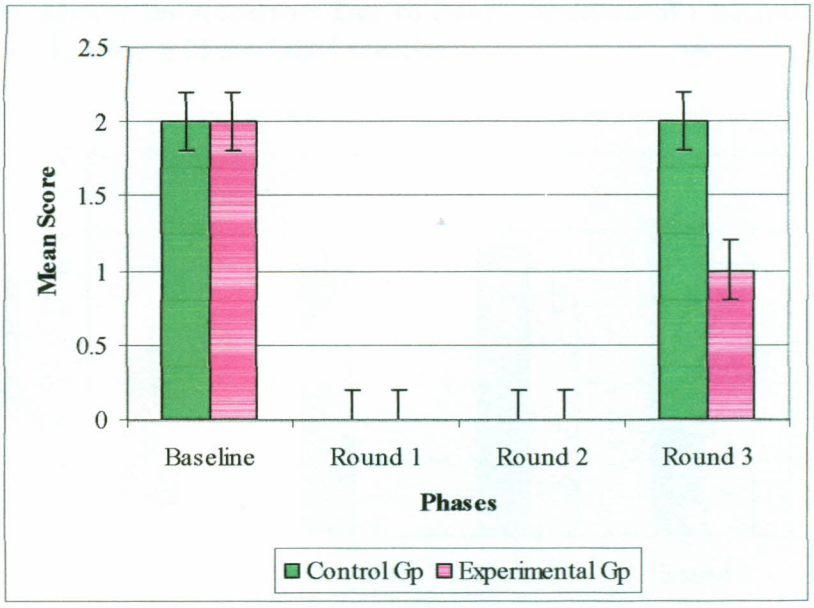
Figure 4.26 Means for Accidents Due to In-adequate Size of the Classroom



Results in Figure 4.26 on accidents due to in-adequate size of the classroom indicate that the mean number of children's accidents from both groups of pre-schools where teachers were or were not in-serviced, were equal (1.00). After in-servicing the Experimental Group of teachers' results in Rounds One, Two and Three, show that the in-serviced group of teachers once again dramatically wiped off accidents in their pre-schools while their colleagues in the Control Group continued to have high number of accidents. The above results like Cutler & Ruopp (1999); Ball (2000) also indicated in the reviewed literature show that in-service training must have been responsible for the better performance by the Experimental Group.

Means for children's accidents due to poor condition of the pre-school classroom are presented in Figure 4.27.

Figure 4.27 Means for Accidents Due to Poor Condition of the Classroom

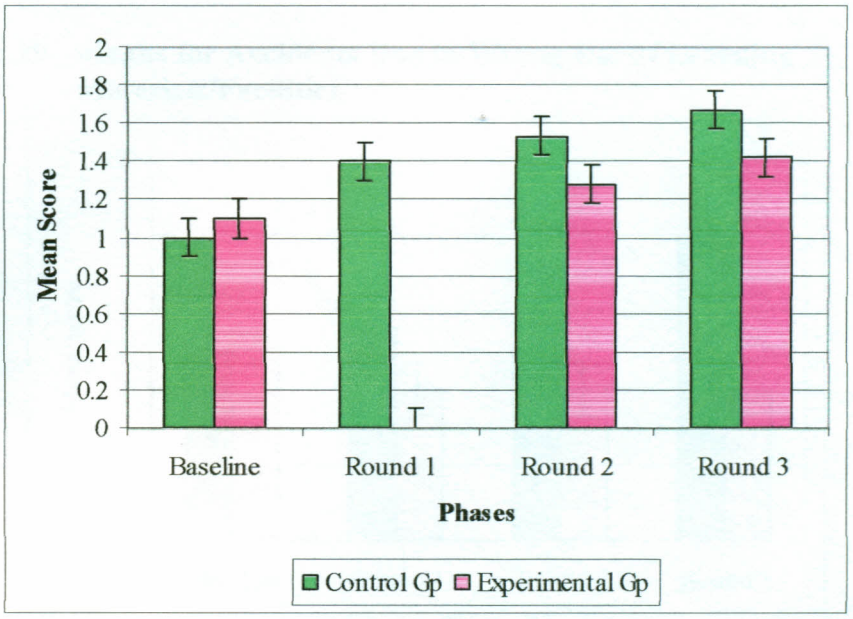


The findings in Figure 4.27 indicate that there wasn't any difference between the Control and Experimental Group of teachers before in-service training or the Baseline study phase. After the in-service workshop, both groups of teachers as the results show, successfully managed to completely prevent children's accidents due to poor condition of the classroom in their pre-schools in Rounds One and Two. In Round Three however, accidents resurfaced but with the Experimental Group registering a mean of 1.00 against 2.00 by their counterparts in the Control Group. This signifies that although the in-serviced Experimental Group of teachers benefited from the safety-care in-service workshop as reviewed literature shows Zeegers (1995), their non in-serviced colleagues in the Control Group likewise must

have learnt from the repeated questioning and tried to be more careful since they knew they were being watched.

Figure 4.28 presents means for children's accidents attributed to poor condition of their learning materials/facilities.

Figure 4.28 Means for Accidents Due to Poor Condition of Children's Learning Materials/Facilities

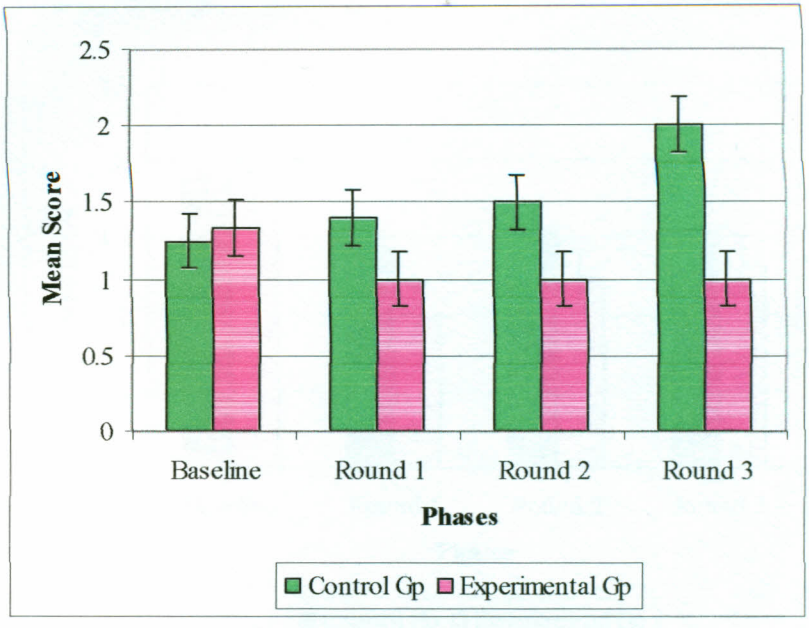


Results in the above graph shows that the number of children's accidents in pre-schools where teachers were in-serviced and where they were not, were almost similar (1.00, 1.10) before in-service training or the Baseline study phase. After in-service training of teachers from the Experimental Group, they were able to prevent accidents in their pre-schools completely in Round One, before they resurfaced in Rounds Two and Three. The Control Group however trailed behind the Experimental Group as accidents in their pre-schools went up consistently in all the post test phases. The results further show that although the Experimental Group was

better throughout the post test phases, the time lapse after in-servicing, appeared to affect their performance, which may be due to the element of forgetfulness as Reitman (1974) & Altmann & Gray (2002) indicate.

Figure 4.29 below provides results for accidents attributed to inappropriate use of learning materials/equipment.

Figure 4.29 Means for Accidents Due to Wrong Use of Learning Materials/Facilities

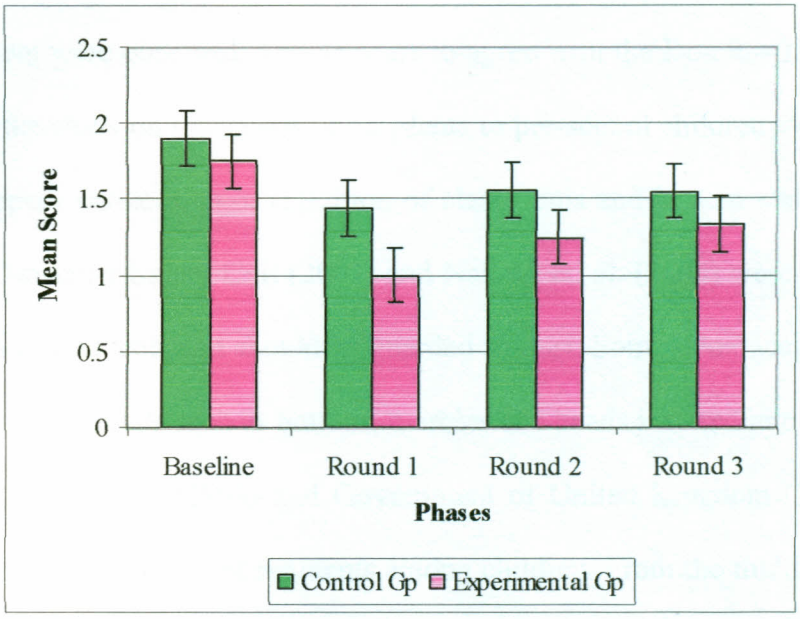


The above figure shows a good performance by teachers in the Experimental Group after the in-service workshop. Before in-service training, they registered a mean of accidents (1.33) due to inappropriate use of learning materials/equipment, which was almost similar to the Control Group. After the in-service training however, the mean number of children's accidents in the Experimental Group of schools consistently remained at 1.00 in Rounds One, Two and Three. In the Control Group

however, accidents rose in all subsequent phases. Once again as literature reviewed shows, the lower number of children's accidents in the Experimental Group of pre-schools, could only be attributed to in-servicing of their teachers.

Results attributed to accidents due to use of in-adequate number of learning materials/facilities by children are presented in Figure 4.30 below.

Figure 4.30 Means for Accidents Due to In-adequate Number of Learning Materials/Facilities



As Figure 4.30 above shows, the mean number of accidents in the Control and Experimental Group of schools were 1.9 and 1.75. After the safety-care in-service workshop for the Experimental Group of teachers, the mean number of children's accidents in their pre-schools, dropped consistently from 1.75 during Baseline study to 1.00 In Round One, but rose slightly in Rounds Two and Three. The Control Group

similarly improved, although the Experimental Group did much better. From the results, the contrast between the two groups of teachers could only be explained by provision of in-service safety-care workshop to the Experimental Group of teachers which Cutler & Ruopp (1999); Borko & Putnam (1995); Zeegers (1995); Ball, (2000) indicate produces positive outcomes.

In conclusion, results from Figures 4.26 to 4.30 indicate that the indoor learning environment is the least place to expect accidents. Very few children's accidents due to factors in the learning environment in comparison to those by human factors and those in the play environment were observed. This appears to agree with the Domino Theory Heinrich (1959) and the study on the causes of accidents to pre-school children (Mugo, 2005). However, slippery surfaces, poor condition of classrooms and broken windows as indicated by the Consumer Safety Unit (2002) and Nakitto et. al. (2004) were some of the factors that led to accidents and should be guarded against. Some other accidents emanated from learning materials such as buttons, marbles and beads inserted into body parts which Oloo (1992); Obara (1998) and Government of United Kingdom (2009) indicate to be common causal factors of accidents among children. From the findings in this section, it is evident that similar accident situations existed between the Control and Experimental Group of teachers or during the Baseline study. However, after in-servicing of teachers from the Experimental Group, accidents among children in their pre-schools reduced and only started to increase during Round Three in some cases. Results of the Experimental group of teachers on accidents attributed to factors in the learning environment in comparison with the Control group very evidently point out to

the fact that the differences could only be linked to in-service training of the Experimental group of teachers.

Although the descriptive results presented above indicate that the Experimental Group had done better, it was not possible to tell whether the differences observed due to human factors and those in the play and learning environments were statistically significantly different or not. Section 4.2.3 below presents results of inferential statistics.

4.2.3 Inferential Statistical Results

Results of the inferential statistics are presented in Table 4.15 to 4.20 after **Ho1** to **Ho6** were tested using One-Way ANOVA.

4.2.3.1 Testing of Ho1

Table 4.15 presents results of **Ho1** that stated, ***"There is no significant difference in knowledge on pre-school children's accidents, between in-serviced and non in-serviced teachers."***

Table 4.15 Significance in Variations Between Control and Experimental Groups in Knowledge on Accidents (ANOVA)

Source	Sum of Sqs	df	Mean Sq	F	Sig.
Variables * Phases * Control & Experimental groups	26.785	12	2.232	2.131	0.013
Error	1089.481	1040	1.048		
Total	1596.666	1079			

$P \leq 0.05$

Teachers' knowledge on accidents during the four study phases (Baseline study, Round One, Two and Three) when tested at alpha level 0.05 (Table 4.15) indicate that

the difference between the Control and Experimental Group was significant ($F_{[df = 12, 1040]} = 2.131$, $p = 0.013$). Null **Ho1** that stated, "*There is no significant difference in knowledge on pre-school children's accidents, between in-serviced and non in-serviced teachers during pre and post testing*," was hence rejected. The alternative hypothesis was accepted since there was a significant difference in knowledge of accidents between the Control and the Experimental Groups. It was therefore concluded that the in-service safety-care training, did have an effect on pre-school teachers' knowledge on accidents.

4.2.3.2 Testing of Ho2

In order to find out whether results from the two groups were statistically different, **$H_0$2** that stated, ***"There is no significant difference between in-serviced and non in-serviced pre-school teachers' beliefs on children's accidents during pre and post testing phases,"*** was tested at 0.05 significant level (Table 4.16).

Table 4.16 Significance in Variations Between Control and Experimental Groups in Beliefs on Accidents (ANOVA

Source	Sum of Sqs	df	Mean Sq	F	Sig.
Variables * Phases * Control & Experimental groups	33.42	12	2.785	2.558	0.002
Error	1179.185	1040	1.134		
Total	1631.867	1079			

$P \leq 0.05$

Statistical testing on Table 4.16 above shows that there was a significant difference ($F_{[df = 12, 1040]} = 2.558$, $p = 0.002$), between teachers' beliefs on accidents in the Control and Experimental Groups. The null **Ho2** that stated, "*There is no significant difference in beliefs on pre-school children's accidents, between in-serviced and non*

in-serviced teachers" was therefore rejected alpha level 0.05, in favour of the alternative hypothesis. It was also concluded that the in-service safety-care training of the Experimental Group of teachers had an effect on their beliefs towards children's accidents in pre-schools.

4.2.3.3 Testing of Ho3

To find out whether there were significant differences between the teachers' practices towards accidents in the Control and Experimental Groups at alpha level 0.05, **Ho3** that stated, ***"There is no significant difference between teachers' practices related to children's accidents in pre-schools where teachers were or were not in-serviced,"*** was tested. Results are presented in Table 4.17.

Table 4.17 Significance in Variations Between Control and Experimental Groups in Practices Related to Accidents (ANOVA

Source	Sum of Sqs	df	Mean Sq	F	Sig.
Variables * Phases * Control and Experimental Groups	51.012	12	4.2510	3.59	0.000
Error	1232	1040	1.1850		
Total	463.244	1079			

$P \leq 0.05$

Table 4.17 above indicates that there was a highly significant difference ($F_{[df = 12, 1040]} = 3.59$, $P = 0.000$), between teachers' responses in the Control and Experimental Groups. Null **Ho3** that stated, "*There is no significant difference between teachers' practices related to prevention of children's accidents in pre-schools where teachers were or were not in-serviced*, was hence rejected in favour of the alternative hypothesis. It was hence concluded that the in-service safety-care training had an effect on pre-school teachers' practices towards prevention of accidents.

4.2.3.4 Testing of Ho4

In order to find out whether the differences between accidents among children from the Control and Experimental Group of teachers were statistically significant or not, **Ho4** that stated "***There was no significant difference in the number of children's accidents due to human factors in pre-schools where teachers were or were not in-serviced,***" was similarly tested (Table 4.18).

Table 4.18 Significance in Variations Between Control and Experimental Groups in Accidents Due to Human Factors (ANOVA

Source	Sum of Sqs	df	Mean Sq	F	Sig.
Factors * Phases * Contr & Exp Gps	26.137	12	2.178	3.179	0.000
Error	410.377	599	0.685		
Total	624.479	638			

$P \leq 0.05$

Results in Table 4.18 on children's accidents from the Control and Experimental Group of pre-schools show a very high significant difference ($F_{[df = 12, 52]} = 3.179$, $P = 0.000$), indicating that in-servicing had great effect on reducing the overall number of accidents among children in pre-schools due to human factors. The null **Ho4** that stated "*There was no significant difference in the number of children's accidents due to human factors in pre-schools where teachers were or were not in-serviced*", was hence rejected in favour of the alternative hypothesis. The alternative hypothesis was accepted since there was a significant difference in knowledge of accidents between the Control and the Experimental Group. It was therefore concluded that the in-service safety-care training did have an effect on pre-school children's accidents.

4.2.3.5 Testing of Ho5

Although the results on children's accidents similarly indicate that the Experimental Group of teachers were better in their accident prevention techniques, it was not possible to tell whether or not the results were statistically different. **Ho5** that stated ***"There is no significant difference between the number of children's accidents due to factors in the play environment in pre-schools where teachers were or were not in-serviced,"*** was hence tested. The results are presented in Table 4.19 below.

Table 4.19 Significance in Variations Between Control and Experimental Groups in Accidents Due to Factors in Play Environment (ANOVA

Source	Sum of Sqs	df	Mean Sq	F	Sig.
Phases * Contr & Exp Gps	69.838	12	5.82	3.14	0.000
Error	722.804	390	1.853		
Total	1032.207	429			

$P \leq 0.05$

Results above for the One-way ANOVA test on accidents due to factors in the play environment in the control and Experimental Groups of schools indicate that the differences were above 0.05 and highly significant ($F_{[df = 12, 390]} = 3.14$, $P = 0.000$). Null **Ho5** that stated, "*There is no significant difference in the number of children's accidents due to factors in the play environment*," was therefore rejected at alpha 0.05 level. Since the results indicate significant differences between the number of children's accidents in the Control and Experimental Group of teachers, the alternative hypothesis was accepted. Based on the above findings, it was concluded that the in-service safety-care training did have an effect on accidents among children in pre-school where teachers' were in-serviced in child safety-care.

4.2.3.6 Testing of Ho6

To find out whether the means for the Control and Experimental Groups were statistically different, **Ho6** that stated, ***"There is no significant difference between the number of children's accidents due to factors in the learning environment in pre-schools where teachers were or were not in-serviced during the pre and post testing phases,"*** was subjected to One-Way ANOVA test and the results are given in Table 4.20 below.

Table 4.20 Significance in Variations Between Control & Experimental Groups in Accidents Due to Factors in Learning Environment (ANOVA

Source	Sum of Sqs	df	Mean Sq	F	Sig.
Factors *Phases * Contr & Exp Gps	74.039	12	8.227	4.446	0.000
Error	495.93	268	1.85		
Total	877.751	304			

$P \leq 0.05$

The results above shows that the values in ANOVA Table 4.20 were highly significant ($F_{[df = 12, 268]} = 4.446$, $p = 0.000$). Since the significance values above were less than 0.05, it was concluded that there was a significant difference between number of children's accidents in pre-schools where teachers were or were not in-serviced. **Ho6** that stated, "*There is no significant difference between the number of children's accidents due to factors in the learning environment in pre-schools where teachers were or were not in-serviced*, was thus rejected at alpha 0.05 level. The alternative hypothesis was accepted since there was significant difference in the number of children's accidents in the Control and the Experimental Group. It was therefore concluded that the in-service safety-care training did have an effect on pre-school teachers' knowledge on accidents.

Results from objective numbers three and four show the prevailing situation before in-servicing of teachers was that the differences among the Control and Experimental Group of teachers were minimal. After the in-service workshop and subsequent testing of hypotheses number one to the sixth however, teachers in the Experimental Group improved their knowledge, beliefs as well as practices towards accidents and ultimately their prevention. The results concur with re-known authorities in in-servicing of teachers Ayot (1980); Karugu & Kuria (1991); Borko & Putnam (1995); Zeegers (1995); Cutler & Ruopp (1999) and Ball (2000), that indeed in-service training is a strong motivator that produces positive output. However, although the safety-care in-service training had a positive impact on the in-serviced Experimental Group of teachers, there was a reduced effect over time (Reiman, 1974; Bouston and Swartzentruber, 1991). To ensure consistency in the prevention of accidents, in-servicing of teachers on child safety-care needs to be done more frequently or on a regular basis. Head teachers could also help in ensuring that teachers practice safety-care skills acquired during in-servicing. Okumbe (1998) & Mwaura (2009) have shown the need for follow up by school administrators in ensuring that teachers play their roles effectively.

The next chapter discusses the conclusion and recommendations based on the above study findings.

CHAPTER FIVE:

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study on "Effects of an in-service safety-care workshop for teachers on pre-school children's accidents" shows that:

- There was a significant difference in knowledge on pre-school children's accidents, between in-serviced and non in-serviced teachers.

- There was a significant difference between in-serviced and non in-serviced pre-school teachers' beliefs on children's accidents during pre and post testing phase.

- There was a significant difference between teachers' practices related to children's accidents in pre-schools where teachers were or were not in-serviced.

- There was a significant difference in the number of children's accidents due to human factors in pre-schools where teachers were or were not in-serviced.

- There was a significant difference between the number of children's accidents due to factors in the play environment in pre-schools where teachers were or were not in-serviced.

- There was a significant difference between the number of children's accidents due to factors in the learning environment in pre-schools where teachers were or were not in-serviced during the pre and post testing phases.

5.2 Implications of the Findings

The implications of the findings in this study are organized along teachers' personal attributes, their knowledge, beliefs and practices related to accidents, then finally, the number of accidents among children in pre-schools attributed to human factors and those in the play and learning environments.

5.2.1 Teachers' Personal Attributes

During the study, teachers' personal attributes like academic and professional education, age, gender, teaching experience and the drive for choosing the teaching career (Tables 4.1 – 4.6) were key components sought that support in-service training in terms of performance. Results show that majority of teachers in both the Control and Experimental groups had pre-requisite characteristics to help them offer child-care. The biggest challenge that emerged however was what influence these attributes could contribute in reducing accidents (see Tables 4.7 – 4.12 and section 5.2.2).

5.2.2 Pre-school Children's Accidents in Relation to Teachers' Personal Attributes

Results show that pre-school teachers' personal information was well-documented in-order to determine whether biases could arise when considering the effect of in-service workshop on pre-school children's accidents. From the results, teachers' attributes

sometimes influenced the number of accidents among pre-school children. In particular age, gender, prior opportunity to in-servicing and voluntary choice of the teaching career influenced the reduction of accidents. However, it was very interesting to note that even pre-school teachers with lower educational and professional levels could ensure reduced number of accidents among children in their pre-schools. In addition, even the number of pre-school children's accidents in relation to the various teachers' attributes changed with passage of time i.e. before and after in-servicing. This therefore without a doubt spells out that in-servicing had a greater part in reducing the overall number of pre-school children's accidents.

5.2.3 Teachers' knowledge on Accidents

Teachers' knowledge on common types of accidents among children in pre-school, their causes and their prevention were important factors in this study. The results show that in-service training influenced teachers' knowledge on accidents positively but time lapse affected their memory. The unavailability of opportunities for in-service training Adams (1995) & Ngome (2002) let alone regular safety-care in-servicing seems to affect the teachers' performance. Provision of regular in-service training for teachers should therefore be considered. This will ultimately lead to minimizing or preventing accidents among children in pre-school.

5.2.4 Teachers' Beliefs on Accidents

Beliefs that were most important and covered in this study included: accidents among children are preventable, adequate supervision and completely safe school facilities

were availed to children in pre-school. In-servicing of teachers on positive beliefs to embrace in regard to accident prevention had a great impact on teachers. However, with passing of time, their positive beliefs towards accident prevention, started to decline. To guard against eroding of positive beliefs, reinforcement through regular in-service training of teachers is therefore necessary.

5.2.5 Teachers' Practices Regarding Accidents

Keenness in supervision, reinforcing safe behaviour, being good safety-models, promoting pro-social behaviours like turn taking or sharing of in-adequate play/learning materials by children and strictly ensuring that safety measures were followed during play/learning activities, which were constituents of the in-service training acted as a catalyst in influencing teachers' practices towards child safety-care. However, with time, forgetfulness came into play and teachers' practices towards accident prevention went down. Although the Experimental Group of teachers did better than their counterparts in the Control Group, the importance of regular in-servicing of teachers' in order to motivate them to ensure child safety consistently can not be underscored.

5.2.6 Pre-school Children's Accidents Due to Human Factors

Comparison of number of accidents among children in pre-schools during pre testing with post testing results shows that, after the in-service training of teachers, accidents due to human factors in the Experimental Group of pre-schools went down significantly when their results are compared to the Control Group. Safety-care levels seem to influence the reduction of accidents due to human factors and hence in-servicing of

teachers needs to be given preference in order to reduce accidents thus enhancing the attainment of children's safety right.

5.2.7 Pre-school Children's Accidents Due to Factors in the Play Environment

Play is an important component in ensuring children's holistic development. However, availability of an adequate size of play space according to the number of children, condition of playground and play materials or equipment, their safe use and adequacy account for whether or not, children can play without getting injured. Results obtained show that teachers in-serviced were able to reduce the number of accidents due to factors in the play environment. Regular in-service training on child safety-care should thus be considered as a way of enhancing teachers' accident prevention techniques.

5.2.8 Pre-school Children's Accidents Due to Factors in the Learning Environment

In-service training of teachers in the Experimental Group of pre-schools similarly seems to have influenced teachers' levels of safety-care judging from the number of accidents that occurred to children due to factors in the learning environment. According to the results, it was evident that the in-service training workshop helped to interrupt the accident sequence and thus reduced them considerably as the Domino Theory also suggests. In-service training of teachers was indeed an effective way of interrupting children's accidents in pre-schools, although after in-servicing, follow up is necessary to ensure that the effects of in-servicing lasted for a reasonable duration of time.

5.3 Conclusion

The study was conducted to find out if any in-service training of teachers was beneficial especially in safety-care aspects to reduce accidents among children in pre-schools. Results show that accidents among children in pre-school were high which was also indicated by other studies cited. The various types of accidents among children were caused by different human factors such as teachers' failure to ensure adequate supervision, not demonstrating safe behaviour, failure to provide safety education to children, not reinforcing safe behaviour in children and not providing appropriate answers to children's questions regarding safety. Factors in the play and learning environments were issues to do with in-adequate size and condition of the playground/classroom, poor condition, wrong use and provision of in-adequate play/learning materials or facilities all of which are contributory causes of accidents among children.

To minimize or prevent the above accidents, an in-service workshop for teachers on safety-care was conducted by the City Centre for Early Childhood Education. After in-servicing teachers in Experimental Group, the number of accidents among children in their pre-schools went down drastically, particularly in Round One. To sustain the positive effect of minimizing accidents among pre-school children, consistency in teachers' accessibility to regular in-service training seems to be the logical way forward. The ultimate goal would be to reduce the number of accidents among children in pre-schools to about 2% and in consistency with the Domino Theory by Heinrich (1959).

5.4 Recommendations

As the study has shown, the bulk of accidents among children in pre-schools can be blamed on human factors. The focus is thus mainly on teachers and the pre-school management in whom child safety-care role is entrusted as well as other key players. The following recommendations are to policy makers, curriculum developers, teacher trainers, pre-school teachers, pre-school management and parents/other ECD stakeholders, as well as for further research.

5.4.1 Recommendations to Policy Makers

i) Policy makers need to ensure that after policies are formulated they are followed to the letter. In pre-schools for example, safety guidelines provided should be followed at all costs. They also need to conduct inspections regularly as well as vigilantly and if possible close down pre-schools, which do not comply with safety requirements.

ii) The government as the main policy maker needs to ensure that safety requirements are in place and are adhered to even in pre-schools attached to public schools. The issue of provision of adequate space per child should particularly be the focus, with the aim to rectify the situation.

iii) In-servicing if not conducted periodically or regularly may not be very useful due to forgetfulness or decay of knowledge which comes with passage of time as memory decay theorists have indicated in reviewed literature in this study. The government through Kenya Institute of Education should thus provide opportunities for short

safety-care in-service training workshops for all personnel working with children at least once in a year at subsidized rates. This could to guard against loss of knowledge gained during in-servicing could also greatly encourage pre-school owners and their staff, to attend

5.4.2 Recommendations to Curriculum Developers

i) Curriculum development and review is an on going process. The curriculum developers and specifically the National Centre for Early Childhood Education (NACECE) under K.I.E need to come up with short courses that can help to improve teachers' knowledge on accidents, their causes and prevention.

ii) They could also improve their in-service teacher training programmes and specifically in child safety-care among other curriculum aspects, based on the findings of this study.

iii) To cater for teachers who cannot avail themselves for in-servicing, they could develop safety-care teaching modules and videos for teachers' use and even trainers. Written materials are useful since they are a point of reference always and can be referred to any time when the user is in need. This may guard against forgetting of important details.

5.4.3 Recommendations to Pre-school Teacher Trainers

i) The pre-school teacher trainers need to stress the importance of safety-care for children during the pre-school in-service programmes. They should remind teacher trainees of the need for them to check if children's play and learning environments are safe every hour if possible.

ii) Other private bodies and teacher trainers that offer teacher development programmes should consider intensifying child safety initiatives through provision of in-servicing opportunities for teachers.

5.4.4 Recommendations to Pre-school teachers

i) Pre-school teachers should appreciate the need to participate in in-service training when offered the opportunity. They could enrol for in-service courses even if it means using their own free time. In-service training helps to rejuvenate their strength and enhance their child safety-care practices. It also provides them with opportunities to meet and share ideas with other teachers and to learn from one another, practical ways of dealing with accidents.

ii) They should recognize the importance of ensuring that children are safe at all times. Vigilant supervision of children and at all times can prevent most accidents before they happen. They should recognize supervision as key in minimizing children's accidents.

iii) They should also ensure that children are taught safety education in order to safeguard themselves from accidents. This entails reminding children on the do's and don'ts that may enhance child safety. Teachers should also ensure they model and reinforce safe behaviour among children in order to motivate children to act in safe ways thereby giving safety-care the importance it deserves.

5.4.5 Recommendations to Pre-school Managers

i) Pre-school managers and administrators should be aware of the need for in-service training of teachers working for or under them. In-service training can be a motivation for teachers to do better in their teaching and safety-care roles. Managers and administrators who are concerned about staff development can thus reap the benefits as many parents will want to enroll their children in schools that constantly strive to ensure safety within their environs.

ii) To reap supplementary benefits, pre-school managers and administrators need to ensure that their pre-schools are safe to guard against the occurrence of accidents of any type. All children's play/learning facilities should be in good order and regularly checked for splintage or breakage or kept out of use until repaired. The play and learning environments also need to be spacious, facilities adequate for all children and used appropriately in order to ensure safety.

iii) In order to motivate teachers, they should not only sponsor them to attend in-service training workshops regularly, but that those whose children suffer the least number

of accidents per term or year should be rewarded as an incentive to remain alert in as far as safety-care is concerned.

iv) Pre-school managers or administrators should also access pre-school policy documents that specify the requirements of a safe school environment and ensure they comply with the safety guidelines. A safe pre-school can lead to ISO certification, which is the modern trend and requirement to ensure maintenance of quality specifications.

5.4.6 Recommendations to Parents and Other ECD Stakeholders

i) Child safety-care role is a permanent and demanding job. Parents and other ECD stakeholders should recognize this fact and reward teachers who maintain safety. If teachers feel appreciated, they will be compelled to do their best in ensuring safety and hence reduce all possible accidents.

ii) Parents and other ECD stakeholders should also supplement teachers' efforts by teaching children safety education at home in order to minimize accidents in pre-schools. They should for example teach children how to use equipment safely and correctly, as a way to prevent accidents and to transfer the same practices to school.

iii) They should also inspect the pre-school premises to note and report facilities that could endanger children. They could also serve as internal quality assurance officers and inspect school facilities every day as they drop their children at school.

This would therefore encourage pre-school personnel to ensure they provide a safe pre-school for children at all times.

iv) There is need to address the reasons why the management in many pre-schools did not send their teachers for refresher courses. This could be linked to high number of accidents in pre-schools even though teachers had prerequisite experience and interest on the job. Parent and other ECD stakeholders have a duty to ensure that teachers of their children are trained in order to ensure they are motivated. In-service training is capable of influencing teachers' knowledge, beliefs and practices towards safe practices and thus prevention of children's accidents as noted in the findings of this study. They could also sponsor or compel the school managers to organize for or send the teachers for in-service workshops.

5.4.7 Recommendations for Further Research

i) The study on "Effects of in-service safety-care workshop for teachers on pre-school children's accidents only covered selected divisions in Nairobi. It has provided the basis for further studies in other divisions not covered, districts or provinces in Kenya to see if the trend is comparable.

ii) The study only focused on injurious accidents among children in pre-schools in order to establish teachers' safety-care levels based on the injurious accidents. Further research could be done in other school levels and using the current study as a basis for study.

iii) Further research could also focus on accidents in waiting in pre-school, other school levels and elsewhere in order to help avert accident scenarios among children that are yet to occur.

iv) The study mainly focused on the causes and prevention of accidents among children in pre-school, but not the effects of accidents. Further research could examine the effects of accidents in children...

v) The in-service training was conducted using the face-to-face training method but in future, further training could be done using the e-learning mode, which is a recent technological approach to determine its impact.

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APPENDICES

Appendix A: Research Work Plan (time schedule)

ACTIVITY	MONTH
Proposal writing	May 2006 – January 2007
Department Defence	February- March 2007
Departmental Corrections	May- July 2007
Presentation at School of Education	July - September 2007
Corrections from School of Education	September - October 2007
Piloting/data collection for Baseline study	October - November 2007
Post test data collection, analysis and report writing	January - December 2008
Submission of thesis	January- March 2009
Graduation	December 2009

Appendix B: Research Budget

ACTIVITY	Unit Cost	Total Cost
1. PROPOSAL WRITING		
Materials: 3 reams paper @ Kshs 500	1,500.00	1,500.00
1 pack of diskettes @ Kshs 500	500.00	500.00
Internet browsing: @ Kshs 2 p/min for 60 hours	120.00	7,200.00
Proposal marking and corrections @ Kshs 5000	5,000.00	5,000.00
Sub Total	**7,120.00**	**14,200.00**
2. Pilot Study		
Transport: group leaders/researcher @ Ksh 200/- x 4 schs x 5 days x 3 div.	4,0000.00	12,000.00
Honorarium: research assistants @ Ksh 200 x 4 schs x 5 days x 3 divisions.	4,0000.00	12,000.00
Sub Total	**8,000.00**	**24,000.00**
3. SCHOOL SELECTION AND RECRUITMENT OF RESEARCH ASSISTANTS (RAs)		
Transport for researcher @ Kshs 200 x 18 schools x 3 divisions	3,600.00	10,800.00
Transport for researcher for training @ Kshs 200 x 3 divisions	10,800.00	32,400.00
Transport: 1 day training of 3 group leaders @ Kshs 200 x 3 divisions	200.00	600.00
Wages: 1 day training: grp leaders/research assistants (19) @ Kshs 200 x 3 divs	3,800.00	11,400.00
Training materials: 1 ream paper @ Kshs 500	500.00	500.00
5 Biros @ Kshs 10 x 3 divisions	50.00	150.00
5 Pencils @ Kshs 25 x 3 divisions	125.00	375.00
5 Erasers @ Kshs 20 x 3 divisions	100.00	300.00
6 folders @ Kshs 25 x 3 divisions	150.00	450.00
1 book flip charts @ Kshs 1000 x 3 divisions	1,000.00	3,000.00
3 pair-colour felt pens @ Kshs 80 x 3 divisions	240.00	720.00
Sub Total	**17,365.00**	**53,220.00**
3. BASELINE STUDY DATA COLLECTION		
Researchers Transport to 18 schs @ Kshs 200 x 3 divisions x 30 days	108,000.00	324,000.00
3 Team Leaders Transport to schs @ Kshs 200 x 3 divs x 30 days per term	6,000.00	18,000.00
Honorarium: grp leaders/research assist. (19) x @ Kshs 1,000 x 18 schs x 3 divs	19,000.00	57,000.00
Sub Total	**126,000.00**	**378,000.00**
4. MAIN STUDY DATA COLLECTION		
Transport: Researcher to 18 schs @ Kshs 200 x 3 divs x 30 days p/term	3,600.00	108,000.00
Transport: 3 group leaders @ Kshs 200 x 3 divs x 30 days per term	6,000.00	18,000.00
Honorarium: gp leaders/research assist (19) @ Ksh 1,000 x 3 divs x 30 days p/term	19,000.00	57,000.00
Sub Total	**126,000.00**	**378,000.00**
5. DATA ANALYSIS AND PRINTING OF THESIS		
Materials: 9 reams paper @ Kshs 500	500.00	4,500.00
25 hours statistical consultation @ Kshs 300	7,500.00	7,500.00
Typing service for 200 pages @ Kshs 25 x 5 copies	5,000.00	25,000.00
Printing service for 200 pages @ Kshs 10 x 7 copies	2,000.00	14,000.00
Photocopying service for 200 pages @ Kshs 1.50 x 7 copies	300.00	2,100.00
Binding 7 copies of thesis @ Kshs 250	250.00	1,750.00
Sub Total	**15,550.00**	**54,850.00**
Grand Total for the Study	**293,635.00**	**883,070.00**

Appendix C: Interview Guide on Teachers' Knowledge, Beliefs Towards Practices Pertaining to Accidents

Form Number:_____

Introduction:

Hullo! I am a PHD student at Kenyatta University, conducting a research on "Effects of An In-service Safety-care Workshop for Teachers on Pre-school Children's Accidents in Selected Divisions in Nairobi Province, Kenya and your pre-school has been chosen as one of the most appropriate to participate in the study. The purpose of this questionnaire is to find out the effect of in-servicing teachers on safety-care against accidents to children and the information will be used to promote the reduction of accidents in pre-schools. The questionnaire has three parts: A, B and C. Part A covers pre-school teachers' knowledge of accidents among children in pre-school, part B teachers' beliefs on accidents and part C teachers' safety-care practices. Please kindly answer the questions below as honestly as possible. All information will be kept confidential. Thank you for your co-operation.

Teachers' Personal Attributes:

1. Teachers' Age: 20 – 29 yrs [ ] 30 – 39 yrs [ ] 40 – 49 yrs [ ] 50 yrs + [ ]

2. Teachers' Gender : Male [ ] Female [ ]

3. Teaching Experience: 0 – 5 yrs [ ] 6 – 10 yrs [ ] 11 – 15 years [ ]
16 – 20 [ ] 21 – 25 yrs [ ] 25 years+ [ ]

4 a) No. of Refresher Courses Attended Since Graduating as a Teacher:

0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 or above [ ]

b) If response to question 5 (a) above is zero [0], please state why teacher has not attended any refresher course.....

.....

5. State Drive for Choice of Career: Personal Choice [ ] From External Pressure [ ]

Part A: Teachers' Knowledge of Accidents

Term: _____ School Code No. _____

PART A: Teacher's Knowledge on Causes of Accidents and Prevention

Instructions to the Research Assistant (RA):
For each of the following questions on teachers' knowledge of accidents and prevention, write the teachers' answers in the spaces provided.

Message to the teacher from (RA):
(Answer the following questions to the best of your knowledge).

A. Knowledge on Causes of Accidents and Prevention	**Score**
1. Identify any 5 common types of accidents among children in pre-school.	
2. List any 5 faults that teachers and pre-schoolers could commit leading to accidents among children.	
3. Identify any 5 play materials/facilities that could contribute to accidents among children in pre-school.	
4. Name any 5 learning materials that could cause accidents among children in pre-school.	
5. List any 5 measures teachers could enforce to curb accidents among children in pre-school.	
Total	

Part B: Teachers' Beliefs About Accidents

Term: _____ School Code No. _____

Instructions to the Research Assistant (RA):
For each of the following questions on teachers' beliefs about accidents below, please indicate with a tick the teacher's most favourable choice of response e.g. Strongly Agree [SA], Agree [A], Not Sure [NS], Disagree [D] and Strongly Disagree [SD].

Message to the teacher from (RA):
(For each of the following questions, please say your most preferred choice of answer).

B. Beliefs on Accidents Among Pre-school Children	**Score**
1. Most accidents among children are preventable. SA [ ] A [ ] NS [ ] D [ ] SD [ ]	
2. In-adequate supervision is not the major cause of most accidents to pre-schoolers. SA [ ] A [ ] NS [ ] D [ ] SD [ ]	
3. Rough play is not responsible for many accidents among pre-schoolers. SA [ ] A [ ] NS [ ] D [ ] SD [ ]	
4. Our school facilities are completely safe for children's use. SA [ ] A [ ] NS [ ] D [ ] SD [ ]	
5. When children interact during learning activities, accidents must occur. SA [ ] A [ ] NS [ ] D [ ] SD [ ]	
Total	

Part C: Teachers' Safety-care Practices

Term: _____ School Code No. _____

Instructions to the Research Assistant (RA):
(Please indicate how often in the last one-term you have observed the teacher doing the following things indicated in the table below by ticking inside the bracket the most preferred answer by the respondent.

Message to the teacher from (RA):
Answer the following questions by saying how often in the last one-term you have performed the following actions:

C. Safety-care Practices	**Score**
1. Reinforcing safe behaviour in children during play and learning activities. Very Often [ ] Often [ ] Undecided [ ] Sometimes [ ] Never [ ]	
2. Supervising children keenly during play and class time. Very Often [ ] Often [ ] Undecided [ ] Sometimes [ ] Never [ ]	
3. Acting as good safety role models to children. Very Often [ ] Often [ ] Undecided [ ] Sometimes [ ] Never [ ]	
4. Ensuring children take turns or share in-adequate play or learning materials. Very Often [ ] Often [ ] Undecided [ ] Sometimes [ ] Never [ ]	
5. Ensuring safety measures are strictly adhered to during play activities. Very Often [ ] Often [ ] Undecided [ ] Sometimes [ ] Never [ ]	
Total	

Appendix D: Observation Guide for Accidents in Pre-school

Term: _____ School Code No. _____

Instructions to the Research Assistant (RA):

Please indicate the number of accidents among children in pre-school per cause.

Factors Causing Accidents	No. of Accidents
Part A: Human Factors:	
a) In-adequate supervision of children in pre-school	
b) Not demonstrating safe behaviour to children in pre-school	
c) Not providing safety education/instructions to children in pre-school	
d) Not reinforcing safe behaviour in children in play or learning environment	
e) Not giving honest answers to children's questions regarding safety in play or learning environment	
Part B: Factors in Play Environment:	
a) In-adequate size of playground	
b) Poor condition of playground	
c) Poor condition of play materials/equipment	
d) Wrong/incorrect use of play materials/ equipment	
e) Use of in-adequate play materials/equipment	
Part C: Factors in Learning Environment	
a) In-adequate size of classroom	
b) Poor condition of classroom (floor, windows, doors & walls)	
c) Poor condition of children's furniture/learning materials/tools	
d) Wrong/incorrect use of furniture/learning materials/tools	
e) Use of in-adequate furniture/learning materials/tools	
Total Score	