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ASSESSMENT OF CAUSES OF OCCUPATIONAL ACCIDENTS AMONG WORKERS AT STOREYED COMMERCIAL BUILDING CONSTRUCTION SITES IN WAKISO DISTRICT, UGANDA

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(J21M16/002)

A DISSERTATION

SUBMITTED TO THE FACULTY OF ENGINEERING, DESIGN AND TECHNOLOGY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTER OF SCIENCE DEGREE IN ENVIRONMENTAL HEALTH AND SAFETY MANAGEMENT OF UGANDA CHRISTIAN UNIVERSITY

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JULY, 2023

DECLARATION

I BIRUNGI DOREEN, hereby declare that this Dissertation is my original work and it has never been submitted before to any other institution of higher learning for fulfilment of any academic award.

SIGNATURE..... DATE.....

APPROVAL

This is to certify that, this dissertation entitled "**Assessment of causes of Occupational Accidents among workers at storeyed commercial building construction sites in Wakiso District, Uganda**" has been done under my supervision and now it is ready for submission.

Signature……

Twinomugisha Bernard

Date……

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ABSTRACT

A study to assess causes of occupational accidents was conducted at construction sites of storeyed buildings in Wakiso District in the towns of Kira and Nansana from November, 2022 to March, 2023. Physical visits were conducted and sites were randomly selected from a list of Municipal Council approved plans during the research period. Pretested structured and semi-structured questionnaires and interview guides were administered to sites and a sample of 132 respondents was used, purposively selected supervisors and randomly selected workers after securing informed consent from owners and workers. The obtained data was analysed to generate descriptive statistics that informed further statistical Analysis. Chi-square tests and a multiple regression model were conducted to analyse the data. Qualitative data was analysed using thematic analysis in the Open code 4.03 software.

Results from the research show that both non-fatal and fatal accidents occur at the storeyed building construction sites. The common ones were: Skin pierces by (26.6%), skin cuts (24%) skin peel-offs (15.9%) and struck-by falling materials (10.3%) as reported by the interviewed people. In addition, 67.4% of those interviewed revealed that they had ever been involved in some the accidents. Causes of the accidents range from Organizational factors that include absence of worksite safety policy 0.296 (P=0.008), lack of signage and safety warnings 0.26 (P=0.043). To some extent, a number of accidents were associated to gender of workers 0.609 (p=0.02), others to socio-economic status like age 0.002 (p=0.817) work experience 0.001 (p=0.791) and work shift, 0.309 (p=0.228).

There is need to encourage storeyed building construction proprietors to invest in protective measures to safeguard workers at their respective sites.

CHAPTER ONE: INTRODUCTION

1.1 Background

Irrespective of providing at least 8% of the global employment (Ellaban *et al.*, 2018), the construction industry is still plagued with high incidences of occupational accidents and illnesses (Hämäläinen *et al*, 2017; Shafique *et al*, 2019). In United States of America alone, the construction industry accounts for 21% of accidents occupational Safety and Health Administration (OSHA), 2017). Nevertheless, the middle and low-income countries carry over 50% burden of occupational accidents globally (Takala *et al.*, 2014; Hämäläinen *et al*, 2017).

Moreover, the growing demand for high-rise building owing to inadequate usable land area in towns of middle and low-income countries like Pakistan and Malaysia have already increased the burden of occupational accidents in the building construction sectors (Lakhiar *et al.,* 2021; Manzoor *et al.,* 2021). Consequently, a rise in the number of fatalities and accidents has been reported. Particular forms of occupational accidents, especially falls and "struck-by" accidents have been projected to become significant to high risks involved with high-raise building (Lakhiar *et al.,* 2021; Manzoor *et al.,* 2021).

The occupational accidents are also attributed to organizational factors such as unsafe working conditions and limited compliance to occupational health and safety guidelines that influence employers (Hystad et al., 2014; Kiconco *et al.*, 2019). Workers' individual factors like as age, educational level, gender and job type, knowledge and attitudes toward PPE are also cited (Chong and Low, 2014; Izudi *et al*,

2017; Abas et al., 2020) to have influence on accident rates of occurrence. It is on this basis that countries have been called upon to increase the enforcement of occupation health and safety guidelines as well as establishing safety management strategies in the construction industries in order to minimize occupational accidents (Manzoor et al., 2021).

Equally, the prevalence of occupational accidents among building constructions workers Uganda's towns like Kampala has been reported as high as 32.4% (Kiconco *et al.*, 2019). Urbanization and dense populations have continued to attract a raise in storeyed building constructions in metropolitan area like Mukono and Wakiso (Office of The Auditor General of The Republic of Uganda, 2015). Studies that have assessed occupational accidents in the construction industry of Uganda (Lubega et al, (2000); Izudi et al, (2017); Kiconco et al., 2019), have not focused on the side of storeyed building constructions. Therefore, this points to the need to accrue information on occupational accidents severity rates and causations at storeyed building constructions in Uganda. This might be important in supporting decision making and informing occupational health and safety policy formulation. This formed the motivation and anchoring of this study conducted in Wakiso District in central Uganda.

1.2 Problem statement

Owing to the lack of usable land area in most of the growing urban towns of middle and low-income countries (Manzoor et al, 2021), the rate of storeyed building construction projects has increased. Unfortunately, this growing demand for storeyed buildings has also led to increased accidents in the construction sector due to unsafe

working environments (Lakhiar et al., 2021). Relatedly, varying rates of occupational accidents have been reported in major towns of East African countries including 74% in Kenya (Kemei, 2016) and 23.73% in Tanzania (URT, 2013). In Uganda, several occupational accidents have been reported in major urban centres such as Mukono, Kampala and Wakiso (GOU, 2016) where these accidents have occurred especially in areas with construction boom in storeyed building projects. In 2021 only, six people were killed at collapsed storeyed building sites in Kisenyi and thirteen in Makindye suburbs of Kampala respectively (Bagala, 2021; Twinamatsiko, 2021).

Workers at storeyed building construction sites in Uganda are continually exposed to occupational hazards that often lead to accidents. There is limited information regarding occurrence rates, different forms of accidents and factors that lead to the cause of accidents. This study aimed at generating information on the forms, rates and drivers of occupational accidents amongst workers at storeyed building construction sites in Wakiso District that can be used by policy and decision makers.

1.3 Objectives of the study

1.3.1 Main objective

The main objective of this study was to evaluate the variations in the rates and drivers of occupational accidents among storeyed building construction sites in Wakiso District.

1.3.2 Specific objective

1. To categorize occupational accidents among the workers at storeyed buildings construction sites in Wakiso district.

2. To determine the occurrence rates of the different types of occupational accidents among workers at storeyed building construction sites in Wakiso district.
3. To determine the factors that cause occupational accidents among workers at storeyed buildings construction sites in Wakiso district.

1.4 Research questions

1. What are the different types of occupational accidents that occur among workers at storeyed buildings construction sites in Wakiso district?
2. What is the rate of occurrence of different types of occupational accidents among workers at storeyed building construction sites in Wakiso district?
3. What are the factors that cause occupational accidents among workers at storeyed buildings construction sites in Wakiso district?

1.5 Justification of the study

Similarly with trends from middle-income countries like Indonesia and Malaysia (Arifuddin et al., 2020; Manzoor et al., 2021), the storeyed building construction sites in Uganda have been associated with high occurrence of occupational accidents. There is growing concern on the need of restructuring existing regulatory frameworks in order to combat the growing rates of occupational accidents reported at storeyed building construction sites. However, the need for detailed data on the nature and rates of occupational accidents at storeyed building construction sites has been listed among the pre-requisite for restructuring existing occupational health and safety

regulatory frameworks. The findings of this study will provide information on the current trends and nature of occupational accidents at storeyed building construction sites which is important for supporting decision making and policy formulation in Uganda.

1.6 Significance of the study

This study generated information on the different types of construction sites and factors that lead to occupational accidents among storeyed commercial building construction workers in the study area. This information can be important for supporting and informing decision making for policy improvement or formulation at both organizational and national level. The information generated in this study can also be used by the relevant occupational health and safety officials and local government authorities to design interventions for sustainable elimination of occupation accidents.

1.7 Conceptual framework

The conceptual framework of this study is shown in (Figure 1.1 below) shows the occupational accidents are as a result of interactions between the dependent and independent variables. The different types of occupational accidents that occur among workers at building construction sites are considered as the dependent variables. It is postulated that occupational accidents are as result of insufficiencies in the independent variables (Nevhage et al, 2008). The rate of accidents is influenced by the frequency of insufficiencies in the independent variables (Nevhage et al, 2008).

The independent variables were grouped into three broad categories namely; workers socio-economic characteristics, organizational factors and psychological and behavioural factors based on existing literature (Filho *et al.*, 2012; Jo, Lee, Kim and Khan, 2017; Kiconco *et al.*, 2019). Workers' individual factors are unique for any given worker at any given working site and include their age, gender, education level, job type, employment, monthly salary and work experience among others (Ismail et al 2012; Williams et al., 2017). Some workers gain knowledge on occupational risk and this is often from their previous work place or as a result of previous trainings on occupational accident risks by the employer. In some instances, young and less experienced workers face higher risks of occupational injuries due to potential lack of specific job training on occupational safety guidelines (Kemei, 2016; Berhanu et al., 2019).

Filho *et al.*, (2012) denotes that those organizational factors are often the underlying causes of occupational accidents. Majority of the organizational factors such as occupational safety training and drills by the employers are aimed at enhancing the knowledge of workers on occupational accident risks (ILO, 2008; Berhanu et al., 2019; Gwynne *et al.*, 2020). Workers attitudes, beliefs and knowledge can be shaped by organizational factors such as safety guidelines, safety trainings and proper supervision at their workplaces (Hystad *et al.*, 2014).

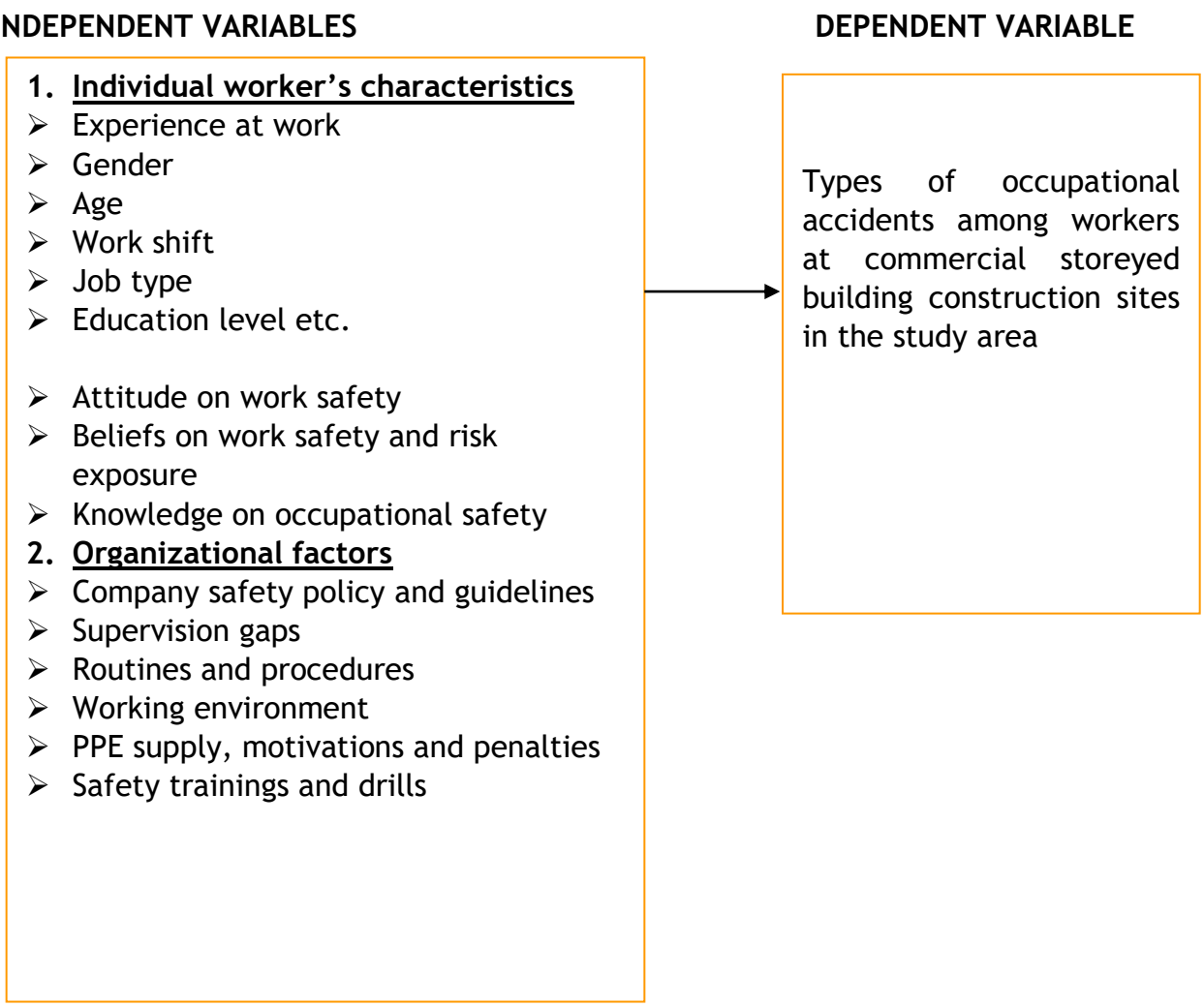

Figure 1. 1: The conceptual framework of the study

CHAPTER TWO: LITERATURE REVIEW

2.1 Types of occupational accidents in the building construction industry

The Center for Disease Control and Prevention (CDC) (2018) mainly categories occupational accidents including the fatal and non-fatal injuries. Fatal injuries refer to bodily harms that result into the death of the causality. According to Center for Disease Control and Prevention (2018), non-fatal injuries refer to bodily harms resulting from human exposure to external forces that are either mechanical, thermal, electrical chemical and radiant in nature. The CDC (2018) sub-categorizes categorizes injuries based on their underlying causes ranging from skin cut, skin pierce or stab, animal bites, fire or burn, fall, foreign bodies, struck by, struck against or crushed, drowning, poisoning and transportation-related accidents.

Similarly, the International Labour Organization (ILO, 1998), denotes that occupational injuries can be categorized into fatal and non-fatal accidents. Occupational accidents that result into the death of the victim within one year from the day of the accident are referred to as fatal accidents (ILO, 1998). Non-fatal accidents do not result into the death of the victim. The trend of both fatal and non-fatal accidents varies across the construction sectors of different regions of the world. In the United states of America, the Bureau of Labor Statistics (2020) reported a 2% increase in the level of fatal occupational accidents between 2019 and 2018. In China fatal accidents declined between 2013 and 2015 until a 6.8% increase was recorded in 2016 owing to the bad weather during the super El Niño Phenomenon (Shao *et al.*, 2019).

Existing literature from scholars such as Shafique et al, (2019) indicate the classification of occupational accidents in the construction sector into; falls from heights, slip, trips and falls, overhead hazards and struck-by falling objects. Other occupational accidents reported in the construction sector include trapped in and contact with electricity accidents (Jo *et al.*, 2017). Kiconco *et al.* (2019) reported accidents such as skin cuts and pierces amongst workers at building construction industry of Uganda.

This study adapted the classification CDC and ILO that categorizes occupational accidents into fatal and non-fatal. Under this classification, the respective accident types such as burns, falls, caught-between, struck-by and struck-against can be grouped in either the fatal or non-fatal categories depending on whether there was loss of life or not. A consideration of other reported occupational accidents reported in the construction industry by scholars such as Jo *et al.*, (2017); Kiconco *et al.*, (2019); Shafique et al (2019) was also considered with guidance from the CDC and ILO categorization.

2.2 occupational accidents at storeyed/high-rise building construction sites

Recent literature from both middle-income countries and low-income countries has shown that there are growing trends of storey buildings in their respective construction industries (Lakhiar *et al.*, 2021; Manzoor *et al.*, 2021). The storey buildings are also referred to as high-rise buildings. The proliferation of storeyed buildings has mainly been attributed to the growing demand for high-rise building owing to inadequate usable land area in towns of middle and low-income countries

like Pakistan and Malaysia (Lakhiar *et al.*, 2021; Manzoor *et al.*, 2021). Unfortunately, reports indicate that high-raise/storey buildings have increased the occurrence rates of occupational accidents in the construction industry (Zaini *et al.*, 2020; Lakhiar *et al.*, 2021).

The storeyed building sites have mainly been associated with struck-by falling objects and fall from heights. Studies have indicated that falls and falling objects from elevated heights of 1.8meters beyond are of the biggest concern (Rafindadi *et al.*, 2022). It is hazardous because of working surfaces, equipment, machinery, trenching, and scaffolding are moved, assembled and disassembled.

In Uganda, a raise in storeyed building constructions in metropolitan areas like Kampala, Mukono and Wakiso owing to urbanization and changing populations has been reported (Office of The Auditor General of The Republic of Uganda, 2015). During this similar period, the prevalence of occupational accidents among building constructions workers in towns like Kampala city has been recorded at 32.4% (Kiconco *et al.*, 2019). In 2021, a storeyed building under construction in Kampala city collapsed and killed thirteen (13) workers (Twimatsiko, 2021) while another located in Kisenyi village in Kampala collapsed and killed six (6) workers (Bagala, 2021). In 2022, a building collapse reported in Nsangi Sub-county in Wakiso District killed one worker and injured two others (Etukuri, 2022). Based on the changing trends in occupational accident occurrences owing the increase in storeyed building constructions witnessed in both Uganda and other low-income countries due storeyed, it was imperative to conduct investigation into this phenomenon.

2.3 Trends in occupational accidents in the construction industry

According to the statistics from Joint estimates of the work-related burden of disease and injury for the period 2000–2016, it was estimated that 1.9 million people die annually due to work related accidents and illness (WHO and ILO, 2021). In the earlier years, the third highest number of total work-related mortalities (380,843) was registered in the Africa region (Hämäläinen*et al.,* 2017). Among developed countries of the world, China was reported with an estimated burden of 99,000 injury deaths at work while the European Union was reported with 4,700 injury deaths at work (Hämäläinen *et al.,* 2017).

There has been growing evidence indicating that the construction sector accounts for a large share of occupational accidents and illness globally (Habibi and Nasir, 2020; Alaloul *et al.*, 2021). It is estimated that over 21% of the occupational accidents and illnesses that were recorded in United States of America are from the construction sector (Bureau of Labor Statistics, 2020). Recent trends even showed an increase in the total number of accidents in the construction industry from 924 persons in 2015 to 1,066 persons in 2019 in United States of America (Bureau of Labor Statistics, 2020). In Hong Kong, a total number of 4,114 occupational accidents were reported to have occurred in 2017 amongst a total population of 118,229 workers in the construction industry (Shafique and Rafiq, 2019).

Varying occurrence rate of occupational accidents have been reported in low-income countries in Africa. Nyaruai et al., (2016) reported a high prevalence of occupational accidents at 70.7% among the building construction workers in Nakuru county in

Kenya. Gebremeskel and Yimer,(2019) indicated that occupational accidents among building construction workers in North Eastern Ethiopia stood at 32.6%. In 2019, Kiconco *et al.*, (2019) reported occupational accident occurrence rates of 32.4% among building construction workers in the Kampala city of Uganda. The recent estimates by Kiconco showed high rates than that reported at 18% in the in 2004 in Uganda by the construction industry (MGLSD, 2004). In 2009, over 40 buildings were reported to have collapsed and killed some workers (MGLSD, 2016). In 2021, a building under construction collapsed in Makindye a city suburb of Kampala and led to the death of thirteen (13) workers (Twimatsiko, 2021) while another collapsed in Kiganda Zone, Kisenyi Killing six (6) workers (Bagala, 2021). These statistics formed a basis of comparison of the rates of occurrence of occupational accidents in the study sites of this study. .3 2.4 Causes of occupational accidents in the construction industry

The causes of occupational accidents amongst workers in the construction industry have been reported basing on underlying factors such as the type of job done by the worker, and the working environment (Takala *et al.*, 2014). Accidents in the construction sector have been attributed to several factors including Workers' socio-economic, psychological and organizational factors (Kiconco *et al.*, 2019).

2.4.1 Socio-economic factors

Workers' socio-economic factors are made up of aspects such as age, gender, education level, job type, employment, monthly salary and work experience (Kiconco *et al.*, 2019). These factors partly influence the occurrence of accidents amongst workers at their work places(Rahmani *et al.*, 2013).

Gender has been associated with causing a difference in the prevalence of occupational accidents among building construction workers (Adane *et al.*, 2013; Gebremeskel and Yimer, 2019). Gebremeskel & Yimer (2019) reported that the odds of occupational injuries were two times higher for male workers compared to female workers at building constructions in Northeast Ethiopia. The variation in the level of occupational accident exposure between male and female workers has been attributed to factors such as the involvement of male workers in harder tasks that lead to injuries (Adane *et al.*, 2013), and female being top users of PPE than male workers (Izudi, Ninsiima and Alege, 2017). Based on this background, the effect of gender of workers on occupational accidents among building construction workers was investigated in the current study.

There have been disparities on the effect of individuals education levels and occupational accidents level (Rahmani *et al.*, 2013; Khodabandeh, Kabir-Mokamelkhah and Kahani, 2016; Kiconco *et al.*, 2019). Gebremeskel & Yimer (2019) reported that occupational injuries were seemingly higher among uneducated workers compared to educated workers at building constructions in Northeast Ethiopia. It is argued that higher educational levels might provide the knowledge and skills for workers to protect themselves from occupational accidents with the increasing levels of education as well as engaging in unsafe actions (Rahmani *et al.*, 2013; Khodabandeh, Kabir-Mokamelkhah and Kahani, 2016). Khodabandeh *et al.*, (2016) denoted that rates of unsafe actions are most likely to be higher among people with low literacy due to low levels of knowledge, lack of awareness about unsafe actions and undertaking of dangerous tasks while educated workers opt for safer working

professions. With knowledge from pre-existing studies, the effect of education of workers on occupational accidents among building construction workers was investigated in the current study.

2.4.2 Organizational factors

Organizational factors mainly concern measures that are aimed at creating safe working environments for the employees and promoting good safety behaviour among the employee by the employer himself. Organizational factors are a legal responsibility of employers to avail to their workers at the workplaces (ILO, 2008). Filho *et al.* (2012) denoted those organizational factors are often root causes of occupational accidents unlike socio-economic factors such as workers experience, employment type and job type.

Some of the measures that are aimed at creating safe working environments and positive safety behaviour among the employee by employers include putting in working places occupational health and safety guidelines for workers, safety training and drills, providing employees with equipment use manuals, and providing Personal Protective Equipment (PPEs) (Lombardi *et al.*, 2009; Williams, 2017). Other organizational factors mainly include supply of appropriate personal protection equipment, conduction of safety training, good leadership on construction sites and site lay out of safety flow procedures (Filho *et al.*, 2012; Hystad *et al.*, 2014). Details of the key organization factors such as PPE supply, working conditions and equipment maintenance, communication and supervision are described here.

2.4.1.1 Safety training and guidelines

Training of construction workers on occupational health and safety guidelines has been associated with reducing their exposure to occupational risks (Moradinazar *et al.*, 2013; Kemei, 2016). This is because it is believed that workers who participate in occupational health and safety trainings tend to equip themselves with enhanced knowledge and skills for protecting themselves from occupational injuries (Moradinazar *et al.*, 2013). According to Kemei (2016), occupational accidents are fewer among construction workers that receive training on occupational health and safety compared to those that do not receive training. Therefore, it was important to investigate workers at the building construction sites previous training on occupational safety and health in the current study.

2.4.1.2 Personal protective Equipment (PPE) supply

The use of PPE is a paramount factor influencing the occurrence occupational accident incidents at building construction sites (Yap and Lee, 2020). Scholars such as Hanna *et al.*, (2017) and Tadesse & Israel (2016) have reported that occupational injury incidents higher among workers who do not use PPE compared to workers who use PPE. The lack of PPE use among workers has been attributed to lack of PPE provisioning to workers by employers, negligence of workers and perceptions of discomfort from PPE from the workers (Kemei, 2016). Occupational accidents have also been linked to the use of poor-quality PPE, improper PPE wearing procedures and inadequate quantity provisioning to workers (Gibb *et al.*, 2005). Elsewhere in the world, it has been reported that lack of awareness on the proper use of PPE amongst

construction workers leads to a rise in the occurrences of occupational accidents in Malaysian construction industry (Yap et al, 2020).

2.4.1.3 Construction site communication

In some countries such as Malaysian where the construction sector is highly dependent on foreign labour, it has been reported that effective communication often is a big challenge that leads to occupational accidents (Yapet al, 2020). Accordingly, Teck et al. (2015) argued that communication language is a barrier for workers that need to learn and fully understand safety requirements during safety training for workers.

2.4.1.4 Construction site supervision

Site supervision involves regular inspection of the working conditions and unsafe behaviours at the construction site (Man *et al* , 2019). Site supervision has been reported as one of main factors influencing occupational accidents at construction sites. This is because safety supervisions by safety managers emphasize occupational accidents risk reduction (Jiang,et al , 2015). Site supervision has also been reported as one of the key ways of ensuring PPE usage among workers by their management (Wong *et al* , 2020). However, findings from some studies have reported no significant association between safety supervision and the safety behaviour of construction workers (Russeng *et al.*, 2019). This implies that workers at these construction sites are exposed to occupational risks even when there is supervision in place. However, this could be attributed to other factors such as lack of PPE use and limited safety training at construction sites (Tadesse et al, 2016; Izudi *et al*, 2017).

2.4.1.5 Working conditions of workers and maintenance of equipment

According to (Gibb *et al.*, 2005), the working conditions of workers significantly influences the likelihood of them getting involved with occupational accidents. Similarly, it has been reported that poorly maintained equipment are likely to fail during use and jeopardize the safety of the workers who operator them (Zhao *et al.*, 2015). Gibb et al., (2005) underscores that the level of maintenance vastly affects the proper operation of plant and machinery.

2.4.3 Psychological factors

Psychological factors that influence occupational safety include attitudes and beliefs of the employees towards the adoption of measures aimed at minimizing the level of employees' exposure to occupational accidents risks such as the use of PPEs (Hystad *et al.,* 2014).

2.5 Occupational accidents risk perceptions amongst construction workers

Risk is the likelihood or probability of a given hazard to occur (Smit et al, 2003). Risk perception is on the other hand defined as "the ability of a given individual to predict the existence of a given amount of a risk". (Ellaban *et al.*, 2018). In this study, risk perception among workers refers to the worker's personal judgements about the possibility of negative occupational occurrences such as injuries and diseases (Hallowell, 2010; Liu *et al.*, 2021).

Risk perception has been found to be an important concept in occupational health and safety in sectors such as the construction industry. This is because it has been

indicated that awareness and knowledge of occupational risks amongst workers at a given work place can propel such workers to take measures that eliminate such risks. It has also been reported that understanding worker's changing awareness levels about workplace health and safety hazards and safety behaviour at work can help employers and safety managers at work places determine where to apply interventions to minimize unsafe conditions (Health Executive Committee, 2003).

2.6 Research Gap

Until to date, only few studies had assessed the types and causes of occupational accidents at building constructions in the urban areas of Uganda like Kampala city (Lubega *et al*, 2000; Izudi *et al* , 2017; Kiconco *et al.*, 2019). Moreover, less emphasizes has been put on assessing the occurrence rates and accident causations at storeyed building sites in Uganda regardless of the observed death of workers due to the collapse of storeyed buildings in Uganda in the recent years (Bagala, 2021; Twimatsiko, 2021).

Furthermore, past studies have also almost entirely been concentrated in Kampala city (Lubega, et al *2000;* Alinaitwe *et al,* 2008; Irumba 2014; Izudi *et al ,* 2017; Kiconco *et al.,* 2019*)* with less emphasis on other urban areas like Mukono and Wakiso. Moreover, occupational accidents are reported to be caused by an interaction of complex process requiring contextualization of the site and local environmental characteristics where they occur in order to develop appropriate interventions for their successful management (Kiconco *et al.*, 2019). There was observable need to

find out the circumstances for the continued occurrence of occupational accidents at storeyed building construction sites as well as determining their occurrence rates.

CHAPTER THREE: METHODOLOGY

3.1 Research Design

A cross sectional research design was used in this study. The cross-sectional research design is an approach important for collecting data from a large population at a particular time, (Kothari, 2004). This particular research design also enables the researcher to examine the relationship amongst different populations or a phenomenon under investigation (Kothari, 2004). In this regard, this approach was used to collect data amongst different workers at the various selected building construction sites in Wakiso district.

3.2 Area of Study

The study was conducted at selected building constructions sites within Wakiso district. Wakiso district is located between latitude 00°24′N and longitude 32°29′E and border by Nakaseke and Luwero districts in the north, Mukono to east, Kalangala Island in the south, Mpigi in southwest and Mityana district to the northwest. The administrative units in Wakiso district include four municipalities which are: Entebbe, Nansana, Kira and Makindye Ssabagabo and eight sub counties including Wakiso, Mende Kalema, Kakiri, Masulita, Namayumba, Kasanje and Busi sub-counties. The study was conducted in two municipalities namely: Kira (Figure 3.1) and Nansana (Figure 3.2) (Wakiso District Local Government, 2017).

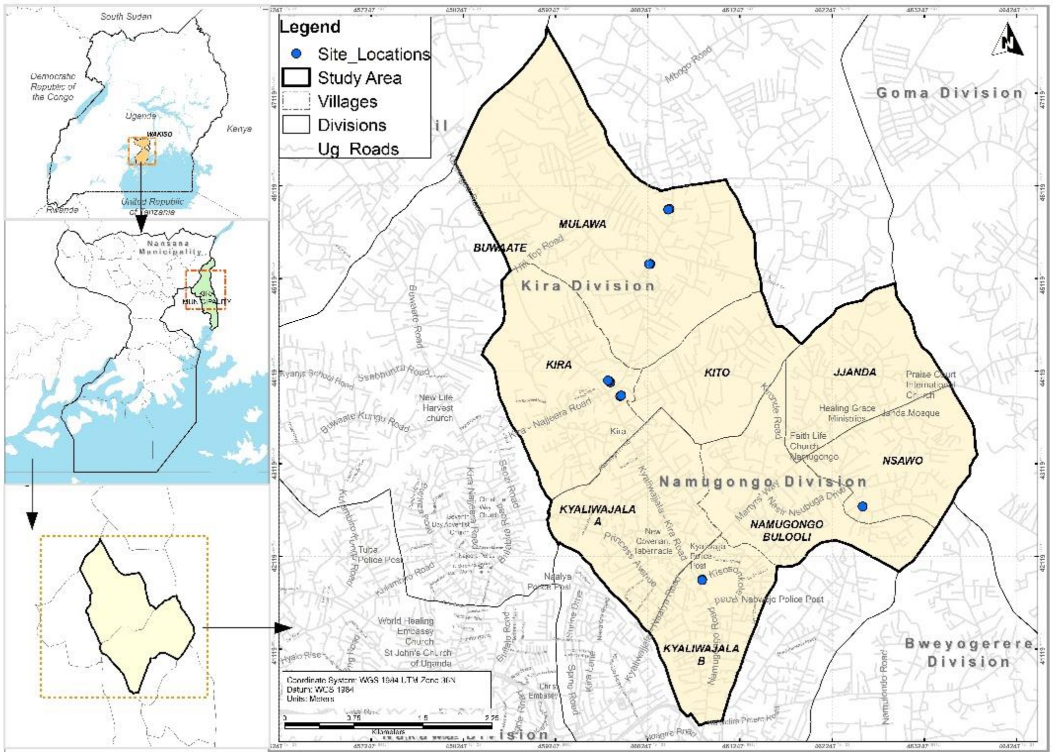

Figure 3. 1: Study sites in Kira municipality

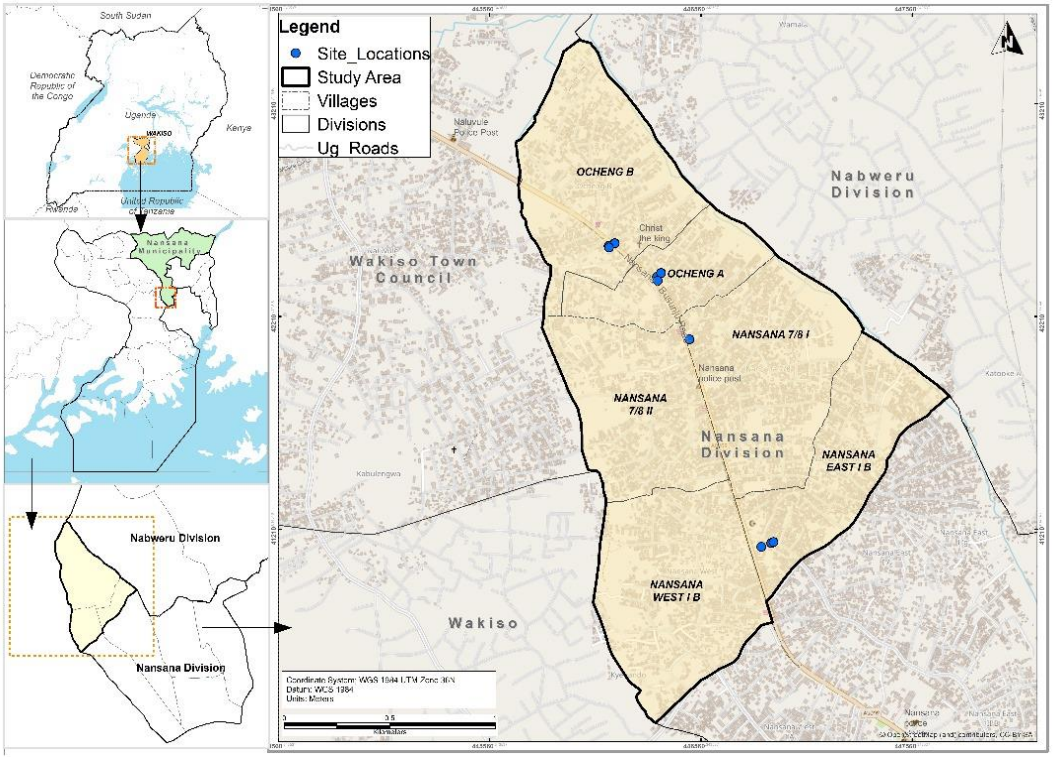

Figure 3. 2: Study sites in Nansana municipality

Wakiso district was selected because it is one of the most populous metropolitan areas of Uganda where large populations are attracting numerous building constructions to meet commercial and housing needs (Wakiso District Local Government, 2017), and yet there is limited information on the rate, types and causes of occupational accidents in important sectors at the building construction industry. Unlike other metropolitan areas such as Kampala city where the nature and prevalence of occupational accidents has been investigated (Kiconco *et al.*, 2019), this was yet to be done in Wakiso district prior to this study. Yet, Wakiso district has attracted large-scale building constructions in the recent years due to the high population in the area (Wakiso District Local Government, 2017).

Kira and Nansana municipalities were selected for this study because they represented the urban and peri-urban centres where urban expansion and proliferation of commercial, education and industrial buildings have been reported, (Kasimbazi, 2017). Inspections and by-laws that regulate the design and construction of permanent buildings in manner that protects workers from any form of occupational accidents were expected be in place. Moreover the National Physical Planning Standards and Guidelines calls for local authorities in urban centres of Uganda to formulate building by-laws that regulate the design and construction of permanent buildings (Ministry of Lands, Housing and Urban Development, 2011).

3.3 Sources of Information

The data for this research was obtained from both primary and secondary data sources.

3.3.1 Primary sources

The primary data sources for this study included information obtained from the building construction workers at different selected construction sites in the study area. The primary data was collected from the respondents of the study during the surveys using both structured and semi-structured interviews (Kothari, 2004). The respondents were selected through the use of non-probabilistic approaches including stratified sampling and simple random sampling as illustrated in sub-section (3.4 below).

3.3.2 Secondary Sources

Secondary data for this study was obtained through desk review of existing literature materials such as published journal articles, reports, research books and literature from the internet, government reports and statutory instruments.

3.4 Population and Sampling Techniques

3.4.1 Population

In this study, the target population was the workers at the selected approved building construction sites in two municipalities of Wakiso district in Nansana and Kira. These municipalities form urban areas of where local authorities are tasked with formulating by-laws that regulate the design and construction of permanent buildings (Ministry of Lands, Housing and Urban Development, 2011). The Lists of all approved building constructions sites in both Kira and Nansana Municipality (Appendix 11) was obtained from the physical planning unit of the respective municipality councils. The second step involved stratification of the different approved building construction sites according to their respective administrative area of location especially at municipality level since the interest is more on urban where building construction is expected to be slightly high. From each municipality the total number of all building construction sites was selected for inclusion into the study. Stratified sampling used to organize the population under study into meaningful groups from which sampling is conducted without creating any bias in the sampling process (Kothari, 2004).

The next step involved visiting of each building construction site within their respective administrative units and the population of workers at each site obtained

from site authorities like site managers, site supervisors and site foremen to determine the sample size of the study.

Unique identification numbers were assigned to each worker at their respective site and simple random sampling used to select the workers that were interviewed for this study at each building construction site. Simple random sampling method was used in this study because it is a good method for giving all the variables in a population equal chances of being included in the study and helps to eliminate bias and sampling errors as recommended by several authors such as , 2005). In order to determine the number of respondents to the sample from each given building construction site, proportionate allocation methods were used (Kothari, 2004).

Table 3. 1: Summary table of the sampling processing

Stage	**Procedure done**
Acquisition of list construction sites	A list of all approved building construction sites and respective contact persons obtained from the physical planner and all building sites with on-going identified
Stratification of construction sites	Workers at different building construction sites organized into groups based on the location of their sites
Simple random sampling	Workers identified from their respective strata
Proportionate allocation	The number workers to be interviewed from building construction sites in every municipality determined based on their respective sample populations

3.4.2 Sample Size

The sample size of this study was determined using the Krejcie and Morgan (1970) method of sample size determination at a desired confidence level of 95% and margin error of 5 (formula 1).

$s = X2\ NP\ (1 - P) \div d2\ (N - 1) + X2\ P\ (1 - P)$ ……Formula 1.

Where;

s = required sample size.

X2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N = the population size.

P = the population proportion (assumed to be .50 that should provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (0.05)

The sample size of this study was 132 respondents from an estimated population of 216 construction workers from the different construction sites that would be visited.

Insights from the pre-test survey conducted on approved buildings construction sites in Kira Municipality showed a minimum number of eight workers, maximum of twenty workers and average of number of twelve workers respectively. Buildings construction sites in Nansana Municipality had a minimum of six workers, a maximum of fifteen workers and an average number of ten workers respectively. The number of workers at a given site varied based on the level of the construction site. Newly established

construction sites had a higher number of workers compared to nearly completed sites.

Table 3. 2: Sample population

Site number	**Location**	**Municipality**	**Number of workers interviewed at each respective construction site**
1	Bulindo	Kira	9
2	Kira town	Kira	10
3	Kijabijo	Kira	8
4	Kyaliwajjala	Kira	8
5	Mulawa	Kira	9
6	Namugongo-sawo	Kira	17
7	Najjera	Kira	20
8	Buwambo	Nansana	15
9	Nansana-east Zone	Nansana	7
10	Nansana-Wamala	Nansana	9
11	Nabweru zone	Nansana	6
12	Nansana-west Zone	Nansana	14
Total			**132**

Note: The procedure for the selection of these respondents is illustrated in sub section 3.4.1 above

3.5 Procedure for Data Collection

Both primary and secondary data was collected for this study. Primary data was collected through both structured interviews and semi-structured using questionnaire (Appendix 6) and interview guide (Appendix 7) as data collection tools respectively.

3.5.1 Characterize the different types of occupational accidents among workers at storeyed commercial buildings construction sites in Wakiso, District.

Structured interviews were conducted with the workers at the selected study sites. Respondents were asked questions on the different types of occupational accidents ever witnessed occurring at their respective worksites. The types of accidents being investigated include but not limited to electrocutions/electrical shocks, slips, falls from height, overhead power contacts, burns, struck by a falling object, struck against, caught between, skin cuts, skin tearing and skin peel-offs from literature (Jo *et al.*, 2017; Kiconco *et al.*, 2019).

Structured interviews were used because they offered an efficient and simple means for the researcher to obtain organized and detailed information from the respondents (Wilson, 2014). The tool for data collection was a structured questionnaire. Questions on awareness on occupational risks, exposure to accident risk during work were also asked by the researcher to the building construction workers.

3.5.2 The occurrence rates of the different types of occupational accidents among workers at storeyed commercial building construction sites

Both structured and semi-structured interviews were conducted using a questionnaire and interview guide with workers and their managers respectively. Questions on the different types of occupational accidents ever witnessed occurring at building construction sites in Wakiso district were asked. Workers were also asked on the number of times they had ever been involved in occupational accidents at their respective worksites and the types of accidents involved in that regard. Semi-structured interviews were conducted with managers and supervisors of the workers at different construction sites to find out the types of occupational accidents frequency of their occurrence as recorded amongst their employees. The managers and supervisors were interviewed because they were directly responsible for designing and implementing occupational safety standards amongst workers at the different construction sites.

3.5.3 Factors that cause occupational accidents among workers at storeyed commercial buildings construction sites in Wakiso, District.

Structured interviews were conducted with workers, managers and supervisors at the study sites. Target information was on their perceived causes of occupational accidents at their respective worksite. Information of the workers' socio-economic attributes such as gender, work experience, job type, and employment type and education level obtained. Information on psychological factors likely to influence safety behaviours of workers was collected. Some of the psychological factors

included beliefs on occupational accident prevention from PPE use, attitudes towards use of different types of PPE and occupational risk awareness and knowledge (Hystad et al., 2014). Workers, site managers and supervisors were interviewed on organizational factors such as the existence of practices and Programmes like occupational safety drills, training and PPE provisioning to workers by the organization(s).

Participatory observational techniques also were used during data collection on the presence of key occupation health and safety tools such as the safety policy and guidelines at the different commercial building construction sites. PPE usage among workers found at the site and other safety equipment such as helmets and safety boots were assessed by the research during the field survey.

3.6 Quality/Error control

The research tools of this study included the interview guide and the questionnaires were pre-tested for their validity and reliability prior to the field survey.

3.7 Validity and Reliability

Research tools, questionnaires and interview guides were pre-tested. This ensured logical validity of the tools and their reliability. The questionnaire was designed in a manner that avoided asking leading questions from the respondents. Furthermore, the study applied the triangulation method to validate and verify the data collected. Triangulation is a method used to increase the reliability and validity of research findings and can be used to validate both qualitative and quantitative studies (Noble et al, 2019).

Prior to the actual field survey and data collection, the research tools including the questionnaire and the interview guide were both first pretested at two storeyed building construction sites within Wakiso district. The intention of the pre-test activity ranged from checking the appropriateness of the designed research questions, checking the ease of asking the questions by the researcher and ease of interpretation by the respondent. Notes were taken and adjustments made to the research tools after the pre-test activity.

3.8 Unit of inquiry and Unit of analysis

The unit of inquiry for this research was the workers interviewed at the different building construction sites in the study area. Information about the workers' accidents and their causations inquired from the respondents.

3.9 Strategy for Data Processing and Analysis

Data collected during the field survey was processed, edited, coded and analysed as follows.

3.9.1 To find out the types of occupational accidents risks among workers at storeyed commercial buildings construction sites in Wakiso, District.

Descriptive statistics approach was used to calculate frequencies and percentages (Kothari, 2004) of the different types of occupational accidents identified amongst workers from different building construction sites in the study area.

3.9.: To examine the occurrence rates of the different types of occupational accidents among workers at storeyed commercial building construction sites

Descriptive statistics approach was used to calculate frequencies and percentages (Kothari, 2004) of occurrence rates of the different types of accidents amongst workers from different building construction sites in the study area. Chi-square tests were conducted to investigate the statistically relationship between the socio-economic characteristics of the workers including the marital status, work experience, work type of workers, education and work shift and the forms of occupational accidents including skin cuts, electrical shocks, skin pierces, skin peel-offs and caught-between accidents. The Chi-square test were used because it is important in showing the associations between two variables (Donald, 2015).

3.9.3: To find out the factors that cause occupational accidents among workers at storeyed commercial buildings construction sites in Wakiso, District.

A Two-step analysis involving descriptive statistics and Multiple Linear Regression Model was conducted. The First step involved descriptive statistics approaches used to calculate frequencies and percentages (Kothari, 2004) of workers' response on the perceived causes of occupational accidents at building construction sites.

The Multiple Linear Regression Model was used to analyse data on the factors that cause occupational accidents among workers at buildings construction sites in the study area. Multi-categorical predictor variables such as the education level and marital status were dummy coding prior to being included in the regression model. The Multiple Linear Regression Model is often used to evaluate the nature of

relationship between a dependent variable and more than one independent variables (Pandis, 2016). The Multiple Linear Regression Model was used for this study because of the presence of multiple accident driver factors such as organizational, psychological and socio-economic that influence occupational accidents among construction workers whose influence on occurrence of occupational accidents to the building construction workers assessed.

Thematic analysis was used to analyse qualitative data obtained during structured interviews with site managers and supervisors on the rates of occurrence of different occupational accidents amongst the workers at their respective construction sites (Braun, 2006). The Open Code 4.03 software (2022) was used for the analysis of the qualitative data (https://www.umu.se/en/department-of-epidemiology-and-global-health/research/-code2/).

3.10 Ethical Considerations

A letter of introduction from the University introducing the researcher as well as seeking permission from relevant stakeholders, to be allowed to access construction sites was obtained. The data obtained from respondents was kept confidential. There was also confidentiality assured to the respondents for their views and personal data. The researcher applied to the Research Ethics Committee (REC) of Uganda Christian University for a certificate that will protect the work.

3.11 Methodological constraints:

Challenges included restricted access to construction sites and therefore failing to access the workers. Such restrictions caused delays and complications in data

collection during the study. Permission was sought from the responsible parties prior to the actual data collection process and this helped in addressing the challenges.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.0 Introduction

This chapter presents the findings of this study based on the specific objectives of the study.

4.1 Social demographic characteristics of respondents

Out of the 132 workers interviewed at the building construction sites in the study area, 97.7% of them were male while only 2.3% were female. A higher proportion of the respondents (53%) were married. Only 3% of the respondents had attained a university degree while 43.9% had at least completed the ordinary level of education (Table 4.1). About three per cent (3.8%) of the workers reported that they worked in the night shift while the majority (96.2%) of them work in the day shift.

All the workers (100%) reported that they were aware of the occupational risks at their respective building construction sites (Table 4.1). While 81.1% of the workers reported that they had received training on occupational Safety only 62.9% of them used personal protective gear (PPE). Only 37.9% of the workers reported a display of occupational safety guidelines and policy at their respective construction sites even though up to 71.2% of the workers reported that they had knowledge of interpretation of occupational safety guidelines and policies. Only 62.9% of the workers reported that they knew about signage at their workplaces and 39.6% per cent of them had the ability to interpret them. The presence of displayed work site safety policies, signs and warnings and workers' knowledge on work site safety policies were highly reported by workers at building construction sites in Nansana Municipality (Appendix

1a). Only prior training on occupational safety was highly reported by workers at building construction sites in Kira Municipality.

Table 4. 1: Social demographic characteristics of respondents

Socio-demographic characteristic		Frequency	Percentage
Gender	Male Female	129 3	97.7% 2.3%
Marital status	Single Married	62 70	47% 53%
Shift	Day Night	127 5	96.2% 3.8%
Education	No formal education Primary Ordinary level Advanced level Tertiary Degree	1 35 58 20 14 4	0.8% 26.5% 43.9% 15.2% 10.6% 3%
Aware of occupational risks	Yes No	132 0	100% 0%
PPE supply to workers	Yes No	83 49	62.9% 37.1%
Prior training on safety	Yes No	107 25	81.1% 18.9%
Safety policy display at site	Yes No	50 82	37.9% 62.1%
Knowledge of safety policy	Yes No	94 38	71.2% 28.8%
Presence of signage and safety warnings	Yes No	47 85	35.6% 64.4%
Interpretation of signage and safety warnings	Yes No	83 49	62.9% 37.1%

The average age of the workers was 27 ± (5.8) years, with an average work duration of six months at their respective work sites Table 4.2 below.

Table 4. 2: Age and work experience of the respondents

Socio-demographic characteristic	**Frequency**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Age (years)	132	16	43	27.4318	5.8
Duration of work on site (month)	132	1	60	6.25	8.45227

4.2 Forms of occupational accidents at buildings construction sites in Kira and Nansana Municipality

Overall, two major categories of occupational accidents namely non-fatal and fatal accidents were reported at storeyed building construction sites visited (Table 4.3). Majority of the building construction workers (79.5%) indicated that they had ever witnessed a non-fatal accident while only 3% of the workers had ever witnessed a fatal accident at a building construction site (Table 4.3).

Table 4. 3: Categories of occupational accidents ever witnessed by workers of building construction sites across all the visited building construction sites

Form of accident		Frequency	Percent
Witnessed fatal accident	Yes	4	3%
	No	128	97%
Witnessed non-fatal accident	Yes	105	79.5%
	No	27	20.5%

Non-fatal accidents had been witnessed by 78.8% of the construction workers in Kira Municipality while these had been witnessed by 80.9% of workers in Nansana Municipality (Table 4.4). Over 96.5% and 97.9% of the building construction workers in Kira and Nansana Municipality reported that they had never witnessed a fatal occupational accident respectively (Table 4.4).

Table 4. 4: Fatal and non-fatal accidents levels witnessed by workers of building construction sites across Kira and Nansana Municipality

Category of accident	**Municipality**	**Frequency**		**Percent**
Witnessed fatal accident	Kira	Yes	3	3.5
		No	82	96.5
		Total	85	100
	Nansana	Yes	1	2.1
		No	46	97.9
		Total	47	100
Non-fatal accident	Kira	Yes	67	78.8
		No	18	21.2
		Total	85	100
	Nansana	Yes	38	80.9
		No	9	19.1
		Total	47	100

Based on the results presented in table 4.3 and table 4.4 above, it was evident that fatal accidents were not a common type of occupational accident at building

construction sites in Kira and Nansana Municipality. This was in line with global estimates showing that burden of fatal accidents at construction sites has stagnated (Guo *et al.*, 2021). Global estimates of occupational accidents and illnesses by Hämäläinen et al., (2017) showed that work-related fatalities are less common than illness globally. However, the percentage of workers who had ever witnessed fatal accidents was higher in Kira municipality compared to Nansana municipality. This could be attributed to differences in the level of administrative and economic development Kira municipality compared to Nansana municipality. Shao *et al.* (2019 Jiangsu a developed Province with a high gross domestic product in China showed higher levels of fatal accidents compared to Zhejiang a less developed province. Shao further argued that economic development is directly proportion to fatal accidents' occurrence.

Table 4. 5: Forms of non-fatal occupational accidents witnessed at building construction sites in Nansana and Kira municipality.

Municipality	Accident type witnessed	Frequency	Percent
Kira	Electrocutions	1	0.8%
	Slip	7	5.6%
	Fall	13	10.4%
	Burns	9	7.2%
	Struck against	3	2.4%
	Struck-by	17	13.6%
	Skin cuts	31	24.8%
	Skin peel-offs	8	6.4%
	Skin pierce	35	28%

	Simple fracture	1	0.8%
Total		**125**	**100%**
Nansana	Electrical shocks	3	4.5%
	Slip	3	4.5%
	Fall	2	3%
	Burns	1	1.5%
	Struck-by falling objects	8	12.1%
	Skin cuts	13	19.7%
	Skin peel-offs	21	31.8%
	Skin pierce	15	22.7%
Total		**66**	**100%**
a Dichotomy group tabulated at value 1.			

Table 4.5 showed that, skin pierces accounted for (28%), skin cuts (24.8%), struck-by accidents (13.6%) and falls (10.4%) among the non-fatal occupational accidents at witnessed at building construction sites in Kira Municipality. Electrical shocks (0.8%) and slips (0.8%) were the least witnessed non-fatal occupational accidents (Table 4.5). In Nansana Municipality alone, skin peel-offs (31.8%), skin pierces (22.7%), skin cuts (19.7%) and struck-by objects (12.1%) were reported as the commonly witnessed non-fatal occupational accidents at building construction sites (Table 4.5).

Unlike earlier findings that have reported that falls from height and struck-by fall objects were the common occupational accidents among workers at high-raise building construction sites in low income countries like Kenya (Kemei, 2016) and Malaysia (Zaini *et al.*, 2020), skin cuts, skin pierces and peel-offs were mostly

reported in this study. Findings of the current study were are in line with findings of Kiconco *et al.*, (2019) indicating that skin pierces from construction materials, skin cuts and falls make up the different forms of occupational accidents amongst building construction workers in Kampala. Falls from heights, slips on the same level, struck by objects, cut and electric shock were reported as the most common type of occupational accidents in the construction industry of South Korea (Jo et al., 2017). Falls from elevations, caught-between, struck-by falling objects and electrical shock accidents have also been reported in the construction sector of the United States of America (Hinze et al., 2005; OSHA, 2018).

Table 4. 6: Forms of fatal occupational accidents witnessed at building construction sites in Nansana and Kira municipality.

Municipality	**Accident type**	**Frequency**	**Percent**
Kira	Electrical shock s	1	12.5%
	Struck by	3	37.5%
	Skin pierces	3	37.5%
	Skin cuts	1	12.5%
Total		**8**	**100%**
Nansana	Falls	1	50%
	Compounded fracture	1	50%
Total		**2**	**100%**
a Dichotomy group tabulated at value 1.			

Struck-by falling objects (30%) and skin pierces by sharp objects (30%) were reported as the most common forms of fatal occupational accidents across building

construction sites in Wakiso district (Table 4.6). In Kira Municipality alone, struck-by falling objects (37.5%) and skin pierces (37.5%) were reported as the most commonly witnessed fatal occupational accidents at building construction sites (Appendix 5). Falls (50%) and skin pierces (50%) were the only fatal occupational accidents reported to have ever been witnessed at building construction sites by workers in Nansana Municipality (Table 4.6).

The indication of struck-by falling objects and skin pierces as the leading form of fatal accidents among workers at building construction sites in Kira municipality can be related to the nature of accidents that has claimed the lives of some of the workers at storeyed building sites in Uganda in the recent years. In 2022, a building collapse reported in Nsangi Sub-county in Wakiso District killed one worker while injuring two others workers (Etukuri, 2022). This implied that both falling building materials and sharp objects such as nails and iron bars on collapsing building structures cause serious injuries to affected workers sometimes leading some to their death. Elsewhere, Hinze et al., (2005) reported struck-by falling objects accidents as a common cause of fatality and serious injuries amongst construction workers in United States of America. Contrary to reports indicating that struck-by falling objects accidents from building collapse as the most common form of fatal accidents at building construction sites in Uganda (Bagala, 2021; Twimatsiko, 2021; Etukuri, 2022), falls are reported as the most common type of fatal accidents in China (Shao *et al.*, 2019).

Findings showing that fall accidents were commonly observed fatal accidents at building construction sites in Nansana municipality was similar to findings from Kenya Kemei (2016) that reported falls as the common from building construction sites. Findings similar to those reported by Shao (2019) were reported in the building construction sector of Malaysia (Williams, 2017). The variation in the nature of accidents can be attributed to the differences in the nature of preventive measures such as PPE supply and safety trainings implemented at the different work sites and countries.

4.3 Occurrence rates of the different types of occupational accidents among workers at building construction sites in Nansana and Kira Municipality

Generally, majority of the workers at the building construction sites in both Kira and Nansana Municipalities (67.4%) indicated that they had ever been involved in a work-related accident (Figure 4.1). In Kira municipality alone, 68.2% of the workers at building constructions had ever sustained a work-related accident while only 66% of the workers in Nansana Municipality had ever sustained a work-related accident (Figure 4.1).

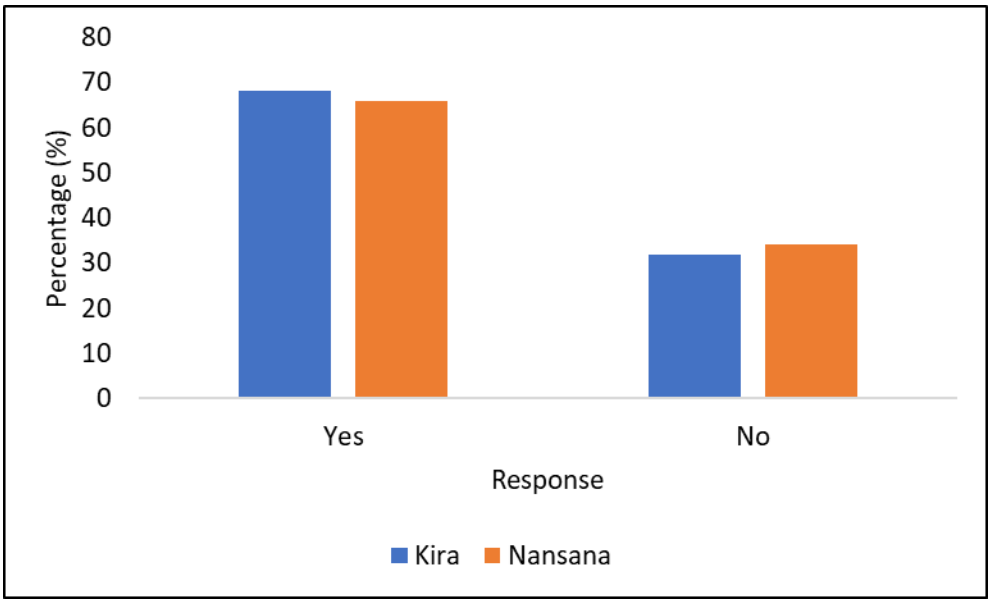

Figure 4. 1: Prevalence of occupational accidents amongst the workers of storeyed building construction sites in Nansana and Kira Municipality

Based on the findings of the current study, it was evident that the prevalence of occupational accidents was high among the workers of storeyed building constructions in both Kira and Nansana Municipality. Similarly, a high prevalence of occupational accidents (70.7%) was reported amongst the building construction workers in Nakuru county of Kenya (Nyaruai et al., 2016). However, the findings of the current study were contrary to findings of an earlier study by Kiconco *et al.* (2019) that reported a lower prevalence of 32.4% occupational accidents among building construction workers in Kampala city in Uganda. Elsewhere in East Africa, Gebremeskel et al, (2019) reported that occupational accidents among building construction workers in North-eastern Ethiopia was as low as 32.6%.

The difference in the levels of occupational accidents could be attributed to differences between the worksite factors including working conditions, safety trainings, site design and layout (Gebremeskel et al, 2019; Kiconco *et al.*, 2019). This implied that the higher prevalence of occupational accidents observed in Wakiso District could be related to lack of provision of improved working conditions such as PPE supply, limited implementation of occupational safety guidelines and low knowledge on building design and layout amongst workers. Moreover, a larger proportion of the respondents in the current study reported that there were no safety policies and guidelines displayed at their workplaces, as recommended by national and international guidelines on occupational health and safety. A section of workers also reported that they were hardly supplied with personal protective equipment by building owners who employ them at their respective sites.

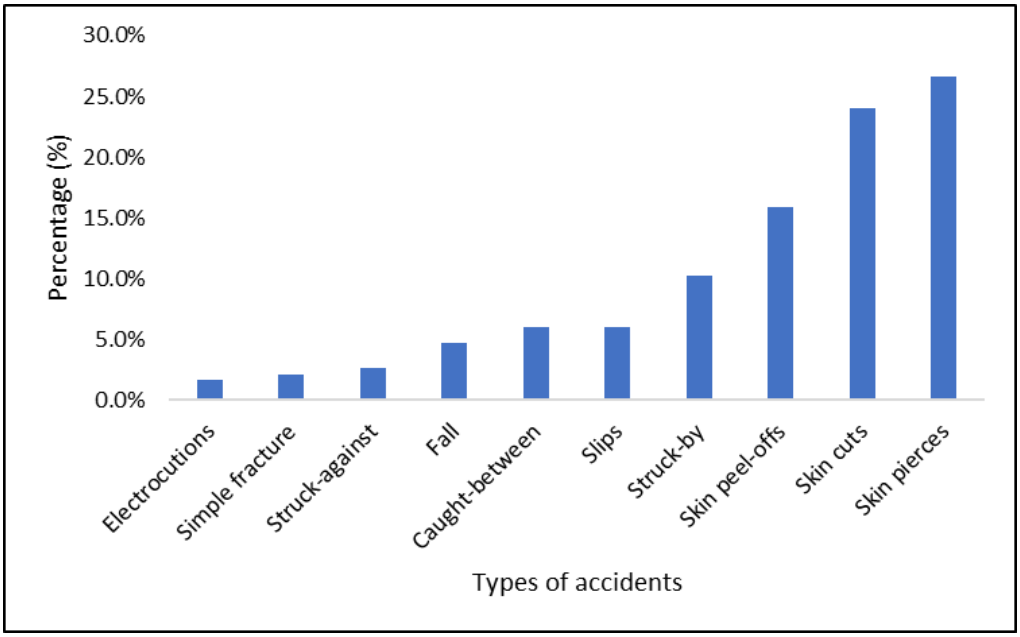

Figure 4. 2: Prevalence of different forms of occupational accidents amongst the building construction workers in Nansana and Kira Municipality

Figure 4.2 showed that workers at storeyed building construction sites in Kira and Nansana municipality mainly sustained skin pierces (26.6%) and skin cuts (24%) as the most common occupational accidents. This was followed by slips, falls, struck-by falling objects, struck-against, caught-between, skin peel-offs and Simple fractures (Figure 4.2). Skin cuts represented 26.4% of all the occupational accidents workers of building construction sites in Kira Municipality had ever sustained, followed by skin pierces and at 25% and struck-by falling objects accidents 12.2% respectively (Appendix 1). In Nansana Municipality, skin peels (29.4%) and skin pierces (29.4%) jointly represented the commonest occupational accidents workers of building construction in this area had ever sustained.

Results of the Chi-square test showed statistically significant association between some of the socio-economic characteristics of the workers including the marital status, work experience, work type of workers, education and work shift and some the forms of occupational accidents including skin cuts, electrical shocks, skin pierces, skin peel-offs and caught-between accidents (Table 4.6).

Table 4. 7: Association between type of occupational accident and workers' socio-economic characteristics

Socio-economic variable	P-value
Experience * Caught-between	0.028
Experience * Skin-cuts	0.001
Experience * Skin pierce	0.048
Marital status * Skin cuts	0.049
Marital status * Skin pierce	0.038
Occupation * Electrical shocks	0.005
Occupation * Skin cuts	0.024
Occupation * Skin pierce	0.005
Education * Skin pierce	0.01
Work shift * Slip	0.008
Work shift * Skin peel-offs	0.000049

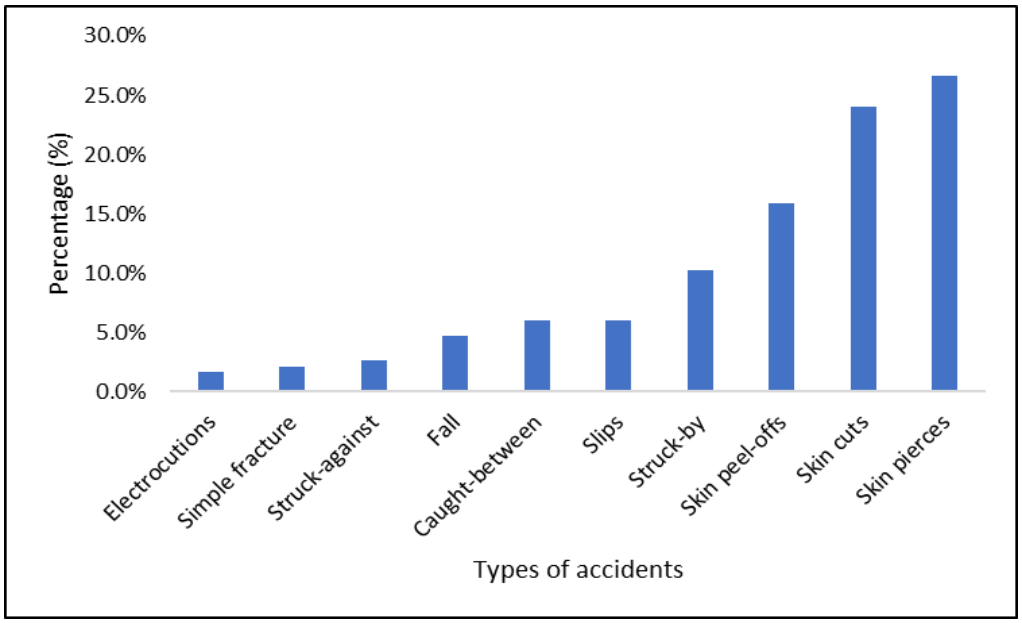

Figure 4. 3: Prevalence of different forms of occupational accidents amongst the building construction workers in Nansana and Kira Municipality

According to earlier findings by Kiconco *et al.*, (2019) that reported that cuts from sharp objects and skin pierces accounted for the highest proportion of occupational accidents amongst building construction workers in Kampala city in Uganda. The rates of occurrence of skin cuts and pierces reported by Kiconco were similar to the rates observed amongst workers in the current study. The similarity in the rates of occurrence of some accident types amongst building construction workers in Kampala and Wakiso districts can be attributed to various factors including socio-economic characteristics of workers, administrative, organizational factors. This is due to the fact that these two areas all form parts of the metropolitan areas of Uganda (Office of The Auditor General The Republic of Uganda, 2015; UPF, 2019) where regulation of building constructions sites might be similar due to similarities in the administrative structures. The informal sectors in both Kampala and Wakiso district almost share the same socio-economic characteristics and yet they are highly employed in the construction sector as casual workers.

Elsewhere, falls from construction elevated grounds have been reported as the most prevalent accidents types amongst storeyed building construction workers in Korea (Jo et al., 2017) and Malaysia (Williams, 2017). Hinze et al., (2005) reported that struck-by falling objects accidents accounted for 24.6% of the accidents in United States of America. The variations in the prevalence of different types of occupational accidents amongst build construction workers in the current study and studies conducted elsewhere can be attributed to differences in working environment and safety measures undertaken by both employers and workers. For instance, it has been

reported that the use of personal protective equipment (PPEs) such as gloves, helmets and googles is low amongst workers in developing countries like Uganda (Lombardi *et al.*, 2009; Izudi et al., 2017), thus making them vulnerable to overhead hazards and injuries like skin cuts and pierces. Moreover, a large proportion of workers indicated that building employers rarely provide workers with personal protective equipment to minimize the risk of exposure to occupational accidents.

Moreover, there were statistically significant associations observed between some of the socio-economic characteristics of the workers such as marital status, work experience, education and work shift and some the forms of occupational accidents such as skin cuts, skin peel-offs and skin pierces. Berhanu et al., (2019) denoted that married building construction workers are most likely to work in more than workplace in an attempt to make more money due to high responsibilities they have in their homes. However, this often leaves such workers fatigued and with limited rest which might unsafe acts leading to occupational accidents (Berhanu et al., 2019). On the other hand, it has been indicated that young and less experienced workers face higher risks of occupational injuries due to potential lack of specific job training and awareness on some of their crucial legal rights such as demanding PPE from the employers (Kemei, 2016; Berhanu et l., 2019). Kiconco *et al.*, (2019) indicated that building construction workers who work during night shifts are confronted with numerous challenges including inadequate lighting, limited standard work procedures, safety precautions and limited supervision that expose to accidents unlike day time workers. All these assertions indicate significant associations were observed between

occupational accidents such as skin cuts, skin peel-offs and skin pierces and some of the socio-economic characteristics of the workers like marital status, work experience and work shift of workers at storeyed building sites in Wakiso district.

Figure 4. 4: Workers walking on top of pillars on a building construction site in Kira Municipality without scaffoldings and PPE, exposing them to occupational falls

4.4 Factors that cause occupational accidents among workers at buildings construction sites in Nansana and Kira Municipality

The top five perceived drivers of occupational accidents reported by the visited building construction sites included bad weather conditions (26.2%), Lack of easy access and exit at the site (14.4%), Lack of good communication amongst same working teams (10.9%), low PPE usage amongst workers (8.2%) and lack of safety warnings and signage (6.5%) (Table 4.8). Findings from key informant interviews also

showed that factors such as low PPE usage amongst workers exposes them to occupational accidents.

Table 4.8: Perceived drivers of occupational accidents amongst the building construction workers in Kira and Nansana Municipality

Factor	**Frequency**	**Percent**
Bad worksite design and layout	10	2.9%
Low workers' knowledge of worksite design and layout	21	6.2%
Bad weather conditions	89	26.2%
Lack of pathways at the site	49	14.4%
Lack of safety warnings and signage	22	6.5%
Poor lighting in the working environments	4	1.2%
Use of unprofessional workers	13	3.8%
Lack of use of PPE usage among workers	28	8.2%
Low knowledge on work place risks	18	5.3%
Type of equipment eg Cranes, nails, etc.	5	1.5%
Suitability, usability and conditions of tools	13	3.8%
Lack of proper communication amongst same working teams	37	10.9%
Inadequate supervision level at site	16	4.7%
Site constraints eg lack of PPE provisioning	15	4.4%
Total	340	100%

"*Some employees have a negative attitude towards the use of certain type of personal protective gear such as masks and gloves, this often leaves them exposed to occupational injuries such as skin cuts and pierces.*" Site supervisor in Kira Municipality, December 2022.

Table 4. 9: Multiple regression model results

Coefficients	Unstandardized Coefficients		Standardized Coefficients	T. Test results	Significance.	95.0% Confidence Interval for B		Collinearity Statistics	
Model	**B**	**Std. Error**	**Beta**			**Lower Bound**	**Upper Bound**	**Tolerance**	**VIF**
(Constant)	-0.032	0.467		-0.069	0.945	-0.956	0.892		
Gender	0.609	0.275	0.194	2.216	0.029	0.065	1.153	0.854	1.172
Age	0.002	0.008	0.022	0.232	0.817	-0.014	0.017	0.716	1.396
Work experience	0.001	0.005	0.024	0.265	0.791	-0.009	0.011	0.814	1.229
Work Shift	0.309	0.255	0.126	1.212	0.228	-0.196	0.813	0.606	1.651
PPE supply on site	-0.04	0.093	-0.041	-0.43	0.668	-0.223	0.143	0.717	1.395
Prior training on safety	-0.134	0.113	-0.112	-1.193	0.235	-0.357	0.089	0.736	1.358
Presence of safety policies	0.296	0.109	0.306	2.705	0.008	0.079	0.513	0.508	1.968
Knowledge of any safety policy	-0.096	0.13	-0.093	-0.737	0.463	-0.353	0.162	0.413	2.423
Presence of safety signage and warnings	0.26	0.127	0.266	2.047	0.043	0.008	0.512	0.387	2.585
Interpretation of safety signage and warnings	-0.147	0.113	-0.152	-1.306	0.194	-0.371	0.076	0.482	2.076
No education	0.557	0.518	0.103	1.075	0.285	-0.47	1.584	0.709	1.411
Primary	-0.006	0.096	-0.006	-0.067	0.947	-0.197	0.184	0.797	1.255
Advanced level	-0.168	0.123	-0.129	-1.364	0.175	-0.412	0.076	0.732	1.366
Vocational	0.055	0.139	0.036	0.393	0.695	-0.221	0.331	0.778	1.285
Bachelor	0.235	0.238	0.086	0.987	0.326	-0.236	0.705	0.863	1.159
(a) Dependent Variable: Accident occurrence									

Workers working at building construction sites with displayed occupation safety policies (P=0.048) as well as safety signage and warnings displayed (P=0.043), were less likely to be involved in occupation accidents. The sex of the workers was highly associated with their involvement with occupational accidents (P=0.029).

Results of the multiple regression model indicated that there was a statistically significant association between the presence of safety policy (P=0.008) and signage and ingression (P=0.043) with Beta values of 0.296 and -A0.147 respectively at the building construction sites and the involvement of workers in occupational accidents. The R square value that (0.244), showed that the independent variable accounted for 24.4% variation in the regression model and thus the variation involvement of building construction workers (Appendix 3). The Multiple regression model was also significant F= (7.07, 21.923), =2.494, p =0.003, R2 = 0.494 (Appendix 4). This implied that the regression model ran was fit for the prediction of contributing factors for the building construction workers' involvement in occupational accidents in the study area.

Both the multiple regression model results and perceptions of workers underpinned organizational factors such as lack of pathways on site, lack of clear safety signage and warnings and lack of workplace safety policy as key factors for occupational accidents at the building construction sites in Kira and Nansana Municipality. However, this contradicted with the international and national regulations occupational health and safety regulations Safety which demand site owners and the proprietors to ensure safety of workers at work site (ILO, 1988, 2013; GOU, 2006; Benjamin O Alli, 2008). The international guidelines on occupational health and safety (ILO, 1987, 2013), beseeches employers to pursue all precautionary measures aimed at safeguarding workers' lives at their respective workplaces. It is advisable for employers to put in place safeguard measures at different stages including structural designs, installations, maintenance and safety signage and warnings in order to

minimize the occurrence of occupational accidents amongst workers at their sites (ILO, 1988; Mwakali, 2006; Gwynne *et al.*, 2017).

According to section 57 of Uganda's occupational health and safety act (GOU, 2006), work environments and buildings are required to have walk ways and be installed with escape routes for emergency cases. Lack of these occupational health and components at the workplace jeopardizes the health and safety of workers. Therefore, this implied that construction companies within the Kira and Nansana Municipality were not taking some key recommended components of occupational safety such as installation means of safety signage and warnings, training workers on and displaying occupational safety guidelines with serious regard. Perhaps, this could also be attributed to the weakness in the occupational safety and policy as well as limited supervision of building construction sites by the mandated bodies such as the Nansana and Kira Municipality governments and National Environmental Management Authority (NEMA).

There was a statistically significant association between the gender of workers of building construction in Wakiso and their involvement in occupational accidents (P=0.029). Based on the Beta value, gender increased the chances of being involved with an occupational accident by 0.194 units values (Table 4.8). The findings of the current study were in line with finding from Gebremeskel and Yimer, (2019) that reported a significant association between gender and occurrence of occupational accidents among his building construction workers in North-eastern Ethiopia. The masculinity of men has been associated with pursuing high risk jobs, thus making

them vulnerable to occupation risks (Ellaban *et al.*, 2018). Therefore, it was likely that male workers at building construction sites were exposing themselves to occupational risks as opposed to their female counterparts.

There was no statistically significant association observed between the occurrence of occupational accidents amongst building construction workers and other socio-economic characteristics of workers including lack of formal education (p= 0.285), age (p= 0.817), experience (p= 0.791), work shift (p= 0.228), PPE supply (0.668) and prior training on occupational safety (0.235) and (Table 4.8).

Regardless of not showing a statistically significant association with workers' involvement with occupational accidents, the beta value of the model showed that lack of formal education increased workers' risk to occupational accidents by 0.285 units. However, being educated to vocational and university education level increased the likelihood of occupational accidents by 0.393 and 0.987 units respectively. This implied that building constructions workers were exposed to some level of occupational accidents whether formally educated or not. These findings were contrary to findings by Khodabandeh, *et al.*, (2016) that that associated higher education with increased occupational safety amongst workers due to improved skills and knowledge of safety procedures at worksites.

Beta values of the regression model also showed that work shift increased the chances of being involved with an occupational accident by 0.126 units values. However, this might be mostly observed among the night shift workers due to exhaustion and fatigue from loss of sleep. Elsewhere, Rahmani *et al.*, (2013) argued that shift workers mostly

suffer from sleep deficiencies that end up exposing them to high risks of work related injuries. Therefore, leaving workers of building construction in Kira and Nansana Municipality to work in both night and day shifts are most likely to increase their risk of exposure to occupational accidents.

Figure 4. 5: Workers erecting iron bars at a building construction site in Kira Municipality without PPE like gloves and safety shoes making them exposed to skin cuts and pierces

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents both the conclusions and recommendations of this study that have been developed basing on the key observations drawn from this study in respect to its specific objectives.

5.1 Conclusions

This study investigated the categories, occurrence rates and causation factors of occupational accidents at storeyed building construction sites in Kira and Nansana Municipality in Wakiso district. Key conclusions drawn from this study include the following;

- The occupational accidents among workers at storeyed building construction sites Kira and Nansana Municipality comprised non-fatal accidents and fatal which was consistent with the broad categories of occupational accidents globally. It was observed that fatal accidents were more uncommon to occur at building construction sites in Kira and Nansana Municipality unlike the non-fatal accidents. This was attributed to global patterns that have shown that non-fatal accidents and work-related are more common than occupational fatalities among workers in the construction industry.

- The occurrence rates of occupational accidents among workers at storeyed building construction sites in Kira and Nansana Municipality were found to be

relatively high, but consistent to rates reported among workers at storeyed building construction sites in other low-income countries like Pakistan, Malaysia and Kenya. These variations in occurrence rates of occupational accidents were attributed to differences in the levels of economic development and working environments such as site design and safety routines and procedures.

- There were variations observed in the occurrence rates of various types of occupational accidents in the current and those reported in other low-income countries. Unlike reports showing falls and struck-by accidents as the most prevalent occupational accidents at storeyed building construction sites in other low-income countries like Pakistan, Malaysia and Kenya, skin pierces, skin cuts, skin peel-offs and struck-by falling objects accidents predominated in Wakiso district. The variation in occurrence rates of different forms of occupational accidents showed. However, there were relationship between so of the workers' socio-economic characteristics such as marital status, work experience and education level with certain accidents suck as Skin pierces, skin cuts, skin peel-offs and struck-by falling objects accidents. This pointed to the need to take workers' socio-economic characteristics into account while promoting occupational safety practices at storeyed building construction sites in Uganda and other low-income countries.

- Environmental challenges and weakness in organizational factors including lack of workplace safety guidelines and workers' PPEs emerged as the lead factors that caused occupational accidents among storeyed building workers in this

study. Based on this, it was evident that there was limited adherence to national and international guidelines that emphasize organizational factors such as occupational safety and health trainings, PPE supply to workers and providing safety signage and means of egress to enhance safety of workers. The gender of the workers was also another key accident causation factor among the storeyed building construction workers.

5.2 Recommendations

The recommendations of this study are categorized into administrative and academic recommendations as follows;

Administrative recommendations

i. Based on the key categories of occupational accidents including the fatal and non-fatal accidents at building construction sites in Kira and Nansana Municipality, there is need to engage the workers on the need to protect themselves from getting involved in occupational accidents at their respective work site. This can be achieved by encouraging the workers to adopt safety measures like the use of personal protective equipment. This can be done through combined efforts of the proprietors of the building constructions and the regulatory bodies such Wakiso district local government, Kira municipal Council and Nansana Municipal. This will be helpful in the minimization of incidences of occupational accidents at building construction sites in the study area.

ii. Emphasis on context specific safety trainings and drills by managers and safety officers of storeyed building construction sites against the most prevalent occupational accidents such as skin cuts, pierces and struck-by, in order to promote positive safety behaviour that would limit their occurrence rates.

iii. Close supervision of newly recruited and young employees before commencing with work at the building construction sites by managers and supervisors so as to minimize on the risks of them sustaining occupation accidents like falls, pierces and struck-by accidents. This is due to the fact that workers' some occupational accidents such as caught-between, skin-cuts and skin pierces showed an association with socio-economic characteristics of workers such as marital status, education level and experience.

iv. There is no need to encourage owners of storeyed building construction sites to put in place the safety measures recommended by national and international regulations such as workplace safety guidelines and supplying PPEs to workers in order to minimize accident occurrences. This also calls for close d supervision from the local and national regulatory bodies with the statutory powers of ensuring adherence to the national and international occupational health and safety guidelines by the storeyed building construction owners. The regulatory bodies with this capacity include the National Environmental Management Authority (NEMA), Wakiso district local government, Kira municipal Council and Nansana Municipal council.

Academic recommendation

v. In order to come up with a gain more insight on the drivers of occupational accidents and develop holistic measures for accident prevention, there is need to investigate other safety aspects such as the factors behind the limited use of PPE among workers the building construction workers. This can be done by scholars and the regulatory bodies such as National Environmental Management Authority (NEMA), Wakiso district local government, Kira municipal Council and Nansana Municipality.

vi. There is also need to investigate the level of occupational safety compliance monitoring of the building construction sites by the regulatory bodies such as National Environmental Management Authority (NEMA), Wakiso district local government, Kira municipal Council and Nansana Municipality.

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Appendices

Appendix 1: The variation in prevalence of different type of occupational accidents amongst the workers of building construction sites in Nansana and Kira Municipality

Location	Accident type	Frequency	Percent	Percent of Cases
Kira	Electrical shocks	2	1.4%	3.4%
	Slip	12	8.1%	20.7%
	Fall	10	6.8%	17.2%
	Burns	13	8.8%	22.4%
	Struck against	3	2%	5.2%
	Struck-by	18	12.2%	31%
	Skin cuts	39	26.4%	67.2%
	Skin peel-offs	12	8.1%	20.7%
	Skin pierce	37	25%	63.8%
	Simple fracture	2	1.4%	3.4%
Nansana	Electrocutions	2	2.4%	6.5%
	Slip	2	2.4%	6.5%
	Fall	1	1.2%	3.2%
	Struck against	1	1.2%	3.2%
	Struck-by	3	3.5%	9.7%
	Caught between	6	7.1%	19.4%
	Skin cuts	17	20%	54.8%
	Skin peel-offs	25	29.4%	80.6%
	Skin pierce	25	29.4%	80.6%
	Simple fracture	3	3.5%	9.7%
a Dichotomy group tabulated at value 1.				

Appendix 2: Multiple response results on perceived drivers of occupational accidents amongst the building construction workers in Kira and Nansana Municipality

Factor	Frequency	Percent	Percent of Cases
Bad worksite design and layout	10	2.9%	8.1%
Low workers' knowledge of worksite design and layout	21	6.2%	17.1%
Bad weather conditions	89	26.2%	72.4%

Lack of pathways at the site	49	14.4%	39.8%
Lack of safety warnings and signage	22	6.5%	17.9%
Poor lighting in the working environments	4	1.2%	3.3%
Use of unprofessional workers	13	3.8%	10.6%
Lack of use of PPE usage among workers	28	8.2%	22.8%
Low knowledge on work place risks	18	5.3%	14.6%
Type of equipment eg Cranes, nails, etc.	5	1.5%	4.1%
Suitability, usability and conditions of tools	13	3.8%	10.6%
Lack of proper communication amongst same working teams	37	10.9%	30.1%
Inadequate supervision level at site	16	4.7%	13.0%
Site constraints eg lack of PPE provisioning	15	4.4%	12.2%
Total	340	100%	276.4%
a Dichotomy group tabulated at value 1.			

Appendix 3: Multiple regression model summary

Model Summary								
R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
494a	0.244	0.146	0.43473	0.244	2.494	15	116	0.003
a Predictors: (Constant), knowledge on safety policies, Gender, interpretation of signs and warnings, Experience, Prior training, 2, 4, PPE supply, Age, Work shift, safety policies, presence of signs and warnings, No formal education, Primary level, Advanced level, Vocational, Bachelor level								
b Dependent Variable: Accident occurrence								

Appendix 4: Multiple regression ANOVA

ANOVA					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	7.07	15	0.471	2.494	.003b
Residual	21.923	116	0.189		
Total	28.992	131			
a Dependent Variable: Accident occurrence					
b Predictors: (Constant), knowledge on safety policies, Gender, interpretation of safety signage and warnings, Experience, Prior training, 2, 4, PPE supply, Age, Work shift, safety policies, presence of safety signage and warnings, No formal education, Primary level, Advanced level, Vocational, Bachelor level					

Appendix 5: List of approved commercial building construction sites in Kira and Nansana Municipality

MUNICIPALITY	S/No	Building (floors)	Location	Contact Person
Kira	1.	3 floors	Kira	Ssendawula
	2.	3 floors	Kira Division	Bosco
	3	3 floors	Najjera	Mubiru John
	4	2 floors	Sonde	Rayonga Derrick
	5	2 floors	Mulawa	Tumwebaze Derrick
	6	1 floor	Mulawa	Twebaze Alfred
	7	2 floors	Kyaliwajjala	Sekasi
	8	2 floors	kijabijo	Flash Aller
	9	3 floors	Bweyogerere	Oteba Victor
Nansana	1.	2 floors	Nabweru, Wamala	Nakawesa Jalia
	2.	2 floors	Wakiso East 2B	Ninsiima Teopista
	3	3 floors	Wakiso East 2B	Nahabwe Timothy
	4	2 floors	Nabweru South 1	Okello Lawrence
	5	1 floor	Wakiso West 2	Bugeza Samuel
	6	2 floors	Buwambo	Musoke Anthony
	7	3 floors	Gombe	Margret Nampijja
	8	1 floor	Kazo	Nyanzi George

	9	1 floor	Migadde	Lumala Rogers
	10	2 floors	Kigogwa, Bombo Road	Hajji Kakoza Abubakari

Appendix 6: Questionnaire

I am Birungi Doreen, a postgraduate student from Uganda Christian University. I am conducting a study titled "ASSESSMENT OF CAUSES OF OCCUPATIONAL ACCIDENTS AMONG WORKERS AT STOREYED COMMERCIAL BUILDING CONSTRUCTION SITES IN WAKISO DISTRICT, UGANDA." You have been identified as a respondent who has been selected to participate in this study. The information you will give will be confidential and strictly used for academic purpose only. I seek your consent; Yes…….. No……..

Latitude ……. Longitude ……. Elevation ……

Part A: SOCIO_DEMOGRAPHIC INFORMATION

1. Name of the respondent/ Respondent ID …….

2. Sex of respondent

a. Male b. Female

3. Age of the respondent (in years): ……

4. How long have you been working on this project (in months);
…….

5. Marital status of the respondent

a. Single b. Married c. Divorced/Separated d. Widower e. Window

6. What type of work do you do on this project?

a. Supervisor. b Foreman c. Casual labour d. Truck driver e. Electrician f. Manager g. Safety officer h. Food vendor i. Others specify

7. What is the highest level of education attended?

(a) Never attended school

(b) Primary

(c) Secondary (O level)

(d) Secondary (A level)

(e) Tertiary (Diploma)

(f) Degree

8. How long have you been working at this particular construction site

9. How far is your household from this site?

10. What time of the day do you do your work?

a. Day shift

b. Night Shift

c. Alternate day and night shifts

11. What is your AVERAGE MONTHLY income earned at this project (UGX)?

PART B: OCCUPATION RISK PERCEPTION

1. Are you aware that you are exposed occupational risks at this particular work place?
   a. Yes
   b. No
2. If no, why do you think you are not exposed to any occupational risks at this particular work place?

……
……..

3. To what degree do you think you are exposed to occupational risks at this particular work place?
   a. Very high
   b. High
   c. Moderate
   d. Low
   e. Very low

4. What do you think is the probability of an occupational accident or injury at this particular worksite?
    a. Very high
    b. High
    c. Moderate
    d. Low
    e. Very low
5. Mention what puts you in position to foresee the likelihood of occupational risks at this worksite that you work from
6. Mention the most common type of risk you think you are exposed to at your area of work
    a. Risk to falls
    b. Risk to cuts
    c. Risk to skin tearing
    d. Risk to skin peel-offs
    e. Risk to electrical shocks
    f. Risk to being struck by falling objects/equipment
    g. Risk of being truck against surfaces or equipment
    h. Risk to being of being caught between objects/equipment
    i. others (Specify)
7. Are you aware of any way through which you can minimize the occupational risks during you work at this at this particular work site?
    a. Yes
    b. No
8. If yes, mention any means (strategy) you think you can use to minimize occupational risks at your workplace

……
……..

9. Are you supplied with personal protective gears (PPE) at work?

a. Yes

b. No

10. Do you think that that PPEs offer sufficient protection from occupational risks to you?

a. Yes

b. No

11. Comment on the quality of PPEs supplied to you by your employer

    a. Very good quality

    b. Good quality

    c. Moderate

    d. Bad quality

    e. Very bad quality

12. Have you ever witnessed any training on occupational safety at this particular work site?

    a. Yes

    b. No

13. Have you ever been trained on occupational safety at this particular work site?

    a. Yes

    b. No

14. Have you ever received any training on occupational safety from a different work site from this current one?

    a. Yes

    b. No

15. Are there any safety policies /rules and regulations displayed at this particular work site?

    a. Yes

    b. No

16. Do you have any knowledge on any particular safety policies /rules and regulations?

    a. Yes

    b. No

PART C: TYPES AND PREVELANCE OF OCCUPATIONAL ACCIDENTS

17. Mention all the forms of occupational accident you have ever witnessed or heard of among workers of any storeyed building sites in your division

a. Electrical shocks

b. Slip/fall on same level

c. Fall from height

d. overhead power contacts

e. Burns

f. Struck by a falling object

g. Struck against object/Appliance

h. Caught between

i. Skin cuts

j. Skin tearing

k. Skin peel-offs

l. None of the above

m. Others (Specify)

18. Mention any type of accidents you have witnessed among any worker since you started working on this project/site (Choose all applicable).

a) Electrical shocks

b) Slip/fall on same level

c) Fall from height

d) Burns

e) Struck by a falling object

f) Struck against object/Appliance

g) Caught between

h) Skin cuts

i) Skin tearing

j) Skin peel-offs

k) None of the above

l) Others (Specify)

19. Did the accident claim the life of the victim?

20. If yes, mention which type of accident it was

a) Electrical shocks

b) Slip/fall on same level

c) Fall from height

d) Burns

e) Struck by a falling object

f) Struck against object/Appliance

g) Caught between

h) Skin cuts

i) Skin tearing

j) Skin peel-offs

k) None of the above

l) Others (Specify)

19. Have you been involved in any form of occupational accident at this particular worksite?

a. Yes b. No

20. What types of accident have you ever sustained?

a. Electrical shocks

b. Slip/fall on same level
c. Fall from height
d. overhead power contacts
e. Burns
f. Struck by a falling object
g. Struck against object/Appliance
h. Caught between
i. Skin cuts
j. Skin tearing
k. Skin peel-offs
l. None of the above
m. Others (Specify)

21. Have you worked on a different construction site before starting work on this particular work site?
    a. Yes
    b. No
22. Mention any type of accidents you have witnessed among any worker from your previous worksite (Choose all applicable).
    a. Electrical shocks
    b. Slip/fall on same level
    c. Fall from height
    d. Overhead power contacts
    e. Burns
    f. Struck by a falling object
    g. Struck against object/Appliance
    h. Caught between
    i. Skin cuts

j. Skin tearing

k. Skin peel-offs

l. None of the above

m. Others (Specify)

23. Were you involved in any form of occupational accident at your previous worksite?

a. Yes b. No

24. How long have your generally been working in the construction sector? ……

25. Has any accident ever forced you to take leave/spend some days off work

a. Yes b. No

21. If yes, how many days did you spend off work following your last accident?

22. Mention how many times you have been involved in accidents
……

23. Rate the frequency of occupational accident at this particular construction site

a. 5=Very high b. 4=High c. 3=Moderate d.2= Low e. 1=Very low

Part D: Causes of Accidents

24. Mention any factors you consider as the common cause of occupational accident at this particular worksite?

a. Lack of training on occupational safety

b. Lack of occupational safety regulations and work policies

c. Lack of supervision at the work sites

d. Weak government policy and regulations on occupational safety

e. Inadequate follow-up of LOTO procedures

f. Inadequate training

g. Unsafe working procedures

h. Poor design and construction of worksites

i. Under/over estimation of distances

j. Contact with uninsulated poles/transmission pole/towers
k. Faulty and damaged appliances
l. Work related stress/exhaustion
m. Minimal adherence to existing procedures
n. Use of unqualified workers
o. None of the above
p. Others (specify)

24. Mention the factor you consider as the main cause of occupational accident sustained at your previous worksite?

a. Lack of training on occupational safety
b. Lack of occupational safety regulations and work policies
c. Lack of supervision at the work sites
d. Weak government policy and regulations on occupational safety
e. Inadequate follow-up of LOTO procedures
f. Inadequate training
g. Unsafe working procedures
h. Poor design and construction of worksites
i. Under/over estimation of distances
j. Contact with uninsulated poles/transmission pole/towers
k. Work related stress/exhaustion
l. Minimal adherence to existing procedures
m. Use of unqualified workers
n. None of the above
o. Others (specify)

Appendix 7: Interview guide

1. Comment on building construction workers' (this particular worksite) awareness level on occupational accidents in this study area

2. Mention the different types of occupational accidents sustained by building construction workers in this study area
3. Comment on the involvement of the managers of building construction sites in build knowledge and awareness on occupational accidents among their workers in this study area
4. What do you think are the causes of occupational accident among the workers of building constructions in the study area?

Appendix 8: Work plan

Activity	**2022-2023**							
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Writing of the proposal and submission								
Questionnaire development								
Data collection								
Cleaning, analysing and interpretation of data								
Writing of research report								
Reviews and conclusions								
Submission of the report								

Appendix 9: Budget

S/No	**Description**	**Estimated amount Ugx**
1	Transport to different construction sites	700,000
2	Printing expenses of questionnaires and interview guides	400,000
3	Printing and binding of the final copies of the research	150,000
4	Miscellaneous	100,000

TOTAL	**1,350,000**

Appendix 10: Introduction letter for the researcher from the Institute of Petroleum Studies, Kampala

Institute of Petroleum Studies - Kampala

September 19, 2022

TO WHOM IT MAY CONCERN

Dear Sir/Madam

INTRODUCTION FOR MS. BIRUNGI DOREEN TO CONDUCT RESEARCH IN YOUR ORGANISATION

Greetings in the precious name of our Lord.

I wish to introduce to you the above-named person, who is a masters student pursuing Master of Science in Environmental Health and Safety, of Uganda Christian University in affiliation with The Institute of Petroleum Studies Kampala (IPSK).

Her proposal has been approved by our vetting committee and is in the process of collecting data. Ms. Doreen would wish to conduct research in your organization.

The title of her research is **"An assessment of risk perceptions and occupational accident causations among workers at building construction sites in Wakiso district, Uganda"**

By copy of this letter, all respondents are notified that this study is for academic purposes and as an Institution, we request you to corporate in facilitating this very interesting research project.

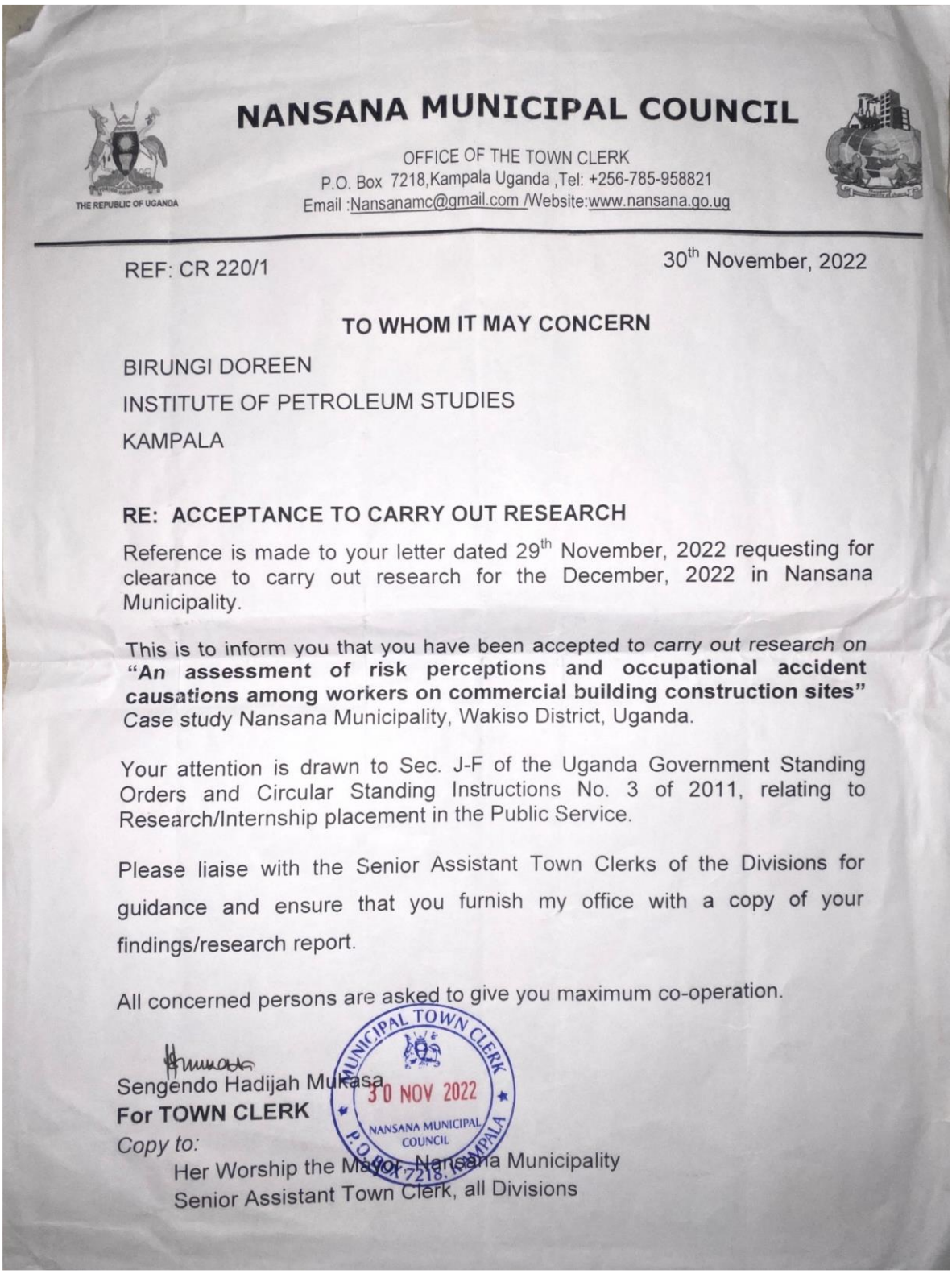
Sincerely,

James Mugerwa
Dean of Studies- IPSK

INSTITUTE OF PETROLEUM STUDIES - KAMPALA
19 SEP 2022
DEAN OF STUDIES
Tel: 0393255448

Plot 6207 Rose Lane, Off tankhill road Muyenga Kampala - Uganda
Tel: 0393255448 Email: info@ipsk.ac.ug Website: www.ipsk.ac.ug

Appendix 11: Permission letter to Conduct research in Nansana Municipality



NANSANA MUNICIPAL COUNCIL

THE REPUBLIC OF UGANDA

OFFICE OF THE TOWN CLERK
P.O. Box 7218,Kampala Uganda ,Tel: +256-785-958821
Email :Nansanamc@gmail.com /Website:www.nansana.go.ug

REF: CR 220/1

30th November, 2022

TO WHOM IT MAY CONCERN

BIRUNGI DOREEN
INSTITUTE OF PETROLEUM STUDIES
KAMPALA

RE: ACCEPTANCE TO CARRY OUT RESEARCH

Reference is made to your letter dated 29th November, 2022 requesting for clearance to carry out research for the December, 2022 in Nansana Municipality.

This is to inform you that you have been accepted to carry out research on **"An assessment of risk perceptions and occupational accident causations among workers on commercial building construction sites"** Case study Nansana Municipality, Wakiso District, Uganda.

Your attention is drawn to Sec. J-F of the Uganda Government Standing Orders and Circular Standing Instructions No. 3 of 2011, relating to Research/Internship placement in the Public Service.

Please liaise with the Senior Assistant Town Clerks of the Divisions for guidance and ensure that you furnish my office with a copy of your findings/research report.

All concerned persons are asked to give you maximum co-operation.

Sengendo Hadijah Mukasa
For TOWN CLERK

MUNICIPAL TOWN CLERK
30 NOV 2022
NANSANA MUNICIPAL COUNCIL
P.O. BOX 7218, KAMPALA

Copy to:
Her Worship the Mayor, Nansana Municipality
Senior Assistant Town Clerk, all Divisions