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HEALTH AND SAFETY RISKS ASSOCIATED WITH THE CONSTRUCTION OF SKYSCRAPERS IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

Health and safety risks in construction of skyscrapers in Kenya are an issue of interest to the practitioners, industrialists, consumers, and the government. The objectives of this study were to determine health and safety risks associated with construction of skyscrapers in Nairobi County, to determine the factors influencing implementation of health and safety measures and lastly to assess the health and safety risk management and control strategies employed in the construction of skyscrapers. A descriptive cross-sectional study design was utilized. The target population of the study was 790 workers working in skyscrapers constructions in Nairobi County. A sample size of 265 workers in skyscraper construction was selected using simple random sampling. Data was collected using semi-structured questionnaires administered through the Open Data Kit (O.D.K.) platform. Data was processed and coded in STATA version 17 for analysis. Data presentation was done using frequency tables and chats. Descriptive statistical technique that included mean and frequencies was done. Further, Ordinal logistic regression analysis was utilized to establish the predictors of the health and safety risks occurrences in construction of skyscrapers. Results shows that there numerous health and safety risks workers are exposed to in constructions of skyscrapers including unsafe handling of machinery and equipment and electrocution, poor site management, falling objects, failure to use PPEs, and unprotected edges. Gender, educational level significantly contributed to likelyhood of occupation and safety risk to occur in construction of skyscrapers in Nairobi County_Health and safety risk occurrence were statistically associated with likelyhood of risk to occurs (fisher's exact p=0.008) and age (fisher's exact p=0.004*)*. The results revealed that risk management and control strategies influence unlikelihood of occurrence of occupation and safety risks in construction of skyscrapers in Nairobi County.

INTRODUCTION

Today like past decade there has been an increasing urban population occasioning the land shortage raising demand for construction of high buildings, Skyscrapers. The industry accounted for more than 273 million jobs worldwide constituting an estimated 8.6% of the total global employment *(*ILO, 2019). The potential construction risks of relatively more than conventional construction as skyscrapers is reliant on human resources. This raises concerns on health and safety of the individuals engaged in constructions of Skyscrapers projects. Accidents do not always because injuries at construction site of Skyscrapers, but they can also cause damage to existing materials and equipment, result in injuries receive greater attention (Triswandana *et al*., 2020). OHS risk is an effort to prevent/avoid/reduce work accidents by stopping/eliminating/eliminating risks (hazard elements) to achieve work targets (Abu Nadhir, 2017). Many more workers suffer or even die as a result of occupational diseases that are attributed to exposure to harmful substances (ILO2019). Accidents do not necessarily result in injury but can also result in damage to materials and equipment. However, accidents that result in fatalities are ones that rightfully attract a lot of attention. Global, regional, and local studies have isolated the construction industry as one of the most dangerous to work in. According to DOHSS Annual Report, (2016), the construction sector is among the most significant contributors. As revealed in the KNBS Economic Survey, 2016, the construction sector grew from 13.1% in 2014 to 13.6% in 2015.

Proper health and safety management lowers the total costs incurred in the long run. According to the latest estimates, over 395 million workers worldwide sustained a non-fatal work injury in 2019. In addition, around 2.93 million workers died as a result of work-related factors, an increase of more than 12 per cent compared to 2000 (ILO). According to Soehtman Ramli (2016), OHS risk management process that includes hazard identification risk assessment and risk control (HIRARC) is a method of preventing or minimizing work accidents. HIRARC is a method that starts by determining the type of work activity, which then identifies the source of the hazard so that the risk is determined. Then risk assessment and risk control will be carried out to reduce exposure to hazards contained in each type of work (Wong et al.,2019). The sizeable increase in the absolute number of work-related fatalities is influenced by several factors, which may relate to an aggravation in terms of unprotected exposures to occupational risks or to socio-demographic changes (ILO, 2023). Construction industry is the riskiest place to work with very high health and safety hazards (Parsons, 2017). Health and safety risks associated with construction work are very frequent in the developing world with available data showing 3–6 times greater chance (Jason, 2018). Workers continue to face the persistent threat of traditional hazards and risks, including biological, chemical, and physical hazards. Workers are exposed to dangerous machinery, strenuous physical tasks and poor work ergonomics, putting them at risk of fatalities, injuries, illnesses, and long-term health implications (ILO 2019).

The health safety situation in the construction industry in Kenya is a matter of great concern to all the stakeholders. Health and safety risks in constructions in Kenya increased by 21.28% to 221,740 cases in 2020. Minister of Manpower Ida Fauziyah stated that based on data from the Social Security Administration (BPJS), work accidents in construction increased from 114,000 in 2019 to 177,000 accidents in 2020 (Riska Hastuti et al., 2020). Kenya is not an exception to research pertaining construction health and safety management. A study by Nyabioge et al (2018) opined that health and safety measures used on construction sites, the enforcement mechanisms of health and safety regulations and the challenges encountered in the management of health and safety. The study acknowledge that, construction sites are considered risky with frequent and high accident rates and ill-health problems to workers, practitioners and end user. The study examined health and safety risks associated with the construction of skyscrapers in Nairobi City County, Kenya

CHAPTER TWO: LITERATURE REVIEW

2.1: Theoretical Review

Psychological Approach of Risk focuses on the individual attitudes, behaviors, perspective, investigating perceptions, underlying beliefs and values that are incorporated in an individual's assessment of risk (Perry, 2003). The reasoning behind this approach is that it depends greatly on how an individual involved in the process perceives risk how it is assessed, judged, and communicated. As a result, perception of risk is the central focus of risk assessment and communication. When an individual estimates probability, it is based on the experience of an individual (Grice, 2014). The manner in which a person observes the world is probably the manner in which they judge, analyze information, and make decisions. The perception of assessing and controlling risk is a determining factor in judgments (Holt, 2001).

Risk perception concept shows how persons on the skyscraper's construction sites perceive different health and safety risks (Winge & Albrechtsen, 2018). Construction sites workers are essentially exposed to various health and safety hazards and their assessment and communication depends on an individual's conception of risks.Socio-Cultural Risk theory has been adopted basing on this approach and both individualism and conceptualism play a critical role (Mei Dina &Purba, 2022). Individual experience and know-how of construction project participants are critical for assessing the level of risk.

2.2 Risk Factors in construction of Skyscrapers.

The main risk factors of accidents in the construction sites include P.P.E. non-compliance, use of unsafe equipment’s, lack of proper site management. The human element was also a mention in a study that sought to explore construction site accidents in Singapore (Asanka & Ranasinghe, 2015). Accident investigation reports revealed that the most common groups of causes of accidents among the main causes were workplace conditions (20%), work

organization (21%), workplace design (15%), and work method (21%). With fatal accidents, the proportion of instances with workplace conditions, in particular workplace design were behind a third of the total accidents (Carrillo-Castrillo, Trillo-Cabello, & Rubio-Romero, 2016).

Workplace factors are also among the causes in an analysis of construction sites accidents in Columbia. This study was premised on the argument that activities in construction sites are high risk, culminating in accidents that affect the mental, health, and social well-being of workers and productivity of the company. 117 accidents formed the basis of analysis. There were 195 instances of failure of control, 112 works related, 136 personal factors, 54 unsafe conditions, and 151 unsafe acts. Worth noting is that some accidents were linked with more than a single cause. Lack of control was therefore the most pronounced cause of construction site accidents. The recommendation was the need for programs that can help in risk management prioritization. This ought to have been praised on the hazards in place, permitting the mitigation as well as control of the risk. It was also essential to develop a self-care culture among the workers (González, Bonilla, Quintero, Reyes, &Chavaro, 2016).

Yilmaz (2015) investigated construction sector accidents in Turkey using an Accident Analysis Management System. According to the data, "being hit by flitting and dashing objects" accounted for 23% of construction site incidents, falling objects accounted for 15%, and "being stung by something" accounted for 11%. In an examination of accident causes in the construction industry Williams, Hamid, and Misnan (2018) identified typical types of construction site accidents as being hit by objects, falling from a height, vehicle-related, contact with tools, collapse, trip and slip, exposure to toxic chemicals, and material handling.Kemei and Nyerere (2016) also explored the type of accidents common in construction sites in Nairobi, Kenya. As per their findings, falling from height and getting hit by falling objects accounted for about 64% of accidents in the construction sites.

In a study conducted in Nairobi County, it was revealed that companies' slot under 1% of their budgets for safety. In their study, Kemei and Nyerere (2016) sought to determine the common site hazards in construction sites in Nairobi, Kenya. The factors linked with accidents in the construction sites included inadequate safety budget, untrained workforce, lack of safety culture among workers, top leaders lacking safety awareness, and laxity in the enforcement of safety regulations. Among the recommendations was the need for increased investment in O.S.H. and the prioritization of safety and health in construction. The need to empower DOSH to offer customized training was also echoed. There have been numerous studies listing the preventive measures for construction site accidents. In an extensive review of literature, Williams, Hamid, and Misnan (2018) highlight the measures that can be called upon to prevent the causes of accidents in construction sites. These include eradicating risk and hazards from design, adequately planning for activities, recruiting seasoned employees, and effective health and safety management. Contractors should embrace staff health and

safety auditing, come up with safety committees, regularly train their staff, embrace innovative technology, report accidents, and uphold proper housekeeping practices. The conceptual framework link the independent variables , precursors of health and safety occurrences in constructions of skyscrapers in Nairobi County.

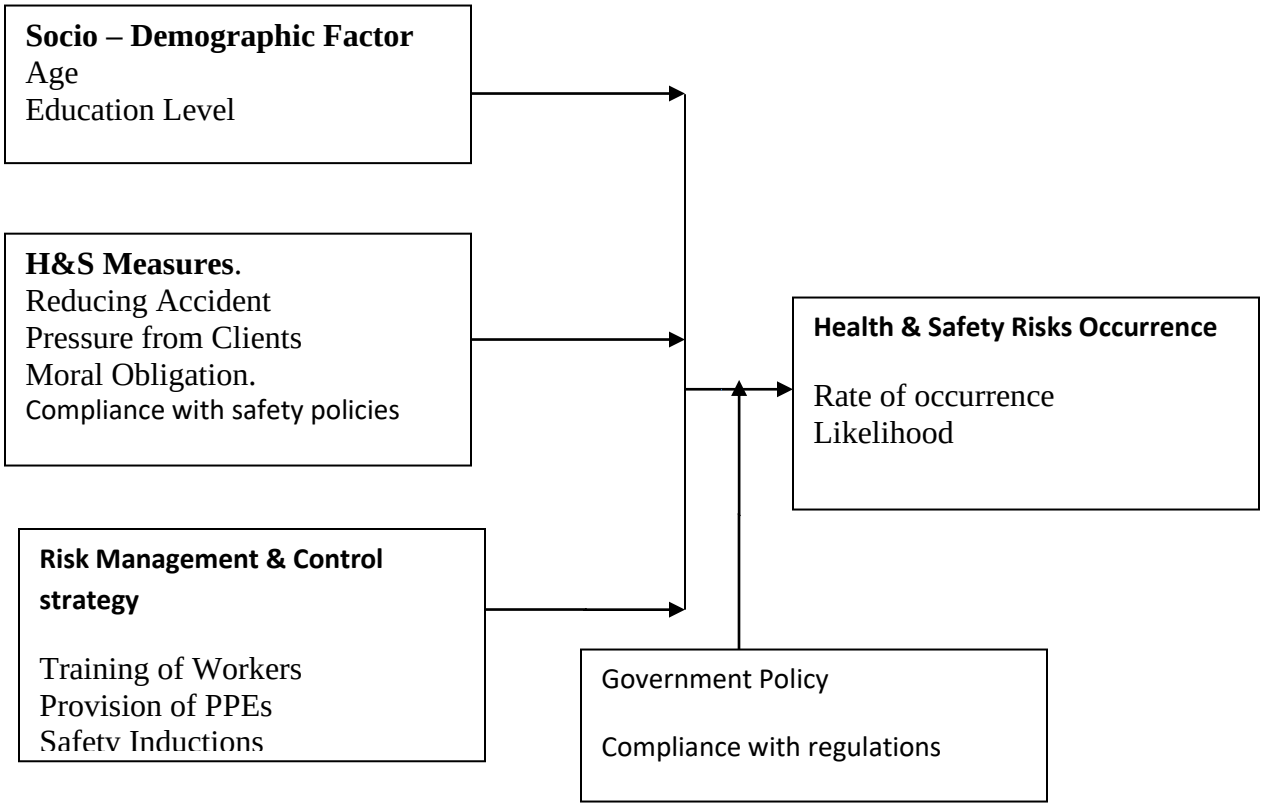

Figure 1.1: Conceptual Framework

3.0 RESEARCH METHODOLOGY

The study employed a cross-sectional study design. Cross-sectional study designs support studies on prevalence of the outcome on health and safety and risk associated with construction of skyscrapers, management and control strategies employed and inculcate safety culture in the construction of skyscrapers.The study was conducted in Nairobi County, Kenya due to rapid urbanization, many complex skyscrapers are currently under construction or recently completed and high population growth that has resulted to increased demand of commercial and residential spaces.

The population under the study comprised of 790 skilled and unskilled workers involved in the construction industry. The study targeted 790 skilled and unskilled workers who were working in the skyscrapers under construction. Stratified random sampling was used to

determine the number of construction workers to take part in the study from the study population of 790. Yamane's formula (Singh & Masuku, 2014) determined a sample size of 265 officers in constructions firms. Data was collected through administration of the questionnaires. The collected data were uploaded to the O.D.K. server in real time each day of data collection. Upon completion of data collection, field data was downloaded from the O.D.K. server platform and exported to Microsoft Excel. Stata Statistical software (Stata Corporation, TX, U.S.) version 17 was used for data analysis. Quantitative data was analysed using descriptive statistics such as frequencies, mean ± standard deviation, mode and percentages .The Chi-square test of the association between the study variables .Ordinal logistic regression was used to establish the whether the predictors of health and safety risks influence likelihood of occurrence in construction of skyscrapers in Nairobi County. Adjusted odds ratios and p-values at 5% level of significance were reported to test hypothesis. Confidence intervals for the odds ratios were also reported.

4.0 RESULTS AND DICUSSIONS

4.1 Introduction

The study sampled 265 respondents; thus a 100% response rate was attained (n= 265), 5 construction sites were sampled for observations. Results on socio-demographic characteristics indicated that the majority of the respondents were men. Two hundred and sixteen (81.5%) of the respondents were male, and 49 (18.5%) were women. By age, 59.3% aged between 18 and 30, 75% aged between 31 and 40 years, and only 12.5% aged between 41 and above. Regarding educational status, 34.3% had achieved tertiary education, 29.8% had a secondary level of education, and 3.8% had achieved primary education4.3: Table 2 presents various health and safety risks associated with skyscraper construction. A significant proportion of respondents in the survey reported at least likelihood occurrence of falling objects (52.1%), likelihood of failure to use P.P.E.s (54.7%), unlikelihood of working at height (69.8%), falling from a height (59.3%) and unprotected edges (53.6%). Further result indicated that there was a likelihood of slips and trip hazards supported by 63.5%, occurrence of electrocution indicated by at least 62.3%, occurrences of unsafe machinery and equipment's as supported by 61.5% and poor site management as indicated by 63.8% of the respondents

Table 2: Health and safety risk likelihood of occurrence in constructing skyscrapers in Nairobi County.

Health and safety risk	Highly likely	Likely	Unlikely
Falling Objects	59 (22.3%)	79(29.8%)	127(47.9%)
Failure to use P.P.E. s	85(32.1%)	60(22.6%)	120(45.3%)
Working at a height	45(20.4%)	35(20.4%)	(20.4%)
Falling from a height	47(17.0%)	61(13.2%)	157(69.8%)
Falling through voids	82(30.9%)	66(24.9%)	117(44.2%)
Unprotected edges	101(20.4%)	41(15.5%)	123(46.4%)
Slips and trip hazards	64(24.2%)	104(39.2%)	97(36.6%)

Electrocution	57(21.5%)	108(40.0%)	100 (37.7%)
Poor site management	92(34.7%)	77(29.1%)	96(36.2%)
Manual handling of materials	61(23.0%)	88(33.2%)	116(43.8%)
Unsafe machinery and equipment's	54(20.4%)	109(41.1%)	102(35.5%)

4.2 Association of Health and Safety Risk with Socio-Demographic Characteristics

Findings in Table 3.reveled that educational level (PV= *0.008*) and age of the workers had significant association (*p=0.004)* with the likelihood of health and safety risks during construction of skyscrapers in Nairobi County to occur in while gender had statistically insignificant (*p=0.459)* associated with the likelihood of health and safety risks during construction of skyscrapers in Nairobi County.

Table 3: Bivariate analysis between socio-demographic characteristics and Health and Safety Risk.

	Education Level				
Health and Safety risk likelihood	**Primary**	**Secondary**	**Tertiary**	**University**	
High likely	0(0%)	1(1.3%)	3(3.3%)	4(4.7)	*Fisher's exact p=0.008*
Likely	1(10)	9(11.4%)	4(4.4%)	1(1.2%)	
Unlikely	9(90%)	69(87.3%)	84(92.3)	80(94.1%)	
Health and Safety risk likelihood	**Male**	**Female**	**Total**		
High likely	8(100%)	0(0%)	*Fisher's exact p=0.459*		
Likely	13(86.7%)	2(13.3%)			
Unlikely	195(80.6%)	47(19.4%)			
Health and Safety risk likelihood	**18-30 years**	**31-40 years**	**31-40 years**		
High likely	7(4.5%)	1(1.3%)	0(0%)	*Fisher's exact p=0.004*	
Likely	15(9.6%)	0(0.0%)	0(0%)		
Unlikely	135(86%)	74(98.7%)	33(100%)		

4.3 Risk Management and Control Strategy Employed in the Construction of Skyscrapers.

Risk management strategies and control measures employed to mitigate the occurrence of health and safety risks during construction of skyscrapers in Nairobi County. The results indicated that there were more than 90% considered in all the variables measured in the construction of Skyscrapers. This was indicated by 100% for training and induction of all the workers, 97.7% for provision of personal protective equipment,97.4% for Appropriate and inspected lifting equipment,97.4 % for Routine Safety audits and inspection,98.1% for Risk Communication – Safety. Warnings and Signages,96.2% for risk Communication – Safety Warnings and Signages , the It was least considered at 82.26% when considering

eradicating risk hazards from design and acquiring a permit to work for risky tasks, respectively as shown in table 3.

Table 4 Risk Management and Control Strategy Employed in the Construction of Skyscrapers.

Risk Management and Control Strategy	Yes	No
Training and induction of all the workers	265 (100%)	0
Provision of Personal protective equipment	259(97.7%)	6(2.3%)
Appropriate and inspected lifting equipment	258(97.4%)	7(2.6%)
Routine Safety audits and inspection	258(97.4%)	7(2.6%)
Risk Communication – Safety Warnings and Signages	260(98.1%)	5(1.9%)
Accident Reporting and First aid facilities	255(96.2%)	10(3.8%)
Safe work methods	246(92.8%)	19(7.2%)
Permit to work on risky tasks.	218(82.3%)	47(17.7%)
Eradicating risk hazards from design	218(82.3%)	47(17.7%)
Adequate planning for activities	250(94.3%)	15(5.7%)
Coming up with health and safety committees	247(93.2%)	18(6.8%)

4.4 Risk Management index.

A risk management strategy index was computed from Table 5, where risk management strategies were scored. Table 5 shows that 77.7% of risk management strategies were appropriately put in place while 22.3% were not in the skyscrapers being constructed. The result implied that increase in utilization of risk management strategies would lower the occurrence of health and safety risks during constructions of skyscrapers in Nairobi City County.

Table 5: Risk management index

Risk management strategies	**Freq.**	**Percent**
Inappropriate	59	22.3
Appropriate	206	77.7
Total	265	100

4.5 Health and Safety Measures in Place

Table 6 presents the observation checklist that reported the presence of all the safety measures that were in place. Hazard communication was the most observed at 99.62%, and all the sites used P.P.E.s.There was consistent use of personal protective equipment (100%), fitted guard rails, properly erected scaffolds, clear footpaths, firefighting equipment, and but not limited to protected edges and voids.

Table 6: Health and Safety Measures in Place

Safety Practices at the Site	Present	Absent
Hazard Communication (Signages)	264(99.6%)	1(0.4%)

Use of personal protective Equipment	265(100%)	(0.0%)
Guard rails and safety fall arrest nets	257(97.06%)	(3%)
Properly Erected and inspected scaffolding	2622(98.9%)	(1.1%)
Isolated Electric cables/wire	249(94.%)	16(6%)
Foot path/ Clear gangways provided	250(94.3.6%)	15(5.7%)
Firefighting equipment	252(95.1%)	13(4.9%)
Permit to work on risky tasks	218(99.6%)	47(99.6%)
Health and safety precautions	260(98.1%)	5(1.9%)
Protected edges and voids	249(99.6%)	16(6%)
Proper manual handling of materials	224(84.5%)	41(15.5%)

4.5: Ordinal Logistic regression

Ordinal logistic regression shows the probability of identified risk occurrence. The table 7 shows that the risk of having unlikely health and safety factors in the construction of health and safety factors increases by (*A.O. R=2.682, p=0.039*) if appropriate risk management strategies are implemented. Education levels, skyscraper types, and other factors displayed were not . The results indicated that application of appropriate health and safety risk measures would significantly (PV=0.039) lower occurrence of risks in construction of skyscrapers. Education level was found to be significant predictor of occurrence of health and safety risks in construction of skyscrapers in Nairobi County. The finding also indicated that compliance with health and safety measures has a significant lower occurrence of health and safety risks in construction of skyscrapers in Nairobi County. The study found that pressure and complexity of the skyscrapers contribute significantly to occurrence of health and safety risks.

Table 7: Ordinal logistic regression

Health and Safety risk likelihood factors	**Odds ratio**	**Std err.**	**z**	**P>z**	**lower**	**upper**
Risk management strategies						
Inappropriate	**Ref**					
Appropriate	2.682	1.281	2.065	***0.039***	1.051	6.842
Education Level						
Primary	**Ref**					
Secondary	0.470	0.576	-0.617	*0.538*	0.043	5.187
Tertiary	0.695	0.88	-0.287	*0.774*	0.058	8.318
University	0.884	1.134	-0.096	*0.923*	0.072	10.921
Compliance						
Yes	**Ref**					
No	2.130	1.479	1.088	*0.276*	0.546	8.31
Business justification						
Yes	**Ref**					
No	2.064	1.491	1.003	*0.316*	0.501	8.504

Complexity						
Yes	**Ref**					
No	1.589	1.125	0.655	*0.513*	0.397	6.363
Pressure from clients						
Yes	**Ref**					
No	0.629	0.42	-0.695	*0.487*	0.17	2.328

5.0 Discussion of Results

From the findings, there are numerous health and safety with likelihood of occurring during construction of skyscrapers in Nairobi County. The results indicated that health and safety risk, falling objects, failure to use P.P.E. s, working at a height, falling from a height, falling through voids, unprotected edges, slips and trip hazards, electrocution, poor site management, manual handling of materials and unsafe machinery and equipment's had likelihood of occurrence during construction of skyscrapers. Abu Aisheh et al., (2022) reported that adopting lean construction practices reduces the likelihood of injuries in construction. They argue that there is an economic benefit and productivity if worker safety is prioritized. Asanka and Ranasinghe, (2015) opined that the main risk factors of accidents in construction sites include non-compliance to personal protective equipment, use of unsafe equipment, and lack of proper site management.

The results revealed that risk management strategies and control measures employed to mitigate the occurrence of health and safety risks during construction of skyscrapers in Nairobi County. The results indicated that there were more than 90% considered in all the variables measured in the construction of Skyscrapers. This was indicated by 100% for training and induction of all the workers, 97.7% for provision of personal protective equipment,97.4% for Appropriate and inspected lifting equipment,97.4 % for Routine Safety audits and inspection,98.1% for Risk Communication – Safety. Warnings and Signages,96.2% for risk Communication – Safety Warnings and Signages , the It was least considered at 82.26% when considering eradicating risk hazards from design and acquiring a permit to work for risky tasks, respectively as shown in table 3. The results were supported by Williams, Hamid, and Misnan (2018) highlight the measures that can be called upon to prevent the causes of accidents in construction sites. These include eradicating risk and hazards from design, adequately planning for activities, recruiting seasoned employees, and effective health and safety management.

The results indicated the health and safety risk factors, accident investigation reports revealed that the most common groups of causes of accidents were workplace conditions (20%), work organization (21%), workplace design (15%), and work method (21%). With fatal accidents, the proportion of workplace conditions, particularly workplace design,was behind a third of the total accidents (Carrillo-Castrillo, Trillo-Cabello, & Rubio-Romero, 2016).This was supported by Pinto (2014) that common occupational risk factors where labour is a mixture of physical tasks and fully mechanized operationsis complex and difficult to quantify risks. He concludes that the lack of reliable, precise data and the use of

qualitative estimates of assessing risk in the construction industry make tracking safety performance difficult. Ahmad, et al. (2016)in Iranian construction industry identified common recurring types of accidents. Other risk factors identified were throwing objects, slipping, collision and crash, abrasion, electrical shock, chemicals, and manual handling.

Finding on factors influencing the implementation of health and safety measures in constructing skyscrapers, pressure from clients was the most likely factor that influenced the health and safety measures taken by construction workers in skyscrapers.External pressure from the client's perspective indicates improved awareness of health and safety measuresand an element of compliance in terms of the site health and safety requirements. Reducing accident occurrence was the unlikely factor workers considered in accounting for factors determining the health and safety measures. Providing a budget for health and safety was a key likely factor determining the extent of actions the construction companies took. Skyscraper construction is a capital-intensive project, so substantial financial resources are expended. Anderson et al., (2020) avered that budgeting for safety must be informed by retrospective data collection to inform safety-related line items. Mei Dina and Purba, (2022) further asserted that there is a need to conduct a special analysis of the project's cost, time, and quality.

Occupational accidents not only have a negative implication on health and safety but on the economy as well. Construction offers employment to a large proportion of the population, meaning that incidents, accidents, and occupational damage affect a significant portion of society's workforce and population. The continuous change in the projects, poor working conditions, change of materials, cross-seasonal work, non-continuous employment, and exposure to pollutants make this industry a very high-risk environment for workers worldwide. The risk of accidents, including falls, being hit by objects, crashes, chemicals, abrasion, and manual material handling is always existent in construction projects. The projects are, therefore, at a constant risk of not being finished in the set timeline and of the best quality because of these inherent risks (Mohammadfam, Soltanzadeh, Moghimbeigi, & Akbarzadeh, 2014).

The study revealed that improved workers' concerns about their health strongly correlated with job satisfaction. Training programs can also guide workers in acquiring supplementary knowledge about potential hazards. Implementing hazard management programs and enhancing workplace safety can be facilitated by empowering workers and managers to participate actively. Mohammadi et al., (2018) avered that the efficacy of a construction company is contingent upon the proficient administration of safety, productivity, quality, health, and environmental factors, alongside marketing and finance. They report that this implies that the safety performance of a project is equally indicative of its success as metrics such as time, quality, and cost. The use of personal protective devices was strongly emphasized. Wong and Siu, (2020) report that the construction industry's continuous use of

personal protective equipment (P.P.E.) is influenced by several elements,such as personal, technological, and environmental factors. These could include previous accident experience, positive attitude towards utilizing personal protective equipment, habituation, risk perception, safety consciousness, safety knowledge, outcome expectations, perceived ease of use, perceived utility, social impact, safety management system, time pressure, and workplace environment. Laryea et al., (2010) interviewed construct managers in the U.K. and found out that some were unaware of P.P.E. specifications and the type of clothing suitable for the jobs. Routine safety audits and inspections were conducted during the construction of the various skyscrapers. Scheduled safety audits are useful risk management strategies for improving workplace safety. With audits, preventive and corrective actions can be formulated and implemented.

6.0 Conclusions and Recommendations

This study concluded that falling objects, failure to use P.P.E. s, working at a height, falling from a height, falling through voids, unprotected edges, slips and trip hazards, electrocution, poor site management, manual handling of materials and unsafe machinery and equipment's had likelihood of occurrence during construction of skyscrapers.. From the results, the study concluded that pressure from clients was the core reason for implementing health and safety measures in the construction of Skyscrapers while to reduce accidents was the least. External pressure from the client's perspective indicates improved awareness of health and safety measures and an element of safety compliance.

The study concluded that health and safety risk management and control strategies employed to prevent occurrence of health and safety risks in skyscrapers constructions such as training and induction of all the workers, provision of personal protective equipment, Appropriate and inspected lifting equipment, Routine Safety audits and inspection, risk communication – safety warnings and signages, accident reporting and first aid facilities, safe work methods and adequate planning for activities were appropriately put in place to foster occupation health and safety in construction of skyscrapers .

The study recommends deliberate awareness creation on the importance of implementing health and safety measures and strategic action of ensuring continuous safety improvement to be prioritized by the site management and safety officers with a view of reducing the risks to acceptable levels. To ensure risk management and control strategies are fully employed onsite, the study recommends the site management team should schedule and conduct regular safety inspections and audits and this should be conducted by external experts to reduce the burden of incidents and occupation accidents. It is necessary to fully collect relevant information on high-rise building construction before research, such as safety management standards, processes, relevant project experience, construction requirements, etc., to establish a good foundation for research work. Theoretical system for identifying safety risks in

construction of skyscrapers is established through the theory of this article and other relevant materials. Thirdly, based on the theoretical system of identifying safety risks in construction of skyscrapers , establish a comprehensive evaluation index system for super high-rise building construction safety risks covering all aspects of the project, and select appropriate evaluation methods to evaluate safety production. Based on the results of the safety risk assessment index system for construction of skyscrapers, analyze the reasons and propose corresponding solutions, so that the control system can play a good role in preventing and solving occurrence of construction of skyscrapers in Kenya

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