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Determinants of compliance to occupational health and safety measures in construction sites in Kampala Central Division, Kampala city, Uganda

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Abstract

The study examined the determinants of compliance to safety and health measures in construction sites in Kampala Central Division, Uganda. Questionnaires containing information relating to safety and health measures at the sites were administered randomly to the construction workers selected from four (4) selected building sites across the division.

The results revealed that there was a 95% level of compliance to safety and health measures which is considered an unacceptable standard and requires attention in the short term according to the scale developed by MBSAT, among the building construction workers in the division. It was also established that there were no personal determinants that affected compliance to safety and health measures within the division as all of them were found to be statistically insignificant. This indicated that none of the personal determinants is a significant predictor of compliance (at 5% level of significance).

The results further revealed that there was a significant association between three organizational determinants of compliance: adequacy of legislation, availability of personal protective equipment (PPE) and availability of standard operating procedures (SOPs) or policy. This proved that there is an association between personal and organizational determinants of compliance to occupational safety in construction sites in Kampala Central Division (at 5% level of significance). However in practice this means there is no one single factor which can determine compliance but a combination of factors of which the organizational factors are more significant in compliance than personal determinants.

Keywords: Determinants; Compliance; Construction Workers; Safety and Health Measures

1. Introduction

Compliance generally refers to conforming to or being in accord with a rule / established guideline, such as a specification, policy, legislation, standard or law, or the process of becoming so [1]. A vital and dynamic role is played by the construction industry in the development of the economy of any country of the world [2], with an immense contribution to the GDP of most countries, having the potential of creating diverse hazards and dangers to operatives with the capability of resulting in injuries or death. However, despite its clear economic benefits, the construction industry, globally, has a poor safety record [3, 4]. In Europe for example, the construction industry produces 30% of fatal industrial accidents, yet employs only 10% of the population [5]. In the United States of America (USA), the incidence rate of accidents in the construction industry is reported to be twice that of industrial average. According to the USA national safety council (NSC), there are an estimated 2,200 deaths and 220,000 disabling injuries each year [3]. Construction fatalities account for 30-40% of industrial fatal accidents in Japan and 50% in Ireland [5]. In the United

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Kingdom (UK), reported major injuries to employees in construction was 3,677 in 2005/6, compared to 3,768 in 2004/5 and 4,386 in 1999/2000 [6].

Construction health and safety (H&S) performance improvement has in recent years become a priority and therefore has gained industry-wide attention [7, 8]. In sub-saharan Africa, the fatality and injury rates in the construction industry are at 21 and 16,012 per 100,000 workers, respectively [9]. These records are markedly higher than the average fatality rate of 4.2 and injury rate of 3,240 per 100,000 workers in developed countries [9]. Comparatively, the accident record for sub-saharan Africa is like that of Asia which has fatality and injury rates of 21.5 and 16,434 per 100,000 workers, respectively [9].

Many researchers have focused on the factors that contribute to non-compliance with Standard Precautions. Reported factors are lack of knowledge, lack of time, forgetfulness, lack of means, negative influence of the equipment on nursing skills, uncomfortable equipment, skin irritation and lack of training [10].

Several authors [11, 12, 13] noted that plausible reasons given for non-compliance with H&S legislation on construction sites are that some individuals are ignorant of the law, and in other cases they take chances, aware of the small likelihood that they may get caught or of the minor severity of the penalties when they are caught.

There is a consensus among occupational safety and health (OHS) professionals on the need for strict compliance with OHS regulations in OHS improvement. Hence, the [14, 15] use of compliance with OHS regulations as one of the management efforts to determine if it correlates with OSH performance; while other authors [16, 17] argue that compliance with OHS regulations brings about benefits not limited to avoiding direct and indirect costs [18] but also contributes to organizations' competitive advantages. However, it is difficult to comprehend why these benefits seem not to attract the construction companies in Uganda to comply with OHS regulations.

In Uganda, work-related injuries continue to be a big problem and the situation of the building construction industry is considered one of the most dangerous [19]. The report from Uganda's Ministry of Gender, Labour and Social Development (MoGLSD) shows that injuries among construction workers accounted for 13% of all occupational injuries in Kampala in 2003 and were the third contributor of injury events [20]. Over 60% of all occupational accidents in the country occur in Kampala [21] and the injury and fatality rate for Kampala district stood at 4248 per 100,000 and 92 per 100,000 workers respectively in 2014 [22].

The Occupational Safety and Health (OSH) Act Number 9 of 2006 of Uganda [23] requires all employers to provide a safe working environment besides safety measures to employees and employees to comply with safety measures in place according to the Republic of Uganda, OSH profile for (2006 [23]. This includes both policies and regulations at organizational level and availability of personal protective equipment (PPE). However, none full time employees like casual workers (working without contracts or formal appointment letters) are not protected by this law.

Compliance to occupational safety and health measures is expected to be at 100 per cent according to one researcher [11], however, construction work is still one of the most hazardous industrial activities in the world. Every year many people fall victim to injury, harm and even death caused by accidents on construction sites. Precautionary measures to control accidents in the building industry are vital [24]. However, Kampala the business and administrative capital of Uganda has suffered major fatalities in construction sites which have led to site closure for accident investigation, loss of man/machine hours, loss of output, high labour turnover, loss of corporate reputation, payment of burial expenses/compensation/insurance claims for the dead among others [25]. It was against this background that this study was conducted focusing on personal and organizational determinants of compliance to Occupational Safety and Health measures on construction sites in Kampala City Central Division, Uganda.

Objectives

The general objective of this study was to establish the determinants of compliance to Occupational Safety and Health Measures in Construction Sites in Kampala Central division, Uganda. Specifically the study:

- Assessed personal determinants of compliance to Occupational Safety and Health Measures in the Construction Sites.
- Established organizational determinants of compliance to Occupational Safety and Health Measures in the Construction Sites.
- Determined the level of compliance to Occupational Safety and Health Measures in the Construction Sites, and

- Established the association between Personal, organizational determinants of compliance to occupational safety and health measures in the Construction sites.

2. Methods and research instruments

This work adopted both the quantitative and qualitative research approaches using a descriptive cross-sectional design.

The research study was carried out in Kampala City Central Division, which comprises the central business district of this largest city in Uganda and includes the areas of Old Kampala, Nakasero and Kololo. These areas are the most upscale business and residential neighbourhoods in the city. The division also incorporates low-income residents which include Kamwookya, Kisenyi and Kampala's industrial area. The coordinates of the division are: 0°19'00.0"N, 32°35'00.0"E (Latitude: 0.316667; Longitude: 32.583333). The division comprises about 20 parishes.

The study population (160) was comprised of all the construction workers in the four construction sites in the locale of Kampala Central Division. Purposive sampling was done to select four construction sites from the list of ten sites whose population was considered as the study population.

The sample size of the study was 113 construction workers as respondents, taken to be the appropriate sample size to answer the determinants of compliance to OSH measures at construction sites in Kampala Central Division, Uganda, because smaller sample sizes are not necessarily reliable enough.

Qualitative and quantitative primary data collection methods were used to collect data. Under qualitative data collection method, an in-depth interview was used to collect data from the respondents. Under quantitative data collection method, a face-to-face interview using a semi structured questionnaire that was administered through open data kit (ODK).

The key informant interview guide (KIIG) was used for the managers and supervisors as the key informants on the account of their knowledge and experience. KIIG had questions on the availability of PPE, guidelines / policies in place, training availed to staff, legislations and working hours.

3. Results and discussion

3.1. Personal Determinants of Construction Workers

The personal determinants of construction workers considered included age, educational level, peer influence, safety risk behavior, perception of risk, individual attitude, knowledge about risk and reporting culture. The results are presented in the Table 1.

3.2. Age of the Study Participants

The results in Table 1 shows that the majority (70.3%) of the study participants were in the age category of 21 -30 years and very few (8.9%) were below 20 years of age while only (20.8%) were in the category of 31-40) and none above. The large percentage of the youthful construction workers was unavoidable due to the energy intensive nature of the activities in this sector. The findings suggest that the construction sites in the study were abiding with the labour laws of not employing workers below 18 years of age. The findings are consistent with earlier findings other researchers [26] who found out that majority of workers (75.3%) were within the age group of 18-30 years. These results also agree with the results of the National Population Council report of 2014 [27] where 55% of the population was below 18 years. This implies that Uganda has more persons in the youthful age than the older age bracket. During the Key informant interview, all said they considered workers of 18 years and above as indicated by a key informant.

"Any one capable and above 18 years" hence the reason why we do not have any workers below 18 years (KI 1).

Table 1 Personal Determinants Influencing Compliance to Occupational Safety and Health

Personal Attribute	Frequency(N=101)	Percent (%)
Age category (years)		
< 20	9	8.9
21 - 30	71	70.3
31 - 40	21	20.8
Education Level		
UCE (Junior High School)	44	43.6
UACE (Senior High School)	25	24.8
Tertiary/University	16	15.8
Others	16	15.8
Peer Influence		
Low	65	64.4
High	36	35.6
Safety Risk Behaviour		
Poor	38	37.6
Good	63	62.4
Perception of Risk		
Poor	8	7.9
Good	93	92.1
Individual Attitude		
Negative	87	86.1
Positive	14	13.9
Knowledge about Risk		
Low	101	100
High	-	-
Reporting Culture		
Poor	18	17.8
Good	83	82.2

3.3. Education Level

The results (Table 1) further show that the majority (78.4%) of the participants had either completed Senior or Junior High School and very few (15.8%) had attained tertiary or University degree as the highest level of formal education. These results agree with the Uganda National Bureau of Statistics findings [28] where more than 82% of the respondents had attained primary, secondary, or more than secondary education level. During the key informant interview, one of the KI was non-committal on the level of education during recruitment:

"It depends on the department like casual laborers we consider physic but for other departments like carpentry and other departments we consider qualifications or work experience." (KI 2).

3.4. Peer Influence

The majority (64.4%) of the workers (Table 1) had low influence from co-workers on use of personal protective equipment, while few (35.6%) had high peer influence. These results contradict earlier studies [29] which explained that the “perception –behavior” connection leads to a default proclivity to act in the same way as those around. For example, a bricklayer who is used to stacking bricks on scaffolding without a brick guard gets a new job with another organization and soon realizes that every other bricklayer in the new establishment uses a brick guard. The bricklayer is likely to adapt and start using brick guards. This form of conditioning is supported by peer pressure and positive safety culture.

The above results are further supported by earlier studies [6] which reported that the things people see around them are major influences of behavior. However, other social influences such as leadership style and culture are capable of changing ones thoughts, beliefs and values, and many researchers constantly have the nature verses nurture debate, in the belief that either one or sometimes both define how human beings develop [30]. It can therefore be argued that peer pressure alone is not enough to enforce compliance to OSH measures.

3.5. Safety Risk Behaviour

The results (Table 1) also show that the majority (62.4%) of workers had good safety behavior while only a few (37.6%) had a poor safety behavior. This may be attributed to the risky activities that the workers undertake daily, which requires them to be protected by use of PPE and following guidelines regarding their safety. These results agree with the ABC model of behavior articulated by several authors [31] who explained that behavior is influenced by two distinct factors: activators and consequences. Hence, the enforcement on safety behavior factors plays the crucial role to encourage safety compliance before the consequences have occurred. In this case the fear of the consequence if noncompliance could be attributed to the good safety behavior.

This could also be attributed to supervision on site to ensure adherence to safety measures as one of the key informants stated:

“Supervision of the staff. Even if you buy them PPE but without supervision nothing is guaranteed. There is need to provide them with safety equipment.” KI 3

3.6. Perception of Risk

The results (Table 1) further show that the majority (92.1%) of the workers had a good risk perception, while very few (7.9%) had a poor risk perception. This may be attributed to the good safety behavior, which is a result of the workers being aware of the risky activities that they carry out every day as well as the awareness of the consequence due to noncompliance. These results also compliment an earlier study [32] which confirmed that the perception of the workers is mostly influenced by the management effort towards safety matters such as the safety training, safety meetings and having sufficient resources available for safety. workmates can influence one another to work safely.

These results were also supported by all the key informants when asked whether they thought the nature of work construction workers do exposes them to occupational hazards. They revealed that:

“Yes for example some machines operating them you need to be protected if you don't protect yourself you may get a hazard that you may never recover from, one can fall or step on a nails, injuries onsite are common but we try to follow safety measures.” (KI 4)

3.7. Individual Attitude

The results (Table 1) further indicate that the majority (86.1%) of the workers have a negative attitude towards compliance to OSH while very few (13.9%) had a positive attitude. This negative attitude maybe attributed to the fact that workers feel management forces them to adherence to compliance of OSH. These results are in agreement with an earlier study [33] on ergonomic knowledge among contractors in a construction site in Georgetown, Penang, found out that majority of the respondents seem to have a low level of knowledge regarding Uganda’s OSH Act of 1994 and have poor attitude towards implementation of safety and health related programs in workplace as well. This study also showed that most of respondents felt that safety programs are something that are forced to them and not something they ought to do as employees as stated in the Act. The above observation is supported by other researchers [34], who stated that safety related continuous promotion and educational process is being forcefully enforced in workplace towards contractors.

3.8. Knowledge about Risk

According to the results Table 1 above, all (100%) workers had a low knowledge of safety, even though 100% of them said they have ever received some job specific training or safety training in occupational hazards and awareness. This may be attributed to the fact that the training was not effective, or the respondents did not understand the question asked. These results agree with those reported earlier [35] that an increase in knowledge is required, but it is not enough to influence the workers' behavior.

3.9. Reporting Culture

The results in Table 1 on reporting culture show that the majority (82.2%) of the respondents had a good reporting culture while very few (17.8%) have a poor reporting culture. This may be attributed to the fact that all staff have had some form of training on compliance and the companies have put in place proper reporting structures in case of accidents and or injuries. This result is supported by one of the key informants who revealed that:

"We provide PPE, treatment in case one is harmed or hurt at work, we also provide first aid and have first aid kits on site, management has also put in place an accident response." KI 5.

If the workers were not reporting accidents, then they would not be able to receive treatment.

Table 2 Organizational Determinants

Organizational Determinants	Frequency(N=101)	Percent (%)
Enforcement of H&S Regulations		
High	-	-
Low	101	100
Adequacy of Legislation		
Inadequate	49	48.5
Adequate	52	51.5
Availability of PPEs		
Low	15	14.9
High	86	85.1
Accessibility of PPEs		
Yes	98	97
No	3	3
Availability of SOP Policy		
Yes	84	83.2
No	17	16.8
Training on the Use of PPEs		
YES	101	100
No	-	-
Workload (working hours)		
4 – 8 hours	22	21.8
9 > hours	79	78.2
<i>Source: Primary 2020</i>		

3.10. Incentives and Enforcement of H&S Regulations and Compliance to OHS

Results in Table 2 show that there was low enforcement of the health and safety regulations since all workers (100%) said there was low enforcement and no incentives for those who adhere or penalties for those who do not adhere. This is an interesting finding because in results shown in Table 1, all (100%) workers were having high knowledge on safety. One of the respondents revealed that:

“the supervisors take long to check on us to see whether we are using the PPE they provide. Even when we use them, there is no reward given or a thank you for adhering. We just use them to protect ourselves because the work we do is dangerous.”

Based on previous studies, one of the aspects to achieve better productivity is workers' compliance to safety procedure. Management can increase workers' motivation by incentive, recognition, and awards. Those can make workers to alter their behavior to the desired outcome such as compliance to work instructions as other studies [36, 37] have found that safety motivation had significant negative correlation with occupational accident rate. Others [38] have further stated that safety management practices have indirect influence on safety performance through safety motivation.

The above results are however contradicted by one of the key informants who stated that:

“We employ specialist like we have a healthy personal who does spot checks all the time to ensure workers adhere to the SOPs, PPE and policies, we also do tool box meetings every morning to inform workers the work we are to do that day the hazards involved and how to prevent them, we also chase worker's who come drunk or don't adhere to policies.” (KI 6).

3.11. Adequacy of Legislation

Table 2 results further show that more than half (51.5%) of the works said that the legislature in place was adequate to enforce compliance to health and safety measures. Although enforcement was very low, the legislation is present, and it is up to the workers to adhere. This is low compared to the responses on other determinants. These results are in line with previous studies which reported that legal and regulatory challenges among other factors contribute to low OSH performance in Ghana [18, 39 and 40]. Other studies on OHS in developing countries [41] largely focused on the investigation of causes of accidents or the development of theoretical models to reduce accidents. Studies on OSH regulations are limited to few African countries such as Nigeria and South Africa, [18, 42].

3.12. Availability of PPEs

The results in Table 2 also show that majority 86 (85.1%) of the workers said there was availability of PPEs. This may be attributed to the fact that the companies perceive construction work to be high risky and availing PPEs shows they are concerned about the wellbeing of the workers. The availability of PPE is a standardized procedure that is a must for a company to provide. However the availability of safety equipment does not guarantee the achievement of work safety in a company [43]. Knowledge, duration of work, and level of workers' education have a very low closeness to workers' compliance using PPE. The availability factor of PPE has a moderate relationship with compliance with the use of PPE as reported by other researchers [43, 44].

This is supported by the key informants when asked whether they have an occupational hazards prevention program on the site and all said yes, where one revealed that:

“Yes like we provide guard walls, demarcate dangerous areas and PPE trainings.” (KI 7)

3.13. Accessibility of PPEs

The results in Table 2 further show that 85.1% of the workers said the PPEs were available and almost all workers (97%) said that the PPEs were accessible. This only emphasizes the value the companies attach to the wellbeing of their workers. Previous studies [44, 45, 46 and 47] reported that the compliance with the utilization of PPE was influenced by accessibility and also availability of the PPE. An increase in available PPE will enhance the frequency of its use.

3.14. Availability of Standard Operating Procedures (SOPs) Policy

The results in the above Table 2 show that (83.2%) of the workers said there was an SOP policy available. This coupled with the results of the availability of PPEs, accessibility of PPEs, and adequacy of legislation proves that these companies are concerned about the wellbeing of their workers but also adhering to the Uganda Occupational Act that dictates that an employer must prepare and as often as may be appropriate, revise a written statement of policy with respect to the safety and health of employees while at work. Every company either small or medium needs to provide SOP and

communicate the SOP to the employees [48]. It is important to ensure that employees understand the working procedures properly to avoid any mistake that can lead to accidents. Most of the companies (56%) showed poor commitment, involvement, and training toward OSH in the workplace. By focusing on corrective actions such as development of SOP and HIRAC (a specific safety management system for micro, small and medium industry) can enhance the readiness of small and medium enterprises (SMEs) to avoid accidents [48].

When asked what management is doing to enforce compliance one of the key informants stated that:

"We employ specialist like we have a healthy personnel who does spot checks all the time to ensure workers adhere to the SOPs, PPE and policies, we also do tool box meetings every morning to inform workers the work we are to do that day, the hazards involved and how to prevent them, we also chase worker's who come drunk or don't adhere to policies." (KI 8)

3.15. Training on the use of PPEs

The table 2 above shows that all (100%) workers said that they had received training either at the start of work or periodic training during their work. This reemphasizes the companies' commitment to ensure the workers perform their duties risk free. Several previous studies [15, 43, 49, 50, 51 and 52], also agree that training provides information about tasks, hazards, and preventive efforts and builds communication between workers and management on top of increasing motivation of the workers.

Failure to provide training is also a violation of the Uganda's OSH Act [23] which states that an employer's expectation is the provision of adequate and appropriate information, instructions, training and supervision necessary to ensure, as far as is reasonably practicable, the safety and health of the employees, and the application and use of occupational safety and health measures, taking into account the functions and capabilities of the different categories of workers in an undertaking.

All the key informants supported these results by confirming trainings done at different stages, more especially at the recruitment stage:

"We do PPE trainings, provide workers with PPE inductions and signage for dangerous areas." (KI 9)

3.16. Workload (working hours)

The results (Table 2 above) shows that the majority of the workers (78.2%) said they work for at least 9 hours or more whereas only (21.8%) worked for 8 hours or less. The general conference of the International Labour Organization (ILO) set 8 hours as the standard for any industrial undertaking. There are almost no studies that have focused on effect of long working hours to the health of workers in Africa or specifically in Uganda. The regulation of working time is one of the oldest concerns of labour legislation. Already in the early 19th century it was recognized that working excessive hours posed a danger to workers' health and to their families. The very first ILO Convention, adopted in 1919, limited hours of work and provided for adequate rest periods for workers. Today, ILO standards on working time provide the framework for regulated hours of work, daily and weekly rest periods, and annual holidays. These instruments ensure high productivity while safeguarding workers' physical and mental health. Standards on part-time work have become increasingly important instruments for addressing such issues as job creation and promoting equality between men and women [53]. The above results therefore indicate that the companies under study were not observing the ILO and Uganda national work standards since the majority are working 9 or more hours per day.

3.17. Level of Compliance to Occupational Health and Safety Measures in Construction Sites in Kampala Central Division

Table 3 below shows results of level of compliance to the occupational Health and Safety measures in construction sites.

Table 3 Level of Compliance to Occupational Health and Safety Measures in Construction Sites in Kampala Central Division

Determinants of compliance	Status of compliance		
	Yes (%)	No (%)	Comment
Presence of an OSH Policy	100	0	Very Good
Awareness of Occupational Risk and Preventive Measures	100	0	Very Good
Presence of an OSH Committee	79	21	Not Good enough (Unacceptable)
Regularity of training workers on OSH	100	0	Very Good
Routine inspection of workers adherence to OSH Measures	100	0	Very Good
Use of PPE	97	3	Good
AVEARGE	95.2	4.8	Good

The above results (in Table 3) show that the majority (95%) of the site workers are complying with occupational health and safety measures. The study findings however reveal that this is unacceptable level of compliance to occupational health and safety measures which requires some level of attention. According to one author, [11] while compliance to statutory regulations should mandatorily be set at 100%, the level of contractor compliance was rated by MBSAT based on the view that scores above 95% are acceptable standards, scores between 90 and 95% can be rated as unacceptable standards which require attention in the short term and below 90% is rated as very poor standard which require immediate attention.

Similar studies conducted by other researchers [11, 12 and 13] noted that building contractors in South Africa do not comply fully with health and safety regulations. It emerged from the MBAWC construction site survey conducted from 2007 to 2010 that the overall combined Health and Safety legislation compliance levels of the sites surveyed ranged from 91.9% to 93.77%. Plausible reasons given for non-compliance with this legislation on construction sites are that some individuals are ignorant of the law, and in other cases they take chances, aware of the small likelihood that they may get caught or of the minor severity of the penalties when they are caught; and other reasons are lack of knowledge and inadequate training of site workers [54, 55]; and the fact that contractors regard the cost of complying with regulations as an unnecessary financial burden [4, 18].

The results above (Table 3) on the determinants of compliance show that all the four sites did not perform well on presence of an OSH committee while they performed fairly well on all the other factors. This could be because the workers were not aware of this committee's existence since all the key informants mentioned the presence of a safety committee.

3.18. Relationship between personal determinants and compliance to occupational health and safety measures in Construction Sites in Kampala Central Division

Table 4 below shows the level of relationship between personal determinants and compliance to occupational health and safety measures.

Table 4 Relationship between the Personal determinants of compliance to occupational safety and health measures in construction sites in Kampala Central division

Status of compliance						
		Noncompliance	Compliance			
Personal Determinants		N (%)	N (%)	df	χ^2	P-Value
Age						
	< 30	29(36.2)	51(63.8)	1	0.423	0.51
	>31	28(39.4)	43(60.6)			
Education Level						
	UCE & Below	21(35.0)	39(69.0)	1	0.008	0.8924
	UACE & above	14(34.1)	27(65.9)			
Peer Influence						
	Low	20(30.8)	45(69.2)	1	1.215	0.27
	High	15(41.7)	21(58.3)			
Safety Risk Behavior						
	Poor	13(34.2)	25(65.8)	1	0.005	0.942
	Good	22(34.9)	41(65.1)			
Perception of Risk						
	Poor	5(62.5)	3(37.5)	1	2.975	0.085
	Good	30(32.3)	63(67.7)			
Individual Attitude						
	Negative	33(37.9)	54(62.1)	1	2.977	0.084
	Positive	2(14.3)	12(85.7)			
Knowledge about Risk						
	Low	-	-		-	-
	High	-	-			
Reporting Culture						
	Poor	14(77.8)	4(22.2)	1	17.988	0.000**
	Good	21(25.3)	62(74.7)			

**Significant at 5% level

The results show that all personal determinants (age, education level, peer influence, safety risk behavior, and perception of risk, individual attitude and knowledge) are not statistically associated with the compliance to occupational safety and health measures at the bivariate analysis level. However, the reporting culture is the only personal determinate significantly associated with compliance to OSH measures at the bivariate analysis level.

3.19. Relationship between the Organizational Determinants of compliance to occupational safety and health measures in construction sites in Kampala Central Division

A bivariate analysis was used to establish the relationship between the organizational determinants of compliance to OSH measures in construction sites. These results are showed in Table 5 below.

Table 5 Relationship between the Organizational Determinants of compliance to occupational safety and health measures in construction sites in Kampala central division

		Status of compliance				
		Non-compliance	Compliance			
Personal determinants		N (%)	N (%)	df	χ^2	P-Value
Enforcement of H&S Regulations		No variation				
	High	-	100		-	-
	Low	-	-		-	-
Adequacy of Legislation						
	Inadequate	32(65.3)	17(34.7)	1	39.489	0.000**
	Adequate	3(5.8)	49(94.2)	-	-	-
Availability of PPEs						
	Low	21(87.5)	3(12.5)	1	38.824	0.000**
	High	14(18.2)	63(81.8)	-	-	-
Accessibility of PPEs						
	Yes	33(33.7)	65(66.3)	1	1.399	0.237
	No	2(66.7)	1(33.3)	-	-	-
Availability of SOP Policy						
	Yes	21(24.4)	65(75.6)	1	26.787	0.000**
	No	14(93.3)	1(6.7)			
Training on the Use of PPEs						
		No Variation				
	YES	-	100		-	-
	No	-	-		-	-
Workload (working hours)						
	4 – 8 hours	11(50.0)	11(50.0)	1	2.925	0.087
	9 > hours	24(30.4)	55(69.6)			

**Significant at 5% level

The study findings in the Table 5 above show that after the bivariate analysis the following organizational determinants: the enforcement of Health and Safety regulations, accessibility of PPEs, training on use of PPEs and working hours are not statistically associated with compliance to occupational safety and health measures in construction sites. However, other organizational determinants including adequacy of legislation and availability of SOPs were statistically associated with compliance to occupational safety and health measures in construction sites in Kampala Central Division.

3.20. Multivariate Analysis results of the Determinants of Compliance to Occupational Safety and Health Measures in Construction Sites in Kampala Central Division

Table 6 below shows results of a multivariate analysis of the relationship between the personal and organizational determinants of compliance to occupational safety and health measures in construction sites in Kampala City Central Division.

Table 6 Multivariate results of the determinants of compliance to occupations safety and health measures in construction sites in Kampala central division

	Status of compliance					
	Noncompliance	Compliance				
Personal determinants	N (%)	N (%)	COR((5%CI)	P-Value	AOR (95%CI)	P-Value
Age			1.42[0.497-4.065]	0.512	2.36[0.347-16.013]	0.38
< 30	29(36.2)	50(63.8)				
>31	6(28.6)	16(71.4)				
Education level			1.04[0.450-2.395]	0.929	0.68[0.167-2.730]	0.581
UCE & Below	21(35.0)	39(65.0)				
UACE & above	14(34.1)	27(65.9)				
Reporting Culture			10.33[3.062-34.875]	0.000**	2.77[0.449-16.989]	0.2373
Poor	14(77.8)	4(22.2)				
Good	21(25.3)	62(74.7)				
Organizational determinants						
Adequacy of Legislation			30.75[8.331-113.460]	0.000**	2.13[3.905-12.454]	0.000**
Inadequate	32(65.3)	17(34.7)				
Adequate	3(5.8)	49(94.2)				
Availability of PPEs			7.03[1.803-27.369]	0.005**	20.93[12.750-59.287]	0.009**
Low	21(87.5)	3(12.5)				
High	14(18.2)	63(81.8)				
Availability of SOP Policy			43.33[5.37-59.49]	0.000**	6.73[2.922-15.014]	0.003**
Yes	21(24.4)	65(75.6)				
No	14(93.3)	1(6.7)				

3.21. Personal determinants of compliance to occupational safety and health measures

Age and educational level were found not to be statistically significantly associated in determining compliance to occupational safety and health measures.

Reporting culture on the other hand, was found to be statistically significantly associated in determining compliance to occupational safety and health measures at the bivariate analysis level but not at multivariate analysis level.

This shows that the workers with a good reporting culture are not more likely to comply to occupational safety and health measures than those with poor reporting culture. In many countries, reporting incidents is considered as a legal

requirement and in 2013 HSE stated that [56] these reports inform the enforcing authorities about deaths, injuries, occupational diseases, and dangerous occurrences which can be used to identify where and how risks arise.

3.22. Organizational determinants of compliance to occupational safety and health measures

3.22.1. Adequacy of Legislation

Adequacy of legislation on compliance to occupational safety and health measures showed a statistically significant effect on the compliance at both bivariate analysis level and at the multivariate analysis level. This implies that the workers who reported availability of PPEs were 21 times more likely to use PPEs than those who reported limited availability of PPEs and that the contractors voluntarily self-regulate. These results are in agreement with earlier researchers [14, 57, 58, 59] who admitted that the later authors do not denote the premise with the word self-regulation; they argue that the construction industry is unregulated because the factories Act of 2004 excludes the construction sites and activities by omission or commission; however, the contractors adopt H&S legislation and implement them. They also note that contractors from some developing countries adopt and implements H & S legislation from developed countries.

3.23. Availability of PPE

The availability of PPEs also shows a statistically significant effect on the compliance to occupational safety and health measures at both bivariate and multivariate analysis levels. This means that the employees who reported the availability of PPEs were 21 times more likely to use PPEs than those who reported limited availability of PPEs. These results are in agreement with earlier researchers [43, 60,61] who had reported that compliance rate was poor due to several factors but most especially lack of access to the items and that some workers argued that PPEs were not necessary or were cumbersome and that they were more comfortable with ordinary clothes while at construction sites.

3.24. Availability of SOP Policy

The results presented in Table 6 above reveal that the availability of SOPs was significantly associated with compliance to occupational safety and health measures at both the bivariate and multivariate analysis levels. The workers at the construction sites that reported availability of SOPs or policies regarding compliance were 7 times more likely to comply to occupational safety and health measures than those that did not report availability on Guidelines or policies regarding use of PPEs. These results are in agreement with an earlier study by Smallwood and Ajayi [62].

4. Conclusion

The study found that majority (78.4%) of the participants had either completed Secondary / High School Education, were aged 21 to 30 years (70.3%), had a low peer influence (64.4%), had a good safety risk behavior (62.4%), had a very good attitude towards compliance (92.1%) with a good reporting culture (82.2%).

The study further found that most construction workers said there was availability of PPE at the construction sites (85.1%). It also found that organizational factors including adequacy of legislation, availability of PPEs and availability of SOPs or policy towards compliance were the only organizational determinants associated with compliance to occupational safety and health measures respectively. No personal determinants were found to be statistically significant to be associated with compliance. Compliance is therefore highest among employees who demonstrated a positive attitude, and reported availability of guidelines or policies regarding compliance, availability of PPEs and adequacy of legislation regarding compliance.

The qualitative results revealed that there was generally good practice of compliance to occupational safety and health measures, signage was feasible on site, construction workers were wearing PPE like head gear, guard wheels, safety belts among other measures.

Compliance to occupational safety and health measures in construction sites in Kampala City central division is therefore associated with adequacy of legislation, availability of PPEs and availability of SOPs or policy. The study found a statistically significant relationship with adequacy of legislation, availability of PPEs and availability of SOPs or policy.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflict of interest. The sponsors and supporters had no role in the design, execution, interpretation, or writing of the study.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study when the questionnaire and interview were being used to collect the data.

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