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Quality Assurance for Occupational Health and Safety Administration (OSHA) In the Morgue: The Impact of SOP Domestication on Implementation and Practice of Universal Safety Precautions in Kenya

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Abstract

The growing need for mortuary services in sub-Saharan Africa amid competing priorities poses occupational health and Safety (OHS) challenges to industry stakeholders. OHS Administration (OSHA) in the healthcare sector in sub-Saharan Africa has not only been overlooked on the assumption that the sector is a 'safe zone' given that "health" is its core mandate, but morgues have been sidelined in resource allocation losing out to presumed priority areas like maternal and child health. Quality implementation of universal safety precautions is however critical in such risky work environments as the morgues. While deliberate morgue safety quality assurance (QA) efforts have been made, emerging data raises an alarm. In over 2.3 million fatalities reported annually in hospital environment related accidents and diseases, morgues are a contributor. However there is lack of information on OHS exposures among mortuary workers in the light of rapid expansions. This study investigated the quality assurance for OSHA in morgues specifically the impact of standard operating procedures (SOP) domestication on practice of universal safety precautions in government mortuaries in Kenya. This was a cross-sectional survey targeting a saturated sample of 39 facilities out of a population of 97 randomly sampled from 3,448 government health facilities. A research model instrument, the Morgue OHS-Hazard Identification Risk Assessment and Control (HIRAC) survey comprising 30 variables developed from the

principles of universal mortuary safety precautions was used to collect data. 100% (39) response rate was achieved. The tool tested the presence and implementation of the universal precautions in a scale of 1-5 and the variables used for stratification to identify factors that correlate with major constructs and relationships between factors determined by Spearman's rank correlation analyses. The result shows cases of "Universal Precautions fully in Place" at 9.8%, "Universal Precautions Partially (Certain Elements) in Place" 27.8%, while cases of "No Universal Precautions in Place" at 62.4%. In addition, a correlation was observed between the presence of SOPs and the practice of universal precautions in the morgues ($P \leq 0.05$). Regression analysis revealed approximately 70% ($r=0.7$) of variance in presence of SOPs as the determinant factor and the practice of individual elements of universal precautions namely; staff protection through vaccination ($P=0.502^{**}$) Appropriate ventilation systems ($P=0.535^{**}$) provision of appropriate equipment e.g. power-saws ($P=0.658^{**}$); Use of additional PPE when gross contamination is anticipated ($P=0.664^{**}$) and Respiratory protection measures at ($P=0.726^{**}$) among others. This study confirms an empirical relationship between SOP domestication and the practice of universal precautions in government owned morgues in Kenya. Results show that morgues which had SOPs were largely compliant with universal safety precautions as opposed to those without SOPs. The findings are significant in improving quality assurance for OHSA in the mortuaries and healthcare sector in Kenya.

Keywords: Practice, Occupational Safety and Health (OHS), Universal Precautions, Mortuary/Morgue, Workers, Public Health Facilities.

1. Introduction

Mortuary services involves managing the receipt, storage and release of deceased people and their property safely, securely, efficiently, effectively and appropriately as the core business of mortuary services teams [1]. This involves several procedures most of which exposes the workers to health hazards. Majority of workers in the morgue, like in other sectors, face hazards and risks often resulting in occupational-related injuries and deaths [2]. A mortuary generally performs five functions, which ought to be kept physically separate as sections namely; (one) the receipt and temporary storage of bodies; (two) performing postmortem; (three) demonstration of postmortem findings in cases of clinical interest or teaching purposes; (four) a section for viewing and/or identification of a body and (five) accommodating visiting relatives/next of kin [3]. However, as is the case in many sub-saharan African countries, many mortuaries which were designed and built to earlier standards are no longer compatible with current good work practices for OHS [4]. OHS risks associated with morgues include: physical risks, chemical risks, and radiation risks, [3]. These are a mixture of environmental controls, workplace practices and the use of appropriate personal protection hazards [5]. Morgue workers are particularly vulnerable to occupationally acquired infectious diseases as shown by recent experiences [6]. They face hazards at work such as infectious diseases, chemical and psychosocial hazards among others [7]. Consequently, health and safety, particularly the prevention of infection, are vital in mortuaries and post-mortem rooms [8] since it is generally acknowledged that OHS-based management systems reduces accidents and injury rates besides improving productivity [9].

1.1. OHS Risks in the Morgue

The risks taken by mortuary staff in line of duty can be attributed to the challenges of balancing between the conflicting interests of stakeholders involved in the mortuary services. Previous studies indentify at least eight (8) key principles based on an assumption that the needs of key stakeholders must be met, in the light of particular emotional and social needs of families, the professional requirements of clinical and other staff, organizational needs in terms of local service profiles, availability of resources, and facilities [5]. These are: (one), a service responsive to individual needs - (beliefs, culture, religion, values, sexual orientation, life-style or social diversity); (Two): A service that shows respect; (Three): a service safe and secure; (four); a service that is confidential; (Five): A reflective service committed to improvement in order to maintain high standards of practice(six): A service which values effective communication (seven: A service that is fit for purpose and (eight): A service which values its staff [1, 10]. However, it is in navigating the eight principles that the staff unfortunately ends up in danger. Mortuary staff will do all they can to meet the needs of individual families in preparing and presenting their relative's body, working with others if necessary [11]. Of the eight principles, principle 1, 2, and 4 are emphazised more than the others causing problems to others [12].

It is important that staff work in an environment which is properly safe and secure [13]. As a result, mortuaries need to have standards stringent enough to cope with the advent of the new or re-emerging infections which workers are increasingly confronted with [4]. Given that working safely is an all-inclusive endeavor, if workers are to participate

in activities to safeguard their health, they must be aware of the risks at work [7, 14] via appropriate standards to contain such risks. Since the elimination of all the risks to the health and safety of mortuary staff and those performing autopsies is the ideal, but not possible [5], stakeholder participation particularly worker involvement is key to success. The risks in the morgues should be reduced as much as possible by providing and maintaining a safe working environment, and ensuring that staff are personally protected and continuously trained in the risks involved in their work and environment to know how to avoid or minimize these risks. [15]. This process involves good working practice, standard operating procedures, and staff training [15, 16].

1.2. Efforts to Contain OHS Risks in the Morgue

Deliberate efforts have been made to contain the OHS risks in the morgue by prescribing precautions for each category of risks viz; Formaldehyde exposure (ventilation challenge), Bloodborne Pathogen Exposures, Administrative Controls for Hazard Communication and management like the use of SOP and other early warning systems, engineering controls for safety and ease of work and provision and proper use of Personal Protective Equipment [17]. These efforts have resulted into development of minimum standards recommended for standard autopsies or morgues [5]. The recommendations details that standard autopsies should be performed in institutions that have the following minimum standards of engineering controls and work practice procedures in place; first; ventilation of the autopsy suite that achieves at least 6 room air changes per hour (vented to the exterior) with the air flow moving away from the operators' breathing zone, second; local exhaust ventilation provided over bone cutting saws or bandsaws used for sectioning of tissue, third; all personnel in contact with the body or any specimens must use personal protective equipment (PPE) of an adequate standard such as impervious aprons and footwear, surgical gloves of latex or a similar synthetic material, eye splash protection and respiratory protection, fourth; procedures in place to deal with autopsy "surprises" that may cause the case to be re-evaluated in mid-procedure, and re-classified in the high-risk category, fifth; clean-up and decontamination procedures domesticated and adhered to and (sixth; regular monitoring of the effectiveness of staff and environmental control measures is conducted, and recorded. These are confirmed in the "typology of universal precaution" namely a variety of procedures to control the risk of infection, including (a) HBV vaccination, (b) engineering controls, (c) work practice controls, and (c) personal protective equipment [18]. With an estimated 2.3 million deaths per year from work-related accidents and diseases, Occupational Safety and Health Administration (OSHA) has become a universal obligation for every workplace enforced by International Labor Organization (ILO) [19]. Countries like Kenya have domesticated the ILO-OSHA requirements by enacting OSHA Law 2007 setting compliance standards and penalties [20] where all health care facilities are classified as legal entities. Despite the gains made so far internationally, the challenges of mainstreaming OHS in the morgues seems to be on the rise in developing countries at a time when health sector boasts of several gains from research [21].

1.3. Quality Assurance Efforts for OHS Administration (OSHA) in the Morgues

Besides the OSHA approaches, the application of quality assurance and standardization processes are on the rise with various medical institutions seeking ISO certifications in Kenya. Process standardization through practices such as the use of Standard Operating Procedures (SOPs), - a critical component of ISO certification [22-24] is taking route. SOP is a key deliverable and part of standardization defined as an activity that gives rise to solutions for repetitive application to problems in various disciplines and is aimed at achieving optimum degree of order [24]. Defined by ICH GCP guideline as "detailed, written instructions to achieve uniformity of the performance of a specific function [25], SOP stipulates in writing who does what, when, where and how by specifying activity or a process [24]. Types of SOPs include administrative and personnel, analyses, substances, quality assurance and records, test system, equipment, and field related [23]. In addition, all SOPs must be adequate in scope to describe the function in sufficient detail, must be approved by a management level as described in a corporate organization chart. The signatures as seal of approval for SOP responsibility, authorship, and Quality Assurance review adds strength and accountability to the SOP [23]. The fundamental role of an SOP is not only to standardize a process, but to keep improving the same process to make better through continuous updating of processes and the SOP itself [26].

This study sought to explore the impact of SOP Domestication as a QA tool on Implementation and Practice of Universal Safety Precautions in Morgues in Kenya. There could be no best place for this evaluation in the health care sector than the morgues in sub-Saharan Africa considered "forgotten areas" and non priority sections of health facilities [7, 14].

2. Methods

2.1. Research Design

Based on the general Occupational Safety and Health (OSH) standard hierarchy of controls methodology, the principles of mortuary universal precautions from minimum standards recommended for standard autopsies or morgues [5], and a Occupational Safety and Health Management System (OHSMS) risk assessment tool [27] a research model comprising 30 variables was developed into a research instrument "Morgue OHS-Hazard Identification Risk Assessment and Control (HIRAC) survey" and used in realization of the objectives. The tool was used to test the presence and implementation of the universal precautions in a scale of 1-5. A saturated sample of 39 morgues was considered from a random sample of 97 health facilities out of 3448 MOH-owned facilities in Kenya [28]. Ranking was based on response categories following the guidelines of Likert response format [29] on a Likert scale of 1 to 5 showing; *1 =Neutral/Not Applicable (process likely to present risk not undertaken in the facility); 2=* Universal Precautions fully in Place *(the risk is low/completely mitigated); 3=* Universal Precautions Partially (Certain Elements) in Place *(Acceptable risks exist in low quantities. Exposures possible but unlikely in large quantities); 4=* Universal Precautions hardly in Place *(Non-Compliance; Significant risk exists - serious enough to warrant urgent changes in day to day operations); 5=* No Universal Precautions in Place *(Catastrophic: Risk is serious enough to impact the facility's ability to meet commitments without jeopardizing workers' safety).* The variables extracted from the filled questionnaires were used for stratification to assist identify factors that correlate with major constructs. Reliability and validity of measures were tested using the factor analysis while relationships between the factors were determined by Spearman's rank correlation analyses. Although, a response rate of 75% was envisaged, a 100% response rate was realized, well above the recommended threshold of 70% [30].

Thirty dimensions of universal safety precautions for morgues derived from the five key OHS areas of challenges in the morgue namely, (1)Administrative controls as part of Hazard Identification, Risk Assessment and Control (HIRAC) such as the use of SOPs and other warning systems – 7 dimensions, (2) appropriate engineering controls for safety an ease of work – 6 dimensions, (3) provision and proper use of Personal Protective Equipment (PPE) – 5 dimensions; (4) Precautions for Bloodborne Pathogen Exposures – 7 dimensions, and (5) Precautions for Formaldehyde exposure (ventilation challenge) – 5 dimensions were developed into a survey tool and administered.

2.2. Data Instrumentations

While response categories followed the guidelines of Likert response format [29], selected questions were administered on a reverse score basis to blindfold the participants [31] and choice of measures based on validity and reliability as per previous observations [32, 33]. The results were summarized, analyzed and correlated using Spearman's rank Corr. Coefficient (Spearman's rho) to determine the relationships.

2.3. Testing Relationships

Each questionnaire comprised 30 questions used to measure the variables. All items were scored from 1 to 5 indicating the lowest to highest value, respectively. Reverse scored items remained "blinded" till analysis. Quantitative statistical analysis comprised verification and organization of the primary data generated by the questionnaires. Reliability and validity of measures were tested using the reliability coefficients and factor analysis and reported in relation to the satisfactory standard of 0.6 [34]. Data analyses were performed using SPSS® - statistical software package version 19.0 (IBM SPSS Inc., Chicago, IL, USA). The relationship between presence of "an updated and maintained SOP highlighting importance of good OHS management" and the implementation of individual components of universal precautions was analyzed by Spearman's rho. Data summaries were coded in SPSS where the initial factors analysis was done. Spearman's rho correlation analysis test was run between the results of practice/application of individual universal precautions for the morgue and the results of presence of a documented OHS management plan for the same respondent facilities. A correlation table (Table 1) was then obtained where the existence of a correlation suggests a relationship between the correlated factors. The analyses were interpreted as positive correlations (**.corr.) significant at the 0.01 level (2-tailed); and (*.corr.) significant at the 0.05 level (2-tailed) at N=39 (for each variable) (Table 1**Error! Reference source not found.**). Statistical significance was set at $P \leq 0.05$.

3. Results

3.1 General Characteristics of the Study Population: KEPH Levels Frequencies

A total of 39 facilities were included in the current study. When stratified in terms of facility service level [Kenya Essential Package for Health Level (KEPH L)], morgues in KEPH Level 5 were 9(23.1%), KEPH Level 4 were 29(74.4%), while KEPH Level 3 was 1(2.6%) as shown in **Table 1.**
KEPH level 2, 56 (58%) facilities were excluded since they did not offer detailed mortuary services and referred cases to next level facilities Figure 1.

3.2 The relationship between the presence of SOPs and Practice of Universal Precautions for Morgues:

The presence of an updated and maintained SOP highlighting importance of good OHS management issued by facility`s top administration highlighting importance of good OHS management seemed to influence the following (Table 1); protection of staff by means of vaccination (e.g. Hepatitis B vaccination program available) (rho=0.502**; P=0.0001); use of additional PPE if blood exposure and gross contamination is anticipated e.g. Surgical caps, hoods (rho=0.506** ; P=0.001); provision of appropriate surgical equipment for procedures e.g. power saws, band saws and vacuum systems in the morgue (rho=0.658**; P=0.000); latex allergy alternatives readily accessible to employees allergic to latex gloves normally provided (rho=0.509**; P=0.001); Procedures in place to deal with autopsy "surprises" that may cause mid-procedure case re-evaluation & reclassification as high-risk (rho=0.852**;P=0.000); Personnel in contact with the body/any specimens use PPE of an adequate standard (rho=0.677**;P=0.000); Worksites clean sanitary and orderly (rho=0.788**;P=0.001); Repair of holes/cracks in floor, sidewalks & surfaces to make safe (rho=0.887**;P=0.000); Aisles and passage ways are appropriately clear (rho=0.887**;P=0.000); respiratory protection program - stench and formaldehyde effects minimized (0.726**; P=0.000); provision of engineering controls such as appropriate ventilation systems (e.g. downdraft tables that capture the air around the cadaver) (rho=0.387**; P=0.015); ventilation of the autopsy suite that achieves at least 6 room air changes per hour (to the exterior) with air flow away from operators' breathing zone (rho=0.505**; P=0.001); inbuilt/local exhaust ventilation & Vacuum systems for power saws or bandsaws used for sectioning of tissue (rho=0.517**; P=0.001) and Adjustable cadaver facility/tray available with Supportive comfortable chair for users (rho=0.660**; P=0.000).

4. DISCUSSION

4.1. Introduction

Mortuary services are a critical part of the service package given to patients who die in hospital, or brought in after death. Mortuary exists to offer service to various stakeholders with varying needs. Consequently, the mortuary staff often has to balance delivery of an effective and efficient service which follows stringent procedures for ensuring safety and security, with the need to demonstrate respect and sensitivity for bereaved families and meet the needs of clinical staff [10]. This challenge calls for the standardization of approaches to service delivery – a gap filled by SOPs aimed at domesticating universal safety precautions for the morgues. SOPs in place reflect both compliance and good practices. This is because assessment and updating of SOPs needs to be an ongoing and standard endeavor. An SOP is never final until it is retired and the process it supports stops. Each review cycle of active documents is an opportunity to refine and improve processes both for compliance and smooth operations [35].

4.2. Use of Administrative Controls

On the use of administrative controls as part of HIRAC such as use of SOPs and other early warning systems, of the five dimensions of administrative controls evaluated, the results showed a non compliance with the universal precautions. The factors that were attributed to this observation were lack of domestication of OHS-SOPs on best practice e.g. SOPs on handling emergencies stood at 58% of the facilities, failure to uphold housekeeping-clean-up and decontamination procedures at 59%, obstruction at pathways and aisles (51%), lack of maintenance or repair of holes/cracks in the floor, sidewalks and surfaces (51%), (**Error! Reference source not found.**). Congestion plays a critical role in this scenario. In most cases the morgues were congested with supplies stored on the pathways, freezers full of cadavers and unclaimed bodies piled up due to bottlenecks and lack of policy implementation. These are in line with the findings of Nyambega 2012 which observed that, rotting bodies piled high, some of them unclaimed for months and providing breeding grounds for maggots, rats and other vermin. A traumatizing experience for both workers and relatives of the dead [36]. With relatives moving in and out to check on the conditions of loved ones, the morgue attendants and related staff strives to make two sets of stakeholders namely the employer and the relatives happy despite putting their own (staffs) life at risk. Similar sentiments are observed by Shkrun and Ramsay that mortuary staff will do all they can to meet the need

individual families in preparing and presenting their relative's body, working with others if necessary [11]. The findings of noncompliance on decontamination and repairs was mainly attributed to non provision of resources in line with the findings of Ogunnowo et al in a similar study in Nigeria [7].

4.3 Importance of SOPs

Standard operating procedures (SOPs) are detailed instructions described to attain homogeneity when carrying out a specific function. Basically, the importance of establishing SOPs in a clinical research center lies in: better preparation when conducting clinical studies, organization of clinical research processes at the research center, training, professionalism, credibility and quality assurance through process standardization and trace-ability in auditing and inspections [37]. Significance of SOPs emanates from the process of its generation. Each phase of the SOP creation must have the participation of the involved team, which will be able to evaluate and validate their procedures and, if necessary, will be able to hire specialized personnel for this purpose. In these cases, the crafting team have the sector knowledge and interact with the center group, being acquainted with each one of the processes and discussing each new SOP that is created. The SOP must be written down in details to achieve homogeneity, both in production or service delivery. Each document must be part of a standard list [37]. This paves way for training to guarantee the quality and homogeneity of all processes involved [37].

4.4. Why SOPs are respected

Types of SOPs include administrative and personnel, analyses, substances, quality assurance and records, test system, equipment, and field related. All SOPs must be adequate in scope to describe the function in sufficient detail such that the study data are reproducible. All SOPs must be approved by a management level as described in a corporate organization chart. Signatures for SOP responsibility, authorship, and Quality Assurance review add strength and accountability to the SOP. In the event a procedure or method is performed differently from what is stated in the SOP, an SOP deviation is necessary. As methods and procedures are improved, SOP revisions are necessary to maintain SOP adequacy and applicability. The replaced SOP is put into a historical SOP file and all copies of the replaced SOPs are destroyed [23].

The significance of SOPs is in line with the thoughts of Gustin 2007 who observed that a documented health and safety plan besides having four key elements namely; management commitment and employee involvement, worksite analysis, hazard prevention and control and training, reflects by definition the key components of effective safety and health program [38]. SOP is part of a documented safety plan. The presence of a written plan shows a commitment on safety by the management [13, 27, 39, 40]. This is because a written plan seeks to involve all stakeholders who can refer to it in case of doubt. It is a clear testimony of negotiations and understanding of all the parties involved particularly employer and employees [41]. A well thought out, participatory written plan is the key to successful OHSM program [42]. The preparation of a written plan of the control measures, in consultation with employees, provides the basis for planning and audit of the service. Because the factors surrounding the autopsy service may change (e.g. new technology may permit easier solutions) the practicability of a planned action may change. However, evidence exists of inconsistent observance of the doctrines by healthcare workers [4], pointing to the critical role of documented OHS plan. In addition, education of workers on risks and institution of standard operating procedure are crucial to safeguard the health of mortuary workers [21].

5. RECCOMENDATIONS:

While mortuaries operate in different ways in various countries and mortuary practice protocols may vary according to local circumstances and needs, there are fundamental principles of good practice which will always apply [3] such as use of SOPs for quality assurance. These principles inform local good practice protocols and are a hallmark of good practice. They provide a basis for, but does not replace, the detailed standard operating procedures (SOPs) which every mortuary must have in place, and which will be adapted to local and individual circumstances [10]. To offer a service that is safe and secure, SOPs are required, and adequate facilities, are needed [1]. SOPs should be: documented, signed and dated by mortuary staff and pathologists responsible for implementing them, made easily accessible to staff, known to and understood by staff involved in their implementation, supported by training, and reviewed and updated regularly, in line with a robust quality management system which includes a programme of scheduled audit [3, 43-45]. All mortuary staff need to be aware of current health and safety legislation and guidance, and receive training to enable them to work safely. Staff visiting the mortuary, and visitors from outside such as health professionals, police officers and funeral

directors, must be informed of, and observe mortuary guidelines on health and safety, manual handling, and security [8]. All staff involved in delivering mortuary services should participate in education and training that is appropriate for their role. Trusts should, therefore, make training and learning opportunities available to mortuary staff at all levels to enable them to develop [1, 12].

6. CONCLUSION:

Health and safety, particularly the prevention of infection, are vital in mortuaries and post-mortem rooms [8] since it generally acknowledged that OHS-based management systems reduces accidents and injury rates besides improving productivity [9]. While focus so far has been on risk assessment, risk assessment does not invalidate nor render unnecessary the practice of universal precautions [5]. A total management approach to the development of written programs, the identification of hazards, the mitigation of hazards by the use of common safety and health tools, and the development of a safe workforce through communications and training are critical to mortuary safety in developing world [42]. The use of SOPs as part of a documented OSHA program would trigger motivational techniques including behavior-based safety, involvement, and training, and addresses tracking and acceptable risk from both safety and health hazards providing a strong foundation that stakeholders need to function as effective managers of workplace safety and health. [42]. In the Kenyan mortuary situation, while the awareness of occupational hazards among the workers was fair while the practice of universal safety precautions was suboptimal. There is a need for periodic training programmes on occupational hazards [7] and use of SOPs as means to addressing safety and quality issues, besides introducing and implementing OHSM programmes in the morgues across the country. This is because as a management tool, SOPs are binding for a company, and a procedure in place means the company must follow it [35].

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References

1. Team DMP: **Care and respect in death : good practice guidance for NHS mortuary staff**. London: Department of Health; 2006.
2. Wu TC, Liu CW, Lu MC: **Safety climate in university and college laboratories: impact of organizational and individual factors**. *J Safety Res* 2007, **38**(1):91-102.
3. Estates NHS: *HBN 20: Facilities for Mortuary and Post-Mortem Room Services - EFM-Standards*: Stationery Office Dublin; 2005.
4. Walls C, Brownless J, Cluroe A, New Zealand. Occupational S, Health S: *Managing Health and Safety Risks in New Zealand Mortuaries: A Guideline to Promote Safe Working Conditions*: Occupational Safety and Health Service of the Department of Labour; 2000.
5. Walls Chris, Brownless Jeff: **Mortuaries - Guidelines to Promote Safe Working Conditions - Managing Health and Safety Risks in New Zealand** Edited by Labour Do. Wellington, New Zealand: Occupational Safety and Health Service of the Department of Labour 2000:52.
6. Kent A. Sepkowitz, Leon Eisenberg†: **Occupational Deaths among Healthcare Workers**. *CDC - Emerging Infectious Disease Journal* 2005, **11**(7):6.
7. Ogunnowo BE, Anunobi CC, Onajole AT, Odeyemi KA: **Awareness of occupational health hazards and the practice of universal safety precautions among mortuary workers in South West Nigeria**. *Nig Q J Hosp Med 2010 Oct-Dec;20(4):192-6* 2010.
8. Great Britain. Health Services Advisory C, Great Britain H, Safety E: *Safe Working and the Prevention of Infection in the Mortuary and Post-Mortem Room*: HSE Books; 2003.
9. Subhani MG: **Study of Occupational Health & Safety Management System (OHSMS) in Universities' Context and Possibilities for its Implementation: A case study of University of Gavle.** University of Gavle, FACULTY OF ENGINEERING AND SUSTAINABLE DEVELOPMENT; 2010.
10. Great Britain. Dept. of H, Great Britain. National Health S: *Care and Respect in Death: Good Practice Guidance for NHS Mortuary Staff*: Department of Health; 2006.
11. Shkrum MJ, Ramsay DA: *Forensic Pathology of Trauma: Common Problems for the Pathologist*: Humana Press; 2007.
12. Georgia-Tech: **OSHA COMPLIANCE GUIDANCE FOR FUNERAL HOMES**. In *Funeral Home Safety And Heath Compliance Assistance (2006)*. Edited by Technology GIo: The Georgia Tech OSHA

Safety and Health Consultation Program; 2006.
13. HSE: **Defining best practice in corporate occupational health and safety governance**. In *Health and Safety Executive -RESEARCH REPORT 506*. 11/06 edition. Edited by Lyon JBA. London: Acona Ltd; 2006.
14. Babatunde EBEO, Charles CCCA, Adebayo TATO, Kofoworola AKAO: **Awareness of occupational health hazards and the practice of universal safety precautions among mortuary workers in South West Nigeria**. *Nig Q J Hosp Med* 2010, **20**(4):192-196.
15. Burnett RA, Royal Institute of Public H, Hygiene: *Handbook of Anatomical Pathology Technology*: Royal Institute of Public Health & Hygiene; 2004.
16. Kelly N, Reid A: **A health and safety survey of Irish funeral industry workers**. *Occup Med (Lond) 2011 Dec;61(8):570-5 doi: 101093/occmed/kqr131 Epub 2011 Sep 9* 2011.
17. Bakhshi SS: **Code of practice for funeral workers: managing infection risk and body bagging**. *Commun Dis Public Health 2001 Dec;4(4):283-7* 2001.
18. Erickson PA: *Practical Guide to Occupational Health and Safety*: Elsevier Science; 1996.
19. Boardman J, Lyon A: *Defining best practice in corporate occupational health and safety governance*. London: Acona Ltd Amadeus House Floral Street London WC2E 9DP Crown copyright; 2006.
20. **Government of Kenya - Ministry of Labor** [http://www.labour.go.ke/]
21. Ogunnowo B, Anunobi C, Onajole A, Odeyemi K: **Exposure to blood among mortuary workers in teaching hospitals in south-west Nigeria**. *Pan Afr Med J 2012;11:61 Epub 2012 Mar 29* 2012.
22. Cook JL: *Standard operating procedures and guidelines*. Saddle Brook, NJ: Fire Engineering; 1998.
23. Isaman V, Thelin R: **Standard operating procedures (SOPs): reason for, types of, adequacy, approval, and deviations from and revisions to**. *Qual Assur* 1995, **4**(3):167-171.
24. Manghani K: **Quality assurance: Importance of systems and standard operating procedures**. *Perspect Clin Res 2011 Jan;2(1):34-7 doi: 104103/2229-348576288* 2011.
25. **ICH Harmonised Tripartite Guideline: guideline for good clinical practice**. *J Postgrad Med 2001 Apr-Jun;47(2):121-30* 2001.
26. Hattemer-Apostel R: **Write it Down – guidance for preparing effective and compliant documentation, 2nd edition, edited by Janet Gough, CRC Press/Taylor & Francis Group, Boca Raton, FL, USA, 2005, 479 p., GBP 130.00, ISBN 0-8493-2171-9**. *The Quality Assurance Journal* 2007, **11**(1):66-67.
27. Minguillón RF, Yacuzzi E: *Design of an indicator for health and safety governance*. Buenos Aires - Argentina: UNIVERSIDAD DEL CEMA; 2009.
28. **List of Public health facilities in Kenya as at Feb 12 2012.** [http://www.ehealth.or.ke/facilities/downloads.aspx]
29. Gadermann AM, Guhn M, Zumbo BD: **Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide.** *Practical Assessment, Research & Evaluation* 2012, **17**(3).
30. Babbie ER: *The practice of social research*
7th edition. Belmont, CA: Wadsworth; 1995.
31. **Online Survey Generator Instructions** [http://abacus.bates.edu/~bpfohl/websurveys/websurvey_instructions.html]
32. Shelby D. Hunt, Van R. Wood, Lawrence B. Chonko: **Corporate Ethical Values and Organizational Commitment in Marketing**. *The Journal of Marketing* 1985 **Vol. 49,** (1).
33. John L. Pierce, Randall B. Dunham, Blackburn RS: **Social Systems Structure, Job Design, and Growth Need Strength: A Test of a Congruency Model**. *The Academy of Management Journal* 1979 **22**(2):223-240.
34. Nunnally JC: *Psychometric theory* 2nd edition. New York: McGraw-Hill.; 1978.
35. Gough J, Hamrell M: **Standard Operating Procedures (SOPs): How Companies Can Determine Which Documents They Must Put in Place**. *Drug Information Journal* 2010, **44**(1):49-54.
36. Nyambega G: **Kenya: Workers Protest Stench of Death At City Morgue**. In *Daily Nation on the Web*. Nairobi Kenya: Nation Media Group; 2012.
37. Barbosa CM, Mauro MF, Cristovao SA, Mangione JA: **The importance of standard operating procedures (SOPs) for clinical research centers**. *Rev Assoc Med Bras* 2011, **57**(2):134-135.
38. Gustin JF: *Safety Management: A Guide for Facility Managers*: Fairmont Press, Incorporated; 2007.
39. Blunt C: **Achieving a Safety Culture Transition**. In *The First National Conference on Occupational Health and Safety Management Systems, July 2000: 2000; Melbourne Vic. Australia*. Edited by Warwick Pearse, Clare Gallagher, Bluff L. Crown Content; 2000.
40. Roughton J, Mercurio J: *Developing an Effective Safety Culture: A Leadership Approach*: Elsevier

Science; 2002.
41. Grammeno G, Ltd CCHA: *Planning Occupational Health [and] Safety*: CCH Australia Limited; 2006.
42. Reese CD: *Occupational Health Safety Management: A Practical Approach*: CRC PressINC; 2008.
43. HSE: **Controlling the risks of infection at work from human remains: A guide for those involved in funeral services (including embalmers) and those involved in exhumation.** . In *Biosafety - Infections at work - Resources*. 06/2005 edition.: Health and Safety Executive. ; 2005:28.
44. Royal Institute of Public H, Hygiene: *A Handbook of Mortuary Practice & Safety: For Anatomical Pathology Technicians*: Royal Institute of Public Health & Hygiene; 1991.
45. Hunt A: **A Handbook of Mortuary Practice and Safety for Anatomical Pathology Technicians**. *Journal of clinical pathology* 1993, **46**(1):95-95.

Tables and Figures

Table 1. The relationship Presence of SOPs and Practice of Universal Precautions for Morgues

Spearman's rho – Correlations	SOPs on Housekeeping Clean-up & decontamination (Universal Precautions for Bloodborne Pathogens) in place.	
(N=39)	rho	P
Worksites clean sanitary and orderly	0.788**	0.001
Repair of holes/cracks in floor, sidewalks & surfaces to make safe	0.887**	0.000
Protection of staff by means of vaccination (e.g. Hepatitis B Vaccination Program available)	0.502**	.0001
Engineering controls in place such as exhaust ventilation	0.387**	0.015
Shields in place when significant splash hazards are anticipated.	0.506**	0.001
Appropriate Surgical equipment in place for autopsy and corpse preparation	0.658**	0.000
Personnel in contact with the body/any specimens use PPE of an adequate standard.	0.677**	0.000
Procedures in place to deal with autopsy “surprises” that may cause mid-procedure case re-evaluation & reclassification as high-risk.	0.852**	0.000
Latex Allergy: Alternatives readily accessible to employees who are allergic to latex gloves.	0.509**	0.001
Aisles and passage ways are appropriately clear	0.887**	0.000
Ventilation of autopsy suite achieves at least 6 room air changes per hour (vented to the exterior) with air flowing away from the operators’ breathing zone.	0.505**	0.001
Local exhaust ventilation is provided over bone cutting saws or band-saws for sectioning of tissue.	0.517**	0.001
Appropriate equipment provided e.g. power-saws, band-saws and vacuum systems in the morgue.	0.331**	0.040
Use of additional PPE if blood exposure and gross contamination is anticipated e.g. Surgical caps, hoods.	0.664**	0.000
Respiratory protection - Stench and Formaldehyde effects minimized	0.726**	0.000
Adjustable cadaver tray available with Supportive comfortable chairs that includes foot-rests provided.	0.660**	0.000

****Corr. Significant at ≤0.05 level (2-tailed)**

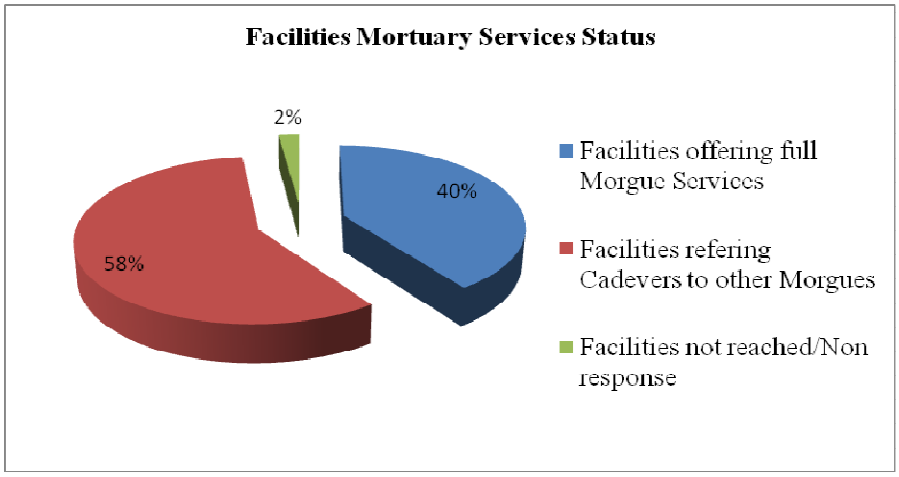

Figure 1. Facilities Mortuary Services' Status