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Qualitative study on the biological hazards associated with mortuary work: the Ghanaian perspective

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SUMMARY

Background: Workplace safety and health are significant public health concerns for maintaining a low-risk environment. In Africa and Ghana, most mortuaries are not well resourced, nor do they follow universal standard precautions for infection prevention. As a result, mortuary attendants are exposed to numerous biological hazards that threaten their health and well-being, and cause anxiety about contracting infectious diseases while attending to corpses.

Objectives: To explore the biological hazards faced by mortuary attendants in Ghana in three selected regions.

Methods: A qualitative research approach was used, together with an exploratory, descriptive design. Semi-structured interviews were conducted to investigate the biological hazards faced by mortuary attendants. Purposive sampling was used, and saturation was reached with 19 participants.

Results: Most mortuary attendants reported exposure to infections through direct contact with bodily fluids. In addition, exposure to potentially contaminated syringes and needles, non-adherence to universal standard precautions for corpse handling, and the poor condition of storage systems and the work environment increase the risk of infection.

Conclusion and recommendations: Mortuary attendants are exposed to biological hazards such as human immunodeficiency virus and other blood-borne diseases, making them hesitant to work and affecting their concentration. This study recommends the urgent provision of functioning cold rooms to preserve the integrity of corpses, personal protective equipment, and adequate training of mortuary attendants on universal standard precautions to improve working environments.

Introduction

Workplace safety and health are critical public health issues to sustain a low-risk work environment. Exposure to various

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biological hazards at work can endanger the health and safety of employees and the environment in which they work [1,2]. Biological hazards are wastes generated during the diagnosis, treatment, testing, research, handling or production of biological products from humans and animals [3]. In Ghana, mortuary attendants attend to dead bodies in fear of contracting infectious diseases because most mortuaries are not well equipped.

Preservation of dead bodies prevents the spread of infections in the community, and allows for education and research. It slows down the decomposition of corpses, allowing time to plan burials and funeral rites which could be influenced by religious, cultural and even forensic motives [4]. Mortuaries provide death care services and are mainly integrated with mainstream hospitals and polyclinics [5]. The job role of a mortuary worker generally involves body reception, preservation (which consists of embalmment and cold storage), and preparation and release of corpses for collection by relatives [6]. These activities, however, come with exposure to biological substances from the corpse carried in bodily fluids and aerosols with their attendant hazards, particularly exposure to blood-borne pathogens such as human immunodeficiency virus (HIV), hepatitis B virus and hepatitis C virus, among others [7].

Occupational health and safety entail the health, safety and well-being of workers in the workplace [8]. Hazards associated with mortuary work arise from diverse sources, including chemical, physical, ergonomic and psychosocial factors (stress and fatigue), and infectious bioagents [3,9]. Exposure to infectious bioagents associated with manual handling of corpses and materials are common hazards experienced by mortuary workers [10]. In the USA, the Occupational Safety and Health Administration established regulations to reduce the risk of transmission of blood-borne pathogens in 1991, and the Centers for Disease Control and Prevention established its surveillance system in 1995 [11]. However, not all countries have established regulations for controlling the risk of exposure to blood-borne pathogens, or created surveillance mechanisms [12].

The inadequacy of necessary resources in health facilities slows work progress and exposes employees to occupational hazards [13]. In Ghana, most mortuaries are not well equipped. As such, mortuary attendants attend to dead bodies in fear of contracting infectious diseases such as HIV/acquired immunodeficiency syndrome (AIDS), tuberculosis, coronavirus disease 2019, etc. This study, therefore, sought to explore the biological hazards faced by mortuary attendants in Ghana, for which knowledge and safety practices could help in the prevention and control of diseases [14].

Methods

Study design

A descriptive, qualitative research design was used in this exploratory study to assess the biological hazards associated with mortuary work [12]. An in-depth understanding of a phenomenon is enhanced and data are preserved in the participants' world rather than statistics [15,16] when using a qualitative research approach. The qualitative research approach was used for this study due to research issues arising from the interpretation of these attendants' real-life experiences, which may best be assessed through qualitative data gathering.

Study setting

This study was carried out in nine healthcare facilities in three regions of Ghana, including tertiary, regional referral, municipal and district hospitals. The district hospitals were Peki Government Hospital in South Dayi District, Anfoega District Hospital in North Dayi District, Sacred Heart District Hospital (Weme-Abor) in Keta municipality, St Anthony's Hospital in Dzodze (all in Volta Region) and Krachi District Hospital (in Oti Region). The study also recruited respondents from municipal healthcare facilities, including Keta and Ho Municipal Hospitals in Volta Region. The remaining healthcare facilities were Bono East Regional Hospital in Techiman and Ho Teaching Hospital, which are secondary and tertiary referral healthcare facilities, respectively. This multi-centre approach enabled the researchers to understand problems in distinct geographical locations in the country.

Study population

Mortuary attendants from selected hospitals in three regions of Ghana, with populations of interest, were included in this study [17]. The inclusion criteria were: mortuary attendants who had worked in the selected mortuary facilities for $\geq$1 year, and consented to participate in the survey [18].

Sampling

Sampling strategies were guided by ethical principles and the opportunity to access people to perform interviews and obtain rich data [19]. Purposive sampling was employed [20]. The researchers recruited the mortuary attendants and explained the content of the study to those who met the inclusion criteria. The sample size of 19 participants was attained by saturation [12].

Data collection method

Data were collected using a semi-structured interview guide [19]. Regarding ethical considerations, permission to participate in the study was sought from all participants. Most participants preferred English or the Ewe language for the interview. Probing was used where necessary during the interview to understand the participant's perception. Interviews were conducted at times and venues convenient for participants. Interviews were recorded using a digital voice recorder and subsequently transcribed. Participants' non-verbal behaviour was recorded as field notes to provide further context to the findings. The time interval for data collection was between October 2019 and September 2020.

Data analysis

Data collection and analysis were undertaken simultaneously to ensure that the themes emerging from the data reached saturation [19,21]. Transcripts were read several times to gain an understanding of the participants' experiences. The data

analysis followed the thematic content analysis approach [22], and data were managed manually. Data were coded and categorized, and themes were developed. The researchers reviewed and discussed the categories and themes to ensure that the participants' outlook was represented accurately [23]. Field notes were also reviewed to add depth to the analysis.

Rigour

The study's trustworthiness was ensured by implementing the principles of authenticity, reliability, confirmability and transferability [24]. Member tests were conducted by checking interpretations of participant-generated data to enhance authenticity and confirmability. All participants were interviewed using the same semi-structured interview guide to ensure reliability. A detailed description of the research method was made for any replication of the research. Peer debriefing was undertaken where participants explored topics to ensure that all facets of the data were protected [25].

Ethical considerations

The research protocol was accepted and approved by the University of Health and Allied Sciences Research Ethics Committee (ID No. UHAS-REC A.1 [35] 19-20). Specific, informed consent was obtained from all participants, as well as permission to audiotape interviews. Participants were told of the study's intent and that participation was voluntary, where anyone could withdraw from the research at any time. The study maintained privacy and confidentiality by using pseudo names; major human bones have been used to represent the identities of participants.

Results

Participants' characteristics

Participants' demographic data included age, sex, marital status, religion, years of work experience, and level of education. The age of participants ranged from 25 to 65 years. There were 18 men and one woman. Fourteen respondents were married, two were not married, two were divorced, and one was widowed. Seventeen respondents were Christian, one was Muslim and one was traditionalist. Work experience of the participants ranged from 1 to 38 years. The minimum education level of the participants was basic education [from primary to junior high (some did not complete junior high school)], and the highest was a prosector certificate. Some participants, however, had no record of formal education.

Main results

The data analysis shows that mortuary attendants face many biological hazards in their work. The findings revealed that most mortuary attendants are exposed to infections through direct contact with bodily fluids. Exposure due to lack of appropriate syringes and needles, lack of universal standard precautions when handling corpses, and poor condition of the freezers and corpses resulting in contamination of the work environment also contributed to the risk of infection. Quotes from the analysed data are used to support the narratives.

Direct exposure to bodily fluids of infected corpses

The study results revealed that all the participants were aware that they could be infected with the same infectious agent that led to the death of the corpses. Daily, all participants were exposed to sharps and bodily fluids, which caused fear and anxiety. Some of the comments voiced by participants are given below:

> 'So, there is that fear that we can easily contract infectious diseases because of the nature of our job' (SCAPULA).

> 'We work with clients who died from dangerous diseases, and you can imagine the risk of coming into direct contact with the infected bodily fluids. Our work-related health and safety protection must be robust' (FEMUR).

Some participants reported that they had been infected with hepatitis B infection at work, and believed that HIV/AIDS infection was possible:

> 'At first, I used to donate blood for the people at the hospital, and I was called again to donate blood. I went to the lab (in 2014), and they told me that hepatitis B is in my blood' (FIBULA).

> 'I went to the OPD [outpatient department] for a check-up, the nurses suspected me of having hepatitis B infection. It was during the screening that I was diagnosed with hepatitis B infection. I think I got it from work' (PUBIS).

> 'Sometimes, colleagues can get HIV/AIDS through a cut at work, but others might think he got it through multiple sexual partners' (METACARPALS).

Most participants believed that exposure could also come from the use of knives and blades in the morgue:

> 'We use surgical knives and blades. At times, mistakenly, we can be cut by the blade. In that case, we just use bleach to disinfect the place' (SCAPULA).

> 'Once in a while, we get injured by needles and scalpel blades, especially when under pressure' (FIBULA).

Participants reported exposure to blood:

> 'When we receive accident cases, you will find every part of your body with bloodstains. I can tell you that sometimes we are careful, but we get stained with blood and other body fluids' (TIBIA).

> 'Sometimes, the types of cases we get stained with the blood from the mangled corpse (METACARPALS).

One participant thought that it was possible to die 'on the job' as a result of acquired infections:

> 'You can lose your life on the job because some of my colleagues didn't retire before losing their lives solely because they got infected with diseases and lost their lives' (FIBULA).

Exposure due to lack of appropriate syringes and needles

The majority of participants complained about the lack of suitable syringes and needles. They indicated that this exposes them to infections from spillages, delays work and leads to tiredness:

'There are no appropriate syringes for the work. The syringes available to us are too small, the 10 cc, making it difficult to inject the formalin into the body. This exposes us to infections' (FIBULA).

'We have to inject the formalin several times into the body. It wastes our time, and we get tired, exposed to doing it. The syringes just don't help because they are too small' (PUBIS).

'Sometimes, there is spillage causing exposure to infected corpses. We don't have the correct syringe size to do our work well and to protect ourselves. We have to use tools at work and protect ourselves so we don't get infected' (HUMERUS).

In one hospital, a participant had to visit other departments in the hospital to obtain work tools:

'Needle, syringe and scalpel blade for use are unavailable, but we ask the theatre staff or renal unit, and if we get lucky, they give us some' (ILIUM).

In another hospital, management asked participants to appeal to other mortuaries in the region for the correct syringes for work:

'They [hospital management] don't mind us. Even the syringes to use for work they don't provide. The last time we asked, they said we should ask other mortuaries if we could get some. We told them they are in management so they should ask for us' (METACARPALS).

Participants in one hospital mentioned they sometimes have to buy syringes outside the hospital for work to minimize the risk of exposure:

'If you have work to do but no right working tools, what will you do? If you can afford it, why not. We buy from outside the hospital (CARPALS).

Exposure due to non-use of universal standard precautions in handling corpses

The need for precautionary measures to reduce exposure to infections is required in any workplace. The findings revealed that most mortuary attendants did not follow universal standard precautions consistently. Most participants depended on the diagnosis of the deceased and information from nurses:

'Knowing the diagnosis is very important. When you know that someone like that has HIV, you have to be careful and protect yourself' (PUBIS).

'When I see the diagnosis in the client's folder, I make sure that I don't contaminate myself, so I don't get infected' (PELVIS).

'Yes, I know I could get infected. When we go for the bodies from the ward, the cause of death is stated. And with this knowledge, we can take the necessary precautions' (RADIUS).

Others took precautions only when corpses were excessively stained with blood:

'Some of the bodies, where too much blood is flowing out of them, get a particular place to put them, so we don't have contact with them' (SACRUM).

In some facilities, there is no consideration for universal precautions except when nurses or doctors say so:

'Over here [this facility], we don't consider those things [precautions]. Unless the nurses label the body with the diagnosis, tell us about the diagnosis, or when I see the diagnosis in the system, I alert my colleague attendants to be careful how they handle that particular body' (SCAPULA).

'At times, they will say you should not work on the body. The doctors will confirm if we should touch the body or not' (ISCHIUM).

Two participants, however, believed in taking precautions at all times:

'Yes, I know some infections can harm me. For this reason, it is vital to protect oneself from diseases always' (ULNA).

'Yes, the probability of infection is there, is high. Because we have heard of them, I have to go and bathe immediately after working on a body' (FEMUR).

Other participants lamented their inability to know the cause of death when the person died at home:

'When someone passes away in the hospital ward, we get all the relevant information regarding the type of disease that killed him. But when the dead body is brought from home, we lack the relevant information' (ULNA).

'When someone dies in the ward, the nurses tell us the cause of death. When the person dies and is brought straight to the mortuary from home, we ask questions about the cause of death, but answers are not straightforward, so we ask them to inform the police and doctors. Then the police will come and check before working on the body' (ISCHIUM).

Most participants stated that people who bring the corpses of those who died at home to the morgue may not know the cause of death:

'Yes, I know about infectious diseases; that is why I said that, especially when a body is from the ward, I will know. It is when the body is from the home that we don't know. If it's from the house, I have to be careful because the one who brought the body might not know what killed the person' (RIBS).

'Knowledge about the infection is good. Most of the time, it's the reason why we seek the cause of death before we attend to the body. When we get to the ward, we ask the nurses to protect ourselves, but it becomes a challenge when death occurs at home because we can't even let the family take the person to the ward to ascertain the cause of death' (PELVIS).

'Yes, they tell us the cause of death on the wards as there will be the diagnosis. The problem we have is when people come from outside, not the hospital. For this, you don't get any note indicating the cause of death' (CLAVICLE).

Most participants washed their hands and instruments with bleach as a precautionary measure:

'We just protect ourselves so that we don't get any illness. But as for the knife we use to cut the bodies, we use it to cut all the bodies we receive, so sometimes we use bleach to wash it' (MANDIBLE).

'Yes. After the procedure, we used bleach to clean the tools and PPE [personal protective equipment]' (PELVIS).

Also, some of the participants complained that doctors and nurses deny them information on the cause of death:

'Most of them (doctors and nurses) will not tell you anything about the dead person when you get to the ward to work. Few among them will tell you that this corpse is infected; take care of yourself. Others only come and call you to carry the corpse away from the ward. These people (nurses and doctors) would deny you vital information on the safe nature of the corpse' (FIBULA).

'Formerly, I was working at hospital A, and when people die, they write the cause of death and label the corpse well. But when I came

here, I tried to inform the nurses to do that, but they didn't do it. I don't know why they don't write the cause of death in this hospital. They do know that some of the bodily fluids affect me' (ILIUM).

Most participants lamented the use of abbreviations in stating the diagnosis:

'We [the attendants] are just in it; we don't know much. The diagnoses are sometimes written in abbreviations. The nurses and the doctors know, so for me, I don't know anything about it, so they have to come and tell me that this patient died of this type of sickness, so I should be cautious. They should say to us, for instance, when somebody dies of HIV because when we send the body into the cold room, we lift the body from the floor level to the top shelf, and sometimes even body fluids pour on us while lifting' (SACRUM).

'Yes, for me, I believe that getting information on the cause of death can help us so, when we are lifting corpses to the shelves, we can know how to handle them. Sometimes, it is during the lifting that blood and other bodily fluids pour on us from the corpses' (SACRUM).

Some participants stated that they do their best to protect themselves:

'Yes, I have to lift the body such that it doesn't touch me. So, I told my colleagues that nobody should let any corpse touch him when we get to work (ward or morgue)' (FIBULA).

'We just have to use the protective equipment well, that we don't get into contact with the body. I think we know how to wear protective clothes well' (ISCHIUM).

Two participants advised colleagues to desist from anything that could reduce their alertness at work, so they could avoid infecting themselves. Drinking alcohol before or at work should be avoided:

'So, always when we get to work, I have been telling my colleagues that they always have to be on their feet, alert. They should not drink [alcohol] just because they are in the mood. It does not make them take care of themselves' (FIBULA).

'Mostly, we just have to be alert always and not drink alcohol before working' (METACARPALS).

A few participants reported that some bodies brought from home are unclean if the patient soiled themselves before death. Relatives take bodies to the morgues without cleaning them:

'They come with their dead bodies from home without bathing or cleaning them. Sometimes, some soil themselves, we tend them ourselves, we have to wash them and prepare them before we work on them. We inject formalin into their bodies, or we cut and inject through the vein into their bodies' (ILIUM).

Condition of the morgue freezers and corpses contaminating the work environment

The data analysis revealed that morgue freezers/refrigerators broke down frequently, causing bodies to start decomposing. Most mortuaries in Ghana use fridges and freezers instead of cold rooms. This situation, according to the mortuary attendants, pollutes the work environment and makes work challenging:

'The morgue fridges/freezers break down often. We report to management, and they will have to go and buy new fridges/freezers for us. It may sometimes take time and thus, affect our work because sometimes the bodies start to get bad' (FIBULA).

'There are no standby fridge motors to help the fridges/freezers work for 2 or 3 days before management buys new fridges/freezers. The delay causes some of the corpses to begin to decompose. Two to three days because the ice of the bodies takes some time to melt' (ILIUM).

Some participants complained about the nature of the freezers:

'The fridges in this facility are old. I am therefore pleading with hospital management to build cold rooms for us. When we put the corpses into the fridges, some bodies get scratches while taking them out. It may anger relatives to question us' (ILIUM).

The majority of the participants stated that decomposed corpses produce an offensive odour, making it difficult to work, and polluting the environment with both the smell and bodily fluids:

'The only challenges we have are about the fridge. Sometimes when it breaks down, the bodies give off an offensive smell' (ULNA).

'If the refrigerator is very active, corpses are well preserved. Yet, the moment ice on the body melts, it will start spoiling and body fluid draining. The formalin prevents it from going bad or getting rotten, but this is not possible without functioning freezers' (MANDIBLE).

'Sometimes, too, in case of accidents and other unfortunate deaths, some start to decompose before they are brought. We have to stand the odour and work on those corpses before the medical doctors come to examine them' (ILIUM).

Decomposed corpses cause mortuary attendants to face the wrath of the relatives:

'The breaking down of the freezers most times affects us and the work. So, some relatives will come and insult us. Sometimes even threaten to sue us in court. Some feel like beating us' (ILIUM).

'The fact of the matter is that hospital management has to change the malfunctioning resources, such as the fridges, the doors, and the handles, so the coldness of the mortuary freezers can be maintained. It can help us from relatives' abuse' (PUBIS).

'Sometimes, we go through a lot. Oh! Bodies decomposing is uncountable. Some relatives come to beat us' (SACRUM).

One of the participants disclosed that relatives reported the mortuary attendants to management for not caring for the corpses left under their care. Although management is aware of the problems with the freezers in the morgue, the attendants get queried about not taking care of the bodies:

'Sometimes they will come to the hospital and report us to management for not caring for the corpses, and we will be queried and answer the queries' (HUMERUS).

In most cases, the mortuary attendants apologised to the relatives. According to some participants, this helps to minimize confrontations with relatives:

'As a normal human being, you have to go and apologise to the relatives of the deceased. We go to apologise to calm them down. Sometimes we explain to them that it isn't our making, it's a misfortune that the freezers broke down, so we couldn't do anything' (PUBIS).

Discussion

Worldwide, few studies have been conducted on occupational risks, safety and health of mortuary attendants, and Ghana is no exception. Most of the studies that have been undertaken have focused heavily on the vulnerability of mortuary attendants to biological hazards (blood and other body fluids) as these risks pose a significant danger. However, no previous studies have been conducted in Ghana. This research, therefore, sought to explore the biological hazards faced by mortuary attendants in Ghana [26]. Mortuary attendants may be at greater risk of exposure to infectious disease agents than the general public due to the mortuary environment and routine activities performed by them [27,28]. In this study, the participants feared that they were at risk of multiple infections that could kill them. Some indicated that their colleagues had work-related infections such as hepatitis B due to exposure to blood, knives and blades [29,30]. This finding is in line with a study by Adamu and Lawani [21], who stated that mortuary attendants had a higher perception of risk of infection than other healthcare workers, and were aware of exposure to infectious disease in their line of work [27,31,32]. Al-Jobory *et al.* [33] reported that mortuary attendants die due to infection with the invisible mycoburden of human cadavers. All the study participants regarded the exposure of mortuary attendants to infection as high and risky. This observation is inconsistent with that of Adamu and Lawani [21], who indicated that some mortuary attendants felt infectious diseases such as Ebola were less contagious. The researchers, however, recommend that training and supervision of mortuary attendants and the availability of personal protective equipment could help resolve the challenges mentioned above.

Studies have found unsatisfactory levels of information followed by repeated incidents of insufficient compliance of healthcare workers with universal precautions [34]. Similar to this study, mortuary attendants disregarded universal precautions. Therefore, they are probably poorly supervised, less likely to be subjected to universal safeguards, and lack psychological support [35]. The present study revealed that participants saw the need for universal precaution measures. However, most participants depended on nurses or relatives for the cause of death and other information about the deceased (information often unavailable from relatives), and the nature of the body before taking appropriate precautions. Inadequate awareness, negative behaviours, lack of proper guidance and necessary supplies, and environmental factors may escalate the effects of exposure [36]. Mortuary attendants need to follow universal standard precautions regardless of whether or not the cause of death is known, or the body has or has not been cleaned.

This study also reported that fridges/freezers break down frequently, resulting in decomposition of corpses in the morgue causing a foul smell; body fluids from these corpses pollute the work environment [37]. Contact with decomposed bodies or bodily fluids is risky. It was also reported that attendants were verbally and/or physically attacked by relatives due to the poor state of the corpses [38]. The researchers suggest that hospital management should provide functioning freezers and cold rooms to prevent body decomposition.

This study was limited in terms of generalizability as a qualitative research method was used.

In conclusion, mortuary attendants are biologically exposed to hazards such as HIV, hepatitis B and other blood-borne diseases. The lack of appropriate essential consumables such as syringes and needles, lack of universal standard precautions, and poor freezer conditions and resultant contamination of the environment by decomposing bodies makes the mortuary attendants hesitant to work, with many struggling to concentrate on their job. As a result, it is recommended that hospital management should include personal protective equipment and essential consumables in their budgets. Also, mortuary attendants should be supervised to ensure that universal standard precautions are followed, and educated on guidelines regarding handling corpses. Hospital management should also ensure the provision of freezers and a cold room to preserve the integrity of bodies. Furthermore, in-service training should be organized and employees should be allowed to improve their education to create an ambient and safe working environment.

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