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AN STUDY INTO KNOWLEDGE, ATTITUDE, AND PRACTICES TOWARDS CONFINED SPACES AT HARARE WATER DEPARTMENT

By

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DECLARATION

To be compiled by the student

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I Vimbai Chikosha do hereby declare that this work-related project is my original work and has not been submitted before. All the information derived from other sources is indicated in the project.

Signature of the student......Date...24/06/24

To be compiled by the supervisor

This dissertation is suitable for submission to the faculty and has been checked for conformity with the faculty guidelines.

Signature of the supervisor......Date.....Date....

DEDICATIONS

A special dedication goes to, God Almighty who strengthened me through this research, I also dedicate this to my husband Forget Chipangura and children, Valiant, Valour and Valerie who have always been my source of inspiration. Their unequivocal support made the completion of this study, a reality.

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ABSTRACT

Background: Working in confined spaces is very risky and unavoidable in water services and carries potential hazards because such spaces are not primarily designed or intended for continuous human occupancy. Confined spaces pose a risk of injury or death to anybody who works there as a result there are regulatory rules such as, Occupational Safety and Health Act (OSHA) 1994 and Industry Code of Practice for Safe working in Confined Space (ICOP)2010.These are to ensure the safety of employees and assets. Failing to follow standard operating procedures may result in fatalities, injuries and diseases. In spaces like manholes, water tanks and sewers, septic tanks to mention a few. This study aimed to understand the knowledge, attitudes, and practices of workers who work in confined spaces at Harare City Council Water Department

Materials and Methods: A descriptive cross-sectional study was carried out and data was collected using research questionnaires. Eighty (80) research questionnaires were administered amongst the participants in confined spaces in the Harare City Council Water Department (HCCWD). The questionnaire consisted of four sections namely, demographic characteristics, knowledge, attitude, and practices (KAP) section. Data was analyzed using Microsoft Excel 2019 and SPSS version 21.

Results: A total of 80 respondents participated in the study with 90% being male, while 10% were female.65.8% of the participants were accounted for by the age group from 25-40 years. The participant's knowledge score was quite fair at 68%. The attitude score was quite positive at 63%. The practices score was positive at 51%.

Conclusion: In conclusion, the workers in the water department who works in confined spaces demonstrated fair knowledge, positive attitude and positive practices when working in confined spaces. Despite fair knowledge and good attitude however practices show that even if they know what they are supposed to do it is not what they put into practice on the actual ground.

Recommendations: Close monitoring is needed when workers are getting in the confined spaces to ensure that they practice as regulated in the laws of safety and health. More to that training should be done on daily basis on SHE talks so that workers will be informed and equipped with the correct practices. Carry mock drills of safety precautions to improve on workers knowledge and develop good habits and practices when entering confined spaces in their daily acknowledgment.

Key terms: Confined spaces, Knowledge, Attitudes, Practices, water department.

ACRONYMS AND ABBREVIATIONS

KAP-Knowledge Attitudes Practices

PPE-Personal Protective Equipment

BUSE-Bindura University of Science and Technology

HCCWD-Harare City Council Water Department

CS-Confined Spaces

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CHAPTER 1:

INTRODUCTION

1.0 BACKGROUND

The Harare Water Department plays a vital role in providing safe and clean water to the residents of Harare, Zimbabwe. However, the nature of the department's operations often involves working in confined areas, which poses inherent risks to the health and safety of its workers. Understanding the knowledge, attitudes, and practices of these workers towards risks in confined areas is crucial for developing effective strategies to mitigate potential hazards and promote a culture of safety.

The study titled "A Study into the Knowledge, Attitude, and Practices Towards Risks Among Workers in Confined Areas: Case of Harare Water Department" aims to explore and evaluate the existing safety culture within the department. By investigating the knowledge levels, attitudes, and practices of workers, this study seeks to identify areas of strength as well as those that require improvement.

Confined areas pose unique challenges, characterized by limited space, restricted entry and exit points, and potential exposure to hazardous substances or conditions. Adequate knowledge regarding these risks is essential for workers to make informed decisions and adopt appropriate safety measures. This study aims to assess the level of knowledge among workers in the Harare Water Department, focusing on their understanding of potential risks associated with confined areas and their ability to identify and mitigate such risks effectively.

Furthermore, workers' attitudes towards risks play a crucial role in determining their adherence to safety protocols and practices. Positive attitudes towards safety can foster a proactive approach to risk management, whereas negative attitudes may undermine safety efforts. Therefore, this study seeks to explore the attitudes of workers towards risks in confined areas, uncovering any potential barriers or facilitators that may influence their safety-related behaviours. While knowledge and attitudes are important, they must be translated into practical actions to ensure the overall safety of workers. This study aims to investigate the current safety practices employed by workers within confined areas in the Harare Water Department. By assessing the alignment between knowledge, attitudes, and practices, the study aims to identify any gaps or discrepancies that may exist. Understanding these gaps is crucial for designing targeted interventions and training programs to enhance safety practices among workers.

Confined spaces (CS) are not normally built or intended for continuous human occupation, working in them is extremely dangerous and fraught with possible hazards. Because there is a risk of injury to workers in confined spaces, strict regulations like the Occupational Safety and Health Act (OSHA) of 1994, the Factories and Machinery (Safe, Health and Welfare) Regulations, 1970, and the Industry Code of Practice for Safe Working in Confined Space (ICOP) of 2010 have been put in place (Botti et al, 2018). These are in place to protect other assets and staff members. If standard operating procedures are not followed when working in computer science, there could be property damage, perhaps fatal injuries, or diseases (Burlet-Vienney, et al 2015). Certain CS are easily recognized, such as storage tanks, silos, sewers, and wells; other CS, such as chambers or pipes, may be less evident but no less hazardous. Confined spaces can be dangerous due to fire or explosion risks, high dust concentrations, low oxygen levels, and high temperatures that cause a significant rise in body temperature (Selman, et al 2018).

Although it is dangerous, working in small areas is a must in the water services industry. Therefore, developing and putting into practice a safe working technique is essential for such locations. An essential component of the infrastructure protecting the environment and public health is the water services sector. They are essential in ensuring that society has access to clean, wholesome water. As time passes, environmental and health safety issues become more of a worry. The tasks performed by confined space workers in the water industry are of a nature that demands full focus. These tasks include cleaning sludge and other waste materials, inspecting the physical integrity of process equipment, performing maintenance and repairs, including welding, modifying, and adjusting mechanical equipment, and performing construction work. (ASA, 2020).

People need to receive the proper training and instruction on safety problems and how to implement them. A qualified person should evaluate the risks associated with the work and working environment in CS, and based on the results, determine what safety measures should be taken to lessen the risk. Employees that receive mandatory occupational safety and health training benefit from improved attitudes, abilities, and knowledge. The relationship between safety attitudes and safety training is demonstrated by a research done in 2002 by Grau et al. on 140 Spanish tile workers. Potential goals of safety attitudes included both individual worker responsibility for safety and safety requirements. However, a few requirements must be satisfied for the training to be successful in changing the attitudes of the workforce.

This is in line with the findings of Aziz and Osman's (2019) study, which discovered that participants' knowledge, abilities, and attitudes do improve with successful training, as determined by learning performance and training transfer. This is also consistent with the occupational safety and health (OSH) paradigm put forth by Christian et al. (2009), which claims that establishing an atmosphere that is conducive to OSH and providing employees with the necessary knowledge and motivation to improve safety compliance and participation.

In addition to training, work experience—a component of human capital—also contributes to the development of a positive work safety culture, which may have an effect on the caliber of interactions, deliverables, and task completion. There has been constant research on the connection between work experience and KAP. Workers with longer work experience and higher educational levels were found to have a greater likelihood of acquiring good knowledge, attitude, and practice, according to the findings of a study conducted on meat-handling employees. Results from a research by Salthouse (1997) indicate that job performance can benefit from job experience.

The findings of this study will contribute to the existing body of knowledge on occupational safety and health, specifically within the context of the Harare Water Department. The identification of areas that require improvement will provide valuable insights for policymakers, managers, and stakeholders to develop and implement effective safety strategies. Ultimately, the goal is to create a safer working environment for the employees of the Harare Water Department, minimizing risks and ensuring their well-being and productivity.

1.2 PROBLEM STATEMENT

Despite the critical role played by the Harare Water Department in providing safe and clean water to the residents of Harare, the risks associated with working in confined areas within the department remain a concern. Confined areas present unique challenges and potential hazards that can jeopardize the health and safety of workers. Therefore, it is essential to assess the knowledge, attitudes, and practices of workers towards risks in confined areas to identify areas for improvement and enhance the overall safety culture within the department.

The existing literature lacks comprehensive research specifically examining the knowledge, attitudes, and practices of workers in confined areas within the Harare Water Department. While some studies have explored general aspects of occupational safety and health, there is a need for a focused investigation into the specific challenges and risks associated with confined areas. Furthermore, there is limited understanding of the factors influencing workers' safety-related behaviours within these areas.

The gap between knowledge and practice in relation to risk management is a critical concern. Despite potentially possessing adequate knowledge regarding risks in confined areas, workers may not consistently translate this knowledge into effective safety practices. This discrepancy highlights the need to delve deeper into the factors contributing to the gap and identify barriers that hinder the implementation of proper safety measures.

Additionally, the attitudes of workers towards risks in confined areas have not been extensively examined. Understanding the underlying attitudes and perceptions of workers is crucial for developing targeted interventions to improve safety practices. Identifying any negative attitudes or misconceptions can guide the development of strategies to promote a positive safety culture and enhance workers' commitment to adhering to safety protocols.

Therefore, the problem addressed by this study is the lack of comprehensive knowledge regarding the knowledge levels, attitudes, and practices of workers towards risks in confined areas within the Harare Water Department. By investigating these aspects, the study aims to identify gaps, barriers, and opportunities for improvement in the current safety culture. The findings will guide the development of effective interventions and strategies to enhance the overall safety and well-being of workers in confined areas within the Harare Water Department.

1.3 SIGNIFICANCE OF THE STUDY

The study on the knowledge, attitudes, and practices towards risks among workers in confined areas within the Harare Water Department holds significant importance for various stakeholders. The findings of this study will contribute to the field of occupational safety and health in several ways, providing valuable insights and implications for practice, policy, and future research.

Firstly, the study's findings will benefit the Harare Water Department itself by identifying areas of strength and weakness in the current safety culture. Understanding the workers' knowledge gaps, attitudes, and practices towards risks in confined areas will enable the department to develop targeted training programs and interventions to enhance safety practices. By addressing these areas of improvement, the department can create a safer working environment, reducing the incidence of accidents and occupational hazards.

Additionally, the study will be valuable for policymakers and regulatory bodies responsible for formulating occupational safety standards and guidelines. The findings can inform the development or revision of existing regulations specific to confined areas, ensuring that the safety requirements align with the actual risks faced by workers in the Harare Water Department. This study can contribute to the establishment of evidence-based policies that prioritize worker safety and well-being.

Furthermore, the research outcomes will benefit professionals and practitioners in the field of occupational safety and health. The insights gained from this study can serve as a foundation for designing effective risk management strategies and safety interventions applicable to confined areas. It can guide the development of training programs aimed at enhancing workers' knowledge, promoting positive attitudes, and improving safety practices within the Harare Water Department and potentially in similar organizations or industries.

The study also has implications for academia and future research. By addressing the existing gap in knowledge regarding confined areas within the Harare Water Department, this study can inspire further research in the field of occupational safety and health. Researchers can build upon the findings and explore additional factors influencing workers' knowledge, attitudes, and practices towards risks in confined areas. This can lead to a deeper understanding of the dynamics involved, facilitating the development of innovative solutions and best practices.

Overall, the significance of this study lies in its potential to contribute to the improvement of occupational safety and health within the Harare Water Department. By enhancing the knowledge, attitudes, and practices of workers towards risks in confined areas, the study aims to create a safer working environment, reduce incidents and accidents, and ultimately protect the well-being of the department's employees. The findings will benefit the department, policymakers, practitioners, and future research endeavours, ultimately fostering a culture of safety and enhancing the overall success of the Harare Water Department.

1.4 AIM

The main aim of the study is to carryout a study into the knowledge, Attitude and Practices (KAP) among workers in confined spaces in the Harare City Council Water Department.

1.5 OBJECTIVES

1. Assess the level of knowledge among workers regarding risks associated with confined areas within the Harare Water Department.

2. Examine the attitudes of workers towards risks in confined areas, identifying any potential barriers or facilitators that may influence their safety-related behaviours.

3. Evaluate the current safety practices employed by workers in confined areas, analysing the alignment between knowledge, attitudes, and actual practices.

4. Identify the factors contributing to the gap between knowledge and practice in relation to risk management within confined areas.

1.6 RESEARCH QUESTIONS

1. What is the level of knowledge among workers in the Harare Water Department regarding risks associated with confined areas?

2. What are the attitudes of workers towards risks in confined areas within the Harare Water Department?

3. What are the current safety practices employed by workers in confined areas, and how do these practices align with their knowledge and attitudes towards risks?

4. What are the factors contributing to the gap between workers' knowledge and their actual practices in relation to risk management within confined areas?

1.7 CHALLENGES

Geographical Scope: The study was limited to the Harare Water Department in Harare, Zimbabwe. The findings may not be directly applicable to other water departments or organizations in different locations. The study involved a specific sample size of workers from the Harare Water Department, based on practical considerations and available resources. The findings may not represent the entire population of workers in the department. The study focused specifically on risks and safety practices within confined areas in the Harare Water Department. Other occupational safety aspects outside of confined areas will not be extensively examined. The study conducted within a specific time frame, and data collection and analysis was limited accordingly. Long-term changes or fluctuations in knowledge, attitudes, and practices may not be fully captured.

1.8 CHAPTER ONE CONCLUSION

In conclusion, Chapter One has introduced the study on knowledge, attitudes, and practices towards risks among workers in confined areas within the Harare Water Department. The significance of the study has been highlighted, along with the research objectives, questions, and hypotheses. The delimitations of the study have also been acknowledged. The subsequent chapters will delve into data collection, analysis, and interpretation, providing valuable insights into confined area safety within the Harare Water Department.

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

A confined space can be defined as any area in the workplace that was not meant as a usual workstation with a constrained access or exit and impose physical, biological and chemical hazards to workers who intentionally or inadvertently enter that space (Pate and Dai, 2014). According to Yassin and Abdalwhab (2015), entry into confined spaces is one of the most dangerous processes that causes many injuries and fatalities than any other work in developing countries. This calls for enhanced knowledge attitudes in order to engender positive practice.

Confined areas present substantial occupational hazards that can jeopardize worker safety and well-being. These hazards arise from various factors, including limited ventilation, restricted mobility, and the potential for exposure to hazardous substances. Extensive literature has shed light on the specific risks associated with confined spaces and the importance of implementing effective risk management strategies.

Research conducted by Smith and Johnson (2018) highlighted that oxygen deficiency is a prevalent hazard in confined areas, posing a significant threat to workers. Lack of adequate oxygen levels can lead to asphyxiation and loss of consciousness, potentially resulting in severe injuries or fatalities. Similarly, toxic gases, such as hydrogen sulfide and carbon monoxide, have been identified as common dangers in confined spaces (Brown et al., 2020). Exposure to these gases can cause respiratory distress, poisoning, and other adverse health effects.

Physical entrapment is another critical hazard in confined areas. Workers may encounter situations where they become trapped or wedged, making it challenging to escape in case of emergencies. This can lead to injuries, fractures, or even fatalities if rescue operations are not promptly executed (Occupational Safety and Health Administration [OSHA], 2019).

Temperature extremes within confined spaces also pose significant risks. Extreme heat or cold can result in heat stroke, hypothermia, or frostbite, respectively. These conditions can have severe health implications and compromise the well-being of workers operating in confined areas (International Labour Organization [ILO], 2017). The determination of employee knowledge, attitudes and practices provides a benchmark against which to measure safety performance and thus an organization's scope in managing accidents and incidents in order to improve workplace safety.

2.1: WORKER'S KNOWLEDGE ABOUT RISKS AND HAZARDS IN CONFINED SPACES

Workers' knowledge levels play a crucial role in ensuring occupational safety in confined areas. Extensive research has focused on examining the factors that influence workers' knowledge acquisition and the importance of targeted training and educational interventions to promote safe practices. Training programs have been identified as a key factor in enhancing workers' knowledge regarding risks in confined spaces. Studies by Lee and Kim (2019) and Roberts et al. (2020) have highlighted the positive impact of comprehensive training programs on workers' hazard recognition skills, understanding of safety protocols, and overall knowledge levels. These programs often include theoretical instruction, practical exercises, and simulations to provide workers with the necessary knowledge and skills to navigate confined spaces safely.

Experience also plays a significant role in workers' knowledge levels. Research by Johnson and Smith (2019) suggests that workers with prior experience in confined areas tend to have higher levels of knowledge and are more adept at recognizing potential hazards. However, it is important to note that experience alone may not guarantee comprehensive knowledge, as workers may develop specific knowledge related to their previous tasks or environments. Therefore, continuous training and knowledge updates are essential even for experienced workers.

Access to information is another critical factor that influences workers' knowledge levels. Providing workers with readily available information, such as safety manuals, standard operating procedures, and hazard communication materials, contributes to their understanding of confined space risks (Occupational Safety and Health Administration [OSHA], 2020). Organizations should ensure that relevant information is accessible, well-organized, and regularly updated to support workers' knowledge acquisition.

Organizational support and a safety culture that values knowledge and continuous learning are vital for promoting workers' knowledge levels in confined areas. Research by Brown and Davis (2021) emphasizes the importance of managerial commitment, effective communication, and the provision of resources for training and education. Organizations should foster a culture that encourages workers to actively seek knowledge, ask questions, and share their experiences to collectively enhance safety awareness and knowledge within the workforce.

To improve workers' knowledge levels in confined areas, targeted training and educational interventions are necessary. These interventions should focus on addressing specific knowledge gaps, reinforcing hazard recognition skills, and ensuring a thorough understanding of safety protocols. Interactive training methods, such as hands-on exercises, case studies, and virtual simulations, can enhance knowledge retention and application (Lingard et al., 2020).

A study KAP in Malaysia about working in confined spaces carried out among water services workers discovered that the majority (67%) of workers had good knowledge about the risks and hazards attendant to confined spaces. Knowledge was associated with age and attitude, in such a way that the higher the age the more knowledgeable were workers about risks and hazards in confined spaces as well as the control measures (Ngah, et. al., 2022). Contrary to this study, a study by Yassin and Abdalwhab (2015), among people working in confined spaces revealed that the majority of workers did not have much knowledge about the concept of a confined space and also lacked knowledge about the hazards and risks that are likely to occur in confined spaces.

2.2 WORKER'S ATTITUDES ABOUT RISKS AND HAZARDS IN CONFINED SPACES

A study KAP in Malaysia about working in confined spaces carried out among water services workers discovered that the majority (66%) of workers had positive attitudes towards the risks and hazards characteristic to confined spaces. Marital status was found to be the single predictor of attitudes (Ngah, et. al., 2022). However, in a different study in China worker's perceptions about managerial support also had a significant impact on worker's consciousness about safety. Furthermore, their perceived job satisfaction and how they perceive risk (Kim, et. al., 2017). A study by Pate and Dai (2014) revealed that perceptions on hazards and risks in confined places were also influenced by the fear of injury and deaths in working alone in a confined space.

2.3 WORKER'S PRACTICES ABOUT RISKS AND HAZARDS IN CONFINED SPACES

Safety practices in confined areas are crucial for mitigating risks and ensuring the well-being of workers. Extensive research has focused on understanding the factors that influence safety practices and the theoretical frameworks that can provide insights into workers' behaviors Ngah, et. al., (2022).

Compliance with safety protocols is a fundamental aspect of safety practices in confined areas. Studies by Zhang et al. (2018) and Smith and Johnson (2020) have highlighted the importance of workers' adherence to established safety procedures and guidelines. Factors such as clear communication of safety rules, effective training programs, and regular safety reminders contribute to increased compliance with safety protocols.

The utilization of personal protective equipment (PPE) is another critical safety practice in confined areas. Research by Wang et al. (2021) and Liang et al. (2019) emphasizes the significance of workers wearing appropriate PPE, such as safety harnesses, respirators, and protective clothing, to mitigate the risks associated with hazardous substances, falls, and physical hazards. Factors such as the availability of suitable PPE, proper training on its usage, and organizational enforcement play a crucial role in promoting its effective utilization.

A study KAP in Malaysia about working in confined spaces carried out among water services workers discovered that the majority (60%) of workers had good practice about the risks and hazards that are apt to be found in confined spaces. A relationship was found between positive practices and positive attitudes (Ngah, et. al., 2022). Contrariwise, a study by Yassin and Abdalwhab (2015) among workers in confined spaces, unraveled that the majority of

workplaces (80%) failed to conduct trainings on confined spaces. They also were unable to provide supervision and procedures. This justifies the need for a thorough confined area training program. The same study also noted that the majority 82%) were allowed entry without prior hazard assessment procedures. Furthermore, there was absence of monitoring of gases before entry and during work. In the same study it emerged that there were no preparedness plans in case of emergency. The study concluded that the chief causes of accidents in confined spaces were bad employee perception of hazards and risks as well as lack of crafting of preventive measures (Kim, et. al., 2017) A study on confined space accidents allotted most of accidents to organizational factors and lack of supervision as internal factors as well as to regulations, politics and government policies (Zahra, et. al., 2019). Thus, controlling accidents in confined spaces requires efforts within the organization as well as from external institutions. Within the organization it is essential to have good contract and emergency management. Another factor that was identified as a major contributor to accidents among workers in confined spaces was poor communication especially at shift handover. Also, decision errors often result in unauthorized entry into confined spaces which is a serious violation that can have unbearable frequency of accident occurrence (Zahra, et. al., 2019). Also, according to de Lima Eustáquio (2024) some of the contributors to confined space accidents include absence of safety procedures, financial constraints and lack of adequate trainings. According to Choudhry and Fang (2008) some further causes of workplace accidents in confined spaces encompass the attitudes of fellow workers, work pressure and the show of macho or bravado where workers want to present themselves as tough.

CHAPTER 3: RESEARCH METHDOLOGY

3.0 INTRODUCTION

The purpose of this chapter is to outline the research methodology employed in the study, providing a clear and systematic approach to gather and analyse data. In this section, the research design, data collection methods, data analysis techniques, and ethical considerations will be discussed.

3.1 LOCATION OF THE STUDY AREA

The study was conducted at Harare City Council Water Department (HCCWD) in the capital city of Zimbabwe, due to its nature of work, occupational hazards, relevance to occupational safety, and the practical application of the study findings within the context of municipal water utility operations. The research aims to provide valuable insights into occupational safety measures, emergency response protocols, and the implementation of confined space regulations in a municipal water utility confined spaces environment.



3.2 STUDY DESIGN

The research employed a descriptive cross-sectional study design. Cross-sectional studies are performed to test the presence or absence of an outcome and the presence or absence of an exposure at a certain time (Girolamo and Mans, 2019). A cross sectional can provide valuable insights into the factors that influence the Knowledge, Attitudes and Practices of workers in confined spaces, which can inform the development of targeted interventions and safety measures to improve the overall safety and well-being of workers in these environments. The data collected through questionnaires was analyzed using both qualitative and quantitative tools.

Cross sectional studies are relatively quick and efficient to conduct, they can help to identify specific groups that may be at increased risk for a given condition, which can be helpful in planning interventions, and they can be used to collect baseline data that can be used for future longitudinal studies. A sample of 80 participants was used to collect data during the research.

3.3 DATA SOURCES

The researcher used primary data sources. Primary data is information that the researcher obtained from primary sources through questionnaire. The sources of primary data were the Water Department participants who responded to the questionnaire.

Primary data sources play a crucial role in gathering relevant information for examining safety culture and its impact on workplace safety within confined areas in Harare Water Department.

3.4 SAMPLING METHOD

A multi-stage sample strategy was utilized in the research to make the sampling process more practicable because of the many workers in the HCCWD. The researcher first used a type of random sampling called stratified sampling to group Harare Water Department into strata basing, division, roles, years of experience and specific working environments. Harare Water has three divisions namely Waste water, Water quality and Water production. Convenience sampling was used where data would be collected. Convenience sampling is a method for collecting samples that involves capturing samples that are conveniently placed close to a location (Thomas et al., 2017). The samples were collected from all three divisions. Lastly the researcher used random sampling of 80 respondents, 30 workers from Waste water, 30 workers from Water production and 20 workers from Water Quality. The advantages of simple random sampling are that it allows the results to apply to the whole demographic and it offers an equal chance of being selected and becoming a member of the sample, this provides an opportunity to gather information from all divisions.

3.5 SAMPLE SIZE

The sample size of respondents was determined by using the Cochran formula below.

No= $(z2 \times p(1-p))/e2$

In directive to estimate the appropriate departmental level respondents, the study based on the entire population of workers in confined spaces in the three divisions and using the following formula for calculating the sample size below:

n = DEFF * (z2 * (p) (1-p)) / d2

DEFF = Design effect (1.2)

Z value = 1.645 for p = 0.1 or 90% confidence intervals P = Estimated is not known, so we assume that 50% q = 1 - p = 1 - 0.5= 0.5

Therefore, the sample size required was calculated as follow:

n= DEFF* (z2 * (p)(1-p)) / d2 n =0.9*(((1.6452)*(0.5)*(0.5))/(0.052)) n=119.5 n=120

Therefore the number of respondents was to be 80.

3.6 RESEARCH TOOLS

The researcher used questionnaire with both closed and open-ended questions as research tool. A questionnaire is a sequence of questions asked to participants to gain statistically useful information about a given topic (Roopa et al., 2012). The questionnaires were manually distributed by the researcher to the target populations in the Water Department. The questionnaire consisted of four (4) sections:

- (i) Demographic characteristics
- (ii) Knowledge on confined spaces
- (iii) Attitudes towards working in confined spaces.
- (iv) Practices when working in confined spaces

The questionnaires were then taken by the researcher for analysis.

3.7 RELIABILITY AND VALIDITY OF RESEARCH INSTRUMENTS

Reliability is a measure of the consistency of the instrument. Chandra and Sharma (2016), define reliability as a matter of whether a particular technique applied repeatedly to the same object would yield the same result each time. The strength of reliability of a particular instrument is found from the uniformity of responses elicited from respondents. The researcher ensured reliability by using objectives to come up with the questions. Also examined the results' consistency with other measures of the same concept and known theories over time, among different observers, and across various test sections to determine their reliability and validity

3.8 STATISTICAL ANALYSIS

Microsoft Excel 2019 and SPSS version 21 were used in the data analysis process. The research questionnaire had 8 questions to ascertain the participants' knowledge, 8 questions to assess their attitudes, and 13 questions to ascertain their practices towards working in confined spaces. Each correct response received a score of 1, while incorrect and don't know responses received a score of 0. Each character's average score was determined, and responses were classified as "Good," if the score was above 70% "Fair," if the score was from 51-69% or "Poor" if it was less than 50%. The overall KAP scores were calculated by combining the scores. The total KAP score was used to rank the level of knowledge, attitude, and practice, of the participants toward food safety and hygiene. Tables were used to display the data after analysis.

3.9 RESEARCH ETHICS

Research ethics can be defined as doing what is morally and legally right during research. They are conduct standards, that differentiate between right and wrong, and acceptable and unacceptable behavior (Parveen et al., 2017). The researcher requested permission from the Human Resources Director as well as the Head of Water Department, with the assistance of the academic later from BUSE approval was granted with limitations to publication of results.

The research subjects participated willingly without being forced. Participants were assured by the researcher that declining to participate would have no negative effects or penalties. The researcher gave the participants all the information they required on the study, such as benefits, risks, funding, and institutional approval. Since everyone has the right to privacy, the researcher safeguarded their personal information. To protect anonymity the researcher advised the subjects not to write their names or put any marks outside the requested spaces. The researcher protected anonymity wherever it was possible.

SUMMARY

This chapter focused on the research methodology. Justification for selecting stratified random sampling was explained. Research design will be stated in this chapter. The Chapter also focused on the population and sample as well as data presentation and analysis procedures.

CHAPTER 4: RESULTS

4.0 INTRODUCTION

Chapter 4 presented, analysed, and discussed findings. The researcher used tables to present data.

4.1 SECTION A: Knowledge towards working in confined spaces

Table 1: Knowledge towards working in confined spaces

Knowledge Variables	Preferred	%	Score
	response		
Q1 Do you have clear understanding of what a	Correct	71	0.7
confined area is?			
Q2 Can you identify common hazards associated	Correct	75.3	0.753
with confined areas?	identification		
Q3 Are you aware of the potential risks involved in	Correct	65.3	0.653
working in confined spaces?	identification		
Q4 Do you know the legal and regulatory	Correct	71	0.71
requirements related to confined spaces safety?	identification		
Q5 Are you familiar with the proper safety	Correct	70	0.7
procedures and protocols for working in confined	identification		
spaces?			
Q5 Do you know the personal protective equipment	Correct	65	0.65
required in confined areas?	identification		
Q6 Familiarity with the emergency response	Familiar	64.9	0.649
procedures and protocol for working in confined			
spaces			
Q7 Are you aware of the emergency response	Aware	68	0.68
procedures in the event an incident in a confined			
space			
Q8 Familiarity with the legal and regulatory	Familiar	61	0.61
requirements related to risk management in			
confined spaces?			
Total knowledge Score			6.105

From the table 1 above, the total knowledge score was 6.105 out of a possible of 9. This translates into a percentage score of (6.105/9) * 100% which equals 68% which is moderately high. Knowledge was highest (75%) pertaining to the identification of common hazards associated with confined spaces and was least (61%) regarding familiarity with legal and regulatory requirements concerning confined spaces.

4.2 SECTION B: ATTITUDES TOWARDS WORKING IN CONFINED SPACES

Table 2: Attitudes towards working in confined spaces.

Attitude variable	Preferred	%	Score
	response		
Q1 Do you feel confident in your ability to identify	Yes	53	0.53
and assess risks in confined spaces?			
Q2 Do you believe that safety measures are	Yes	74.2	0.742
adequately implemented in confined areas within			
the Harare Water Department?			
Q3 Do you believe that safety procedures and	Yes	79.4	0.794
protocols are necessary for working in confined			
spaces?			
Q4 Are you willing to report any safety concerns or	Yes	60.8	0.608
incidents related to confined areas?			
Q5 Do you believe that teamwork and	Yes	61.9	0.619
communication are crucial for maintaining safety in			
confined areas?			
Q6 Do you think that protective equipment (ppe)	Yes	72.2	0.772
required in confined areas?			
Q7 Do you believe that safety measures in confined	Yes	88.7	0.887
areas are important for your well-being?			
Q8 Do you believe that there is need for additional	Yes	68	0.68
training, support or resources to bridge the gap			
between knowledge and practice in risk			
management within confined spaces			
Total Attitude Score			5.704

From **Table 2** above, the mean score for positive attitude was 0.63 (5.704/9) which represents a percentage of 63% which if moderately high. Attitudes were more positive (88%) regarding the belief that safety measures in confined spaces are important and they were least positive regarding whether respondents feel confident in their ability to identify risks and hazards in confined spaces.

4.3 SECTION C: PRACTICES TOWARDS WORKING IN CONFINED SPACES

Table 3: Practices towards working in confined spaces

Practice	Preferred	%	Score	
Variable	response			
Q1 Have you received any training specific to	Yes	65	0.65	
confined space safety during your time in the				
Harare Water Department?				
Q2 Are you familiar with the safety procedures and	Yes	77	0.773	
protocols for working in confined spaces?				
Do you conduct thorough risk assessment before	Yes	77	0.77	
entering a confined space?				
Q3 Do you consistently use the appropriate	Yes	33	0.33	
personal protective equipment (ppe)when working				
in confined spaces				
Q4 Do you follow safety procedures and protocols	Yes	66	0.66	
while working in confined spaces?				
Q5 Do you communicate hazards and risks to	Yes	17.5	0.175	
colleagues before entering a confined space?				
Q6 Do you report safety concerns or incidents	Yes	77.3	0.773	
related to confined areas?				
Q7 Have you received adequate training on risk	Yes	53	0.53	
management within confined spaces?				
Q8 Do you consistently conduct risk assessments	Yes	46	0.46	
before entering confined spaces?				
Q9 Do you consistently implement appropriate	Yes	32	0.32	
control measures to mitigate risks in confined				
areas?				
Q10 Do you consistently use the required personal	Yes	64	0.64	
protective equipment when working in confined				
spaces?				
Q11 Do you effectively communicate and share	Yes	33	0.33	
risk related information with your colleagues before				
entering a confined space?				
Q12 Do you regularly review and update risk	Yes	54	0.54	
management practices in confined areas?				
Q13 Have you encountered any incidents related to	No	7.2	0.072	
confined areas in your work experience?				
Total Practices Score			7.023	

From **Table 3** above, the mean score for practice was 0.50 (7.023/14) which represents a fairly low rate (51%) of positive practice. Good practice was recorded highly (77%) with regards to familiarity with safety procedures and protocols for working in confined spaces, conducting of thorough risk assessments before entering confined spaces and as well as for

reporting accidents and incidences that occur in confined spaces. Good practice was lowest (7.2%) regarding the non-occurrence of accidents in confined spaces.

CONCLUSION

The study concludes that although knowledge about confined spaces was high and attitudes relatively positive, this did not translate into high positive practices as reflected by the low mean score of practice of 0.50 or fifty percent.

RECOMMENDATIONS

The study recommends that there be held some training sessions among workers in confined spaces in order to improve their practices. This is so because only 50% of the workers report to have had adequate training concerning working in confined spaces.

CHAPTER 5

5.0 DISCUSSION OF RESULTS

5.1 KNOWLEDGE TOWARDS WORKING IN CONFINED SPACES

Results show a moderately high level of knowledge (68%) about confined spaces issues with regard to occupational health and safety in confined spaces. This tallies with findings from a study about confined spaces where 67% of the workers were knowledgeable about occupational health and safety issues in confined spaces (Ngah, et. al., 2022). The majority of workers were able to identify the common hazards and risks associated with confined spaces. However, contrary to this study, a study by Yassin and Abdalwhab (2015), among people working in confined spaces revealed that the majority of workers did not have much knowledge about the concept of a confined space and also lacked knowledge about the hazards and risks that are likely to occur in confined spaces. This discrepancy may be related to differences in organizational supervision and the provision of training sessions. In the present study 65% of the workers report to have received some training on hazards and risks associated with confined spaces. The study also shows that the majority of workers were aware of the legal and regulatory requirements related to confined spaces safety. This may also be because the majority of workers had received training on confined space issues. Also, the majority (65%) of the workers reported being familiar with emergency protocols in confined spaces. This knowledge may also have been imparted by the training programs that they reported to have undergone. Regarding protective clothing, 35% of the workers were not aware of the type of protective clothing that is required to be used in confined spaces. Although this percentage may seem little, it indicates the potential exposure of workers to potential injury and death. Given the requirement for zero tolerance to injury and death and in line with the precautionary principle this issue of lack of knowledge needs to be resolved. It is important to identify and characterize those workers who lack knowledge and design awareness programs and trainings specifically targeted at such people depending on their characteristics. In terms of awareness to emergency response procedures in the event of an accident, although 68% reported being aware, there is need to address this lack of knowledge in the remaining 32% of the workers.

They need to be identified and characterized and get subjected to some special training according to their characteristics.

5.2 ATTITUDES TOWARDS WORKING IN CONFINED SPACES

Regarding attitudes the overall mean positive attitude mean score was moderately high (0.63) or 63%. This high level of positive attitudes may be accounted for by the trainings which 65% of them report to have undergone. According to Loosemore and Malouf (2019) training has been shown to significantly improve the attitudes of workers' attitudes. However, they highlight the need to motivate workers to be trained as compulsory training may achieve negative results. This high level of positive attitudes in the present study are consistent with findings by Ngah, et. al., (2022) among confined space workers in Malaysia where 66% of the workers exhibited positive attitudes.

5.3 PRACTICES TOWARDS WORKING IN CONFINED SPACES

In terms of practice in confined spaces, the majority of workers (65%) reported having received training. This is contrary to findings by Yassin and Abdalwhab (2015) who reported that 80% of workplaces in confined spaces failed to provide trainings. The current study has revealed that the majority of workers reported that they conduct thorough hazard and risk assessments before entering confined spaces. This is contrary to findings by Yassin and Abdalwhab (2015) who observed that the majority of workers (82%) were allowed entry into confined spaces without prior hazard assessment procedures.

In spite of the high knowledge about the need for appropriate PPE for confined spaces, only 33% reported that they consistently used PPE in confined spaces. This can be due to lack of supervision (Yassin and Abdalwhab, 2015). It may also be due organizational factors and lack of supervision as internal factors as well as to regulations, politics and government policies (Zahra, et. al., 2019).

Another factor that may result in workers not wearing PPE may be lack of resources or financial constraints that may hamper the procurement of PPE as employers seek to maximize profit at the expense of worker safety.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

Conclusively, workers demonstrated a moderately high level of knowledge about confined spaces issues with regard to occupational health and safety in confined spaces which include safety protocols and procedures. Also, the majority of workers were able to identify the common hazards and risks associated with confined spaces. In regards to protective clothing(ppe), 35% of the workers were not aware of the type of protective clothing that is required to be used in confined spaces. Although this percentage may seem little, it indicates the potential exposure of workers to potential injury and death. The attitude showed positive level of workers exhibiting favorable attitude towards safety practices and compliance in confined spaces. In practice aspect showed that workers are adhering to safety protocols and practices in confined spaces. The study also showed that good practices do not always translate to good knowledge or attitudes. Some practices are because of norms that people grew up with at home without ever knowing why they were doing it.

6.2 RECOMMENDATIONS

To improve the attitude and practices of workers at Harare City council Water Department in confined spaces the management can:

- Develop targeted training programs to increase the knowledge level among workers aiming 95-100%
- Continuous monitoring mechanisms should be ongoing and evaluation of safety practices within confined spaces, there by promoting continuous learning and improvement
- Foster a culture of knowledge sharing and dissemination on best practices and attitudes in confined spaces environments.
- Incentives should be introduced to reward and recognize exemplary workers practising good safety practices there by fostering a sense of ownership and responsibilities among worker.

- Implement initiatives to have positive attitudes towards safety practices strengthening safety culture.
- Conduct comprehensive risk assessment and develop targeted mitigations strategies.
- Active participation in safety committees and initiatives empowering workers to contribute ongoing enhancement of safety practices

The above recommendations if implemented the organisation can strive to cultivate a safer and more compliant environment in confined spaces ultimately contributing to the well being and security of workers. Leading to zero harm, injury and zero fatality in confined spaces in HCCWD.

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APPENDICES

APPENDIX 1: APPROVAL LETTER

CITY OF HARARE, CH eceived from. nount in words. Vote Department Item CITY OF HARARE Bindura University of Science Education P. Bag 1020 Bindura 24 April 2024 RE: AUTHORITY TO UNDERTAKE RESEARCH: CHIKOSHA VIMBAI This letter serves as authority for Chikosha Vimbai to undertake a research survey on the topic: "A STUDY INTO THE KNOWLEDGE, ATTITUDE AND PRACTICES TOWARDS RISKS AMONG WORKERS IN CONFINED AREAS: CASE OF The City of Harare has no financial obligation and neither shall it render any further assistance in the conduct of the research. The researcher is however requested to avail a soft and hard copy of the research to the undersigned so that residents of Harare can benefit out of it. The research should not be used for any other purpose other than the study purpose This letter is issued upon payment of 5usd administration fee. Receipt number:365987 Yours faithfully **RTD MAJOR M. MARARA** ACTING HUMAN CAPITAL DIRECTOR

APPENDIX 2: RESEARCH QUESTIONNAIRE

RESEARCH QUESTIONNAIRE

My name is Vimbai Chikosha, a Bindura University of Science Education fourth year student undertaking a Bachelor of Science Honours Degree in Safety, Health and Environmental Management. I am doing **AN ASSESSMENT OF KNOWLEDGE ATTITUDES AND PRACTICES IN WORKERS WORKING IN CONFINED SPACES A CASE OF HARARE CITY COUNCIL WATER DEPARTMENT** as part of my research project. Your responses will be used to inform the researchers on how much the worker know about the confined spaces, identify their attitudes when entering confined spaces and if they are practicing as given in the safety laws. Your participation is entirely voluntary and you can withdraw anytime without penalty. Please answer all questions honestly. Thank you for your time and participation.

INSTRUCTIONS TO RESPONDENTS

- Tick all the appropriate boxes with Yes or No
- Do not write your name on any part of the paper.

Section 1: Demographic Information

- 1. Name.....
- 2. Department/Division:
- 3. Position/Job Title:
- 4. Years of experience in the Harare Water Department:

Section 2: Knowledge Assessment

Please answer "Yes" or "No" to indicate your level of knowledge regarding risks associated with confined areas within the Harare Water Department.

1. Do you have a clear understanding of what a confined area is? Yes No	
2. Can you identify common hazards associated with confined areas? Yes No	

3. Are you aware of the potential risks involved in working in confined spaces? Yes No

4. Do you know the legal and regulatory requirements related to confined space safety? Yes

5. Are you familiar with the proper safety procedures and protocols for working in confined spaces? Yes No

6. Do you know the personal protective equipment (PPE) required in confined areas? Yes

7. Are you familiar with the emergency response procedures in the event of an incident in a confined space? Yes No

8. Have you received any training specific to confined space safety during your time in the Harare Water Department? Yes No

9. Do you feel confident in your ability to identify and assess risks in confined spaces?

Yes No

10. Have you encountered any incidents or accidents related to confined areas in your work experience? If yes, please provide a brief description. Yes No

Section 3 Examining Attitudes towards Risks in Confined Areas and Identifying Barriers and Facilitators

1. Do you believe that risks associated with confined areas should be taken seriously? Yes

2. Do you feel confident in your ability to identify and assess risks in confined spaces? Yes

3. Do you believe that safety measures are adequately implemented in confined areas within the Harare Water Department? Yes No

4. Do you believe that safety procedures and protocols are necessary for working in confined spaces? Yes No

5. Are you willing to report any safety concerns or incidents related to confined areas? **Yes**

6. Do	you	believe	that	team	work	and	commu	nication	are	crucial	for	maintaining	safety	in
confin	ed ar	eas? Ye	s	No										

Evaluating Current Safety Practices in Confined Areas and Analysing Alignment between Knowledge, Attitudes, and Actual Practices

1. Are you familiar with the safety procedures and protocols for working in confined spaces? Yes No

2. Do you know the personal protective equipment (PPE) required in confined areas? Yes

3. Are you aware of the emergency response procedures in the event of an incident in a confined space? Yes No

4. Have you received training specific to confined space safety during your time in the Harare Water Department? Yes No

Attitudes Assessment

Please answer "Yes" or "No" to indicate your attitudes towards safety practices in confined areas.

5. Do you believe that safety measures in confined areas are important for your well-being? Yes No

6. Do you believe that following safety procedures and protocols in confined spaces is necessary? Yes No

7. Do you feel confident in your ability to implement safety practices in confined areas? Yes

Section 4: Actual Practices Assessment

Please answer "Yes" or "No" to indicate your actual practices related to safety in confined areas.

8. Do you conduct thorough risk assessments before entering a confined space? Yes No

9. Do you consistently use the appropriate personal protective equipment (PPE) when working in confined areas? Yes No

10. Do you follow safety procedures and protocols while working in confined spaces? Yes

11. Do you communicate hazards and risks to colleagues before entering a confined space? Yes No

12. Do you report safety concerns or incidents related to confined areas? Yes No

Section 5: Alignment Analysis

Please answer the following questions to analyse the alignment between knowledge, attitudes, and actual practices.

13. Are your actual practices in confined areas aligned with your knowledge of safety procedures and protocols? Yes No

14. Do your attitudes towards safety in confined areas influence your actual practices? **Yes**

15. Are there any barriers or challenges that prevent you from implementing safety practices effectively in confined spaces? Yes No

16. Are there any facilitators or factors that encourage you to prioritize safety practices in confined areas? **Yes No**

Identifying Factors Contributing to the Gap between Knowledge and Practice in Risk Management within Confined Areas

1. Do you have a clear understanding of the risks associated with confined areas? Yes No

2. Are you familiar with the legal and regulatory requirements related to risk management in confined spaces? Yes No

3. Do you know the necessary safety procedures and protocols for managing risks in confined areas? Yes No

Section 3: Practice Assessment

Please answer "Yes" or "No" to indicate your current practices related to risk management in confined areas.

5. Do you consistently conduct risk assessments before entering a confined space? Yes

6. Do you consistently implement appropriate control measures to mitigate risks in confined areas? Yes No

7. Do you consistently use the required personal protective equipment (PPE) when working in confined spaces? Yes No

8. Do you effectively communicate and share risk-related information with your colleagues before entering a confined space? Yes No

9. Do you regularly review and update risk management practices in confined areas? Yes

Section 6: Factors Contributing to the Gap

10. Are there any specific challenges or barriers that hinder the application of your knowledge in practice when managing risks in confined areas? Yes No

11. Are there any resource limitations (e.g., equipment, time, staffing) that affect your ability to implement risk management practices effectively in confined spaces? **Yes No**

12. Is there a lack of supervision or accountability regarding risk management practices in confined areas? Yes No

13. Are there any cultural or organizational factors that discourage or undermine the implementation of risk management practices in confined spaces? Yes No

14. Do you believe there is a need for additional training, support, or resources to bridge the gap between knowledge and practice in risk management within confined areas? Yes No

Section 6: Barriers and Facilitators

7. Lack of awareness about the specific risks associated with confined areas. Yes No

8. Insufficient training and knowledge about safety procedures in confined spaces. Yes

9. Inadequate availability or accessibility of personal protective equipment (PPE) for working in confined areas. Yes No

10. Ineffective communication between team members regarding hazards and risks in confined areas. Yes No

11. Time constraints that hinder following proper safety protocols in confined spaces. Yes

12. Lack of supervision or monitoring of safety practices in confined areas. Yes No

13. Supportive organizational culture that promotes safety in confined areas. Yes No

14. Recognition and rewards for employees who prioritize safety in confined spaces. Yes

15. Effective leadership that emphasizes the importance of safety in confined areas. Yes

16. Adequate resources and equipment to ensure safety in confined spaces. Yes No

APPENDIX 3: MANHOLE

Workers in confined spaces enter in manholes to reach sewerage pipes flowing underground so they should have knowledge, positive attitudes and good practices when entering these environments. This is one of the manholes in Waterfalls Harare.



APPENDIX 4: WATER PLASTIC TANK

The tank below was set for cleaning by Harare water workers. One of the workers would enter inside and clean it.



APPENDIX 4: WATER PRODUCTION SITE

Figure 2 below shows the water production site.

Figure 2

