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# Evaluating Knowlege Of Biohazard Spillage Among Health Care Professionals And Personnel

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***Abstract*:** This study evaluates the knowledge and practices related to biohazard spillage management among 100 healthcare professionals and personnel, including housekeepers, lab technicians, pharmacists, nurses, and dialysis technicians. Using a structured questionnaire via Google Forms, the research assessed awareness, response strategies, training effectiveness, and documentation practices. Findings revealed high awareness of biohazards (97%) and spillage management (97%), with 90% having received formal training. However, gaps were noted in documentation (47% did not record incidents), consistency in following safety protocols, and preparedness, as 11% responded to spills with panic. Common causes of spillage included improper handling (97%) and insufficient training (47%). While most adhered to standard protocols, the study highlights the need for enhanced training frequency, practical drills, and improved documentation to ensure effective and safe spill management in healthcare settings.

## I. INTRODUCTION

Health is the primary need and concern of populations worldwide, and healthcare settings are where health is restored.[1] In healthcare settings, such as primary, secondary, or tertiary care, various types of waste are generated during patient care, which have the potential to put humans at risk of infectious diseases.[2] Biomedical waste refers to by-products of healthcare, including sharps, disposable items, blood, body parts, chemicals, pharmaceuticals, medical devices, and radioactive materials.[3]According to a report by the World Health Organization (WHO), approximately 85% of hospital waste is non-infectious, while 10% is infectious, and the remaining 5% consists of hazardous materials, including chemical, pharmaceutical, or radioactive waste.[4] Spill are considered part of Biomedical Waste (BMW) management according to the Bio-Medical Waste (Management and Handling) Rules, 1998 of India.[5]Biological spills in hospital are a concern because they can pose health risks to healthcare professionals and personnel, potentially spread into the environment, and threaten the health of the community, animals, and plants.[6] Managing bio hazardous spills is crucial for infection control in healthcare settings, as improper handling can pose significant risks to both healthcare professionals and patients.[7] Despite advances in our understanding and control of these infections, blood and body fluid spillage remains a significant global public health issue.[8] The Occupational Safety and Health Administration (OSHA) advises that all healthcare professionals and personnel who handle blood and body fluids should receive training on managing bio hazardous spills. Spill response should be in SOPs, and staff must get regular training to handle spills.[9]

This study aims to evaluate the knowledge of healthcare professionals and personnel in managing biohazardous spills within healthcare settings.

## II. REVIEW OF LITERATURE

In a study conducted among healthcare staff at a paediatrics tertiary hospital in the Kashmir valley, just 37.5% of participants were aware of the availability of blood spill kits in the hospital.[10]

In a study conducted among healthcare providers in Tamil Nadu, only 18.1% used Personal Protective Equipment (PPE) appropriately. The main reasons for improper PPE use were its unavailability (78%) and a lack of awareness about its importance (11%).[11]

A study conducted at a teaching hospital in South India found that 66.24% of nurses were knowledgeable about the correct segregation and disposal of biomedical waste, and 73.88% were informed about hand

hygiene. However, only 52.2% of nurses followed hand hygiene practices before and after patient care, and just 39.4% used sodium hypochlorite as a disinfectant for managing blood and other body fluid spills. [12]

## III. OBJECTIVES

· To assess the knowledge regarding spill management among health care professionals and personnel.
· Assess healthcare professionals and personnel understanding of proper procedures for responding to and managing biohazard spills.
· To evaluate the effectiveness of current training programs and identify areas for improvement in biohazard management.

## IV. MATERIALS AND METHODS

1.**Source of data**: The questionnaire was designed to assess healthcare professionals and personnel knowledge on biohazard spillage. The questionnaire included questions on:
- Individual personal information: name, age, gender, qualification, designation
- Identification of biohazardous materials
- Immediate response procedures
- Containment and clean-up protocols
- Training in spillage management
- Reporting and documentation practices
- Question Types: The questionnaire featured multiple-choice questions

2. **Survey Tool**: The finalized questionnaire was created and administered using Google Forms, allowing for easy distribution and data collection

3. **Sampling:**
- Population: The survey targeted 100 healthcare professionals including lab technicians, pharmacists, dialysis technicians, nurses and personnel mainly housekeepers
- Sampling Method: convenient sampling method

4**. Informed Consent:**
- Consent Form: An informed consent form was included at the beginning of the Google Form, explaining the purpose of the survey.

5**. Data analysis**: Data was analysed using built-in Google Forms analytics

## V. RESULT

100 healthcare professionals and personnel participated in the current study. The study participants were predominantly females (88%), participants were aged between 22 to 55 years. Majority of participants were housekeepers (50%) followed by lab technicians (21%) and pharmacist (11%), nurses (10%) and dialysis technicians (8%).

**Table 1:** Demographic profile

| VARIABLE | CATEGORY | PERCENTAGE |
|---|---|---|
| GENDER | Male | 12% |
| | Female | 88% |
| AGE | 22-35 | 54% |
| | 36-55 | 46% |
| DESIGNATION | Housekeepers | 50% |
| | Lab technicians | 21% |
| | Pharmacists | 11% |
| | Nurses | 10% |
| | Dialysis technicians | 8% |

Out of 100 participants 97% of the respondents reported knowing what biohazards are. This indicates a high level of awareness of the risks posed by biohazardous materials, which is crucial for healthcare workers who frequently deal with such hazards. Similarly, 97% of the respondents confirmed their understanding of spillage, indicating that they were well-informed about what constitutes a spillage and the potential dangers it poses in healthcare settings. Furthermore, 90% of respondents had undergone

formal training on spillage management, signifying that hospitals and healthcare institutions are investing in educating their staff about how to handle such incidents.

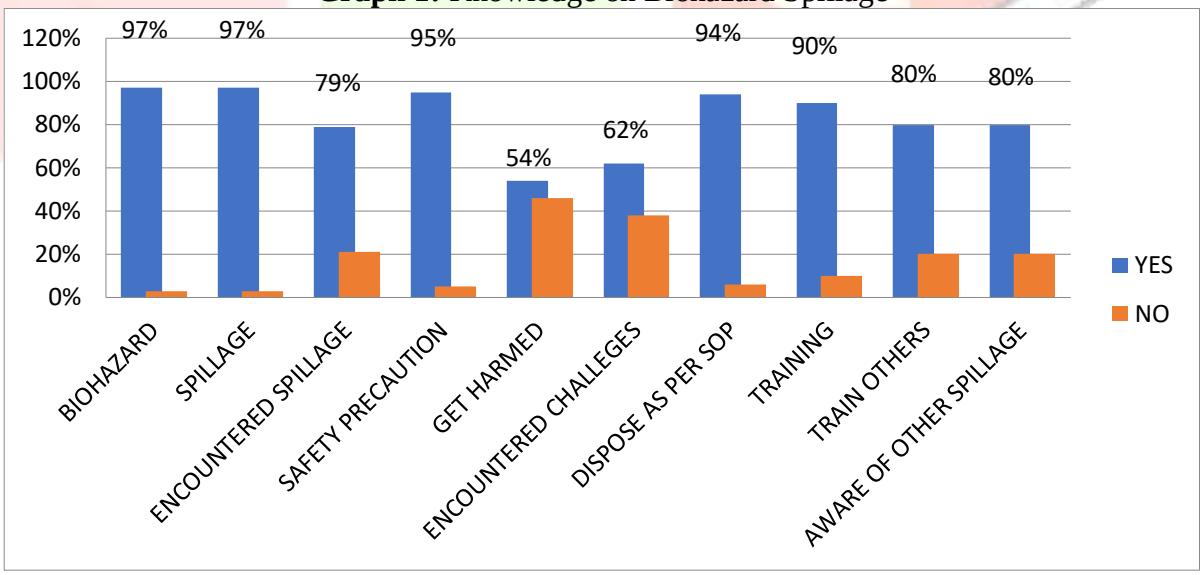
However, despite this comprehensive training, not all respondents had experienced a spillage incident at work. About 79% of the respondents reported that they had encountered a spillage, while the remaining 21% had not. 95% of respondents follow safety precautions when managing spillage, but 5% are not. Among the respondents who experienced spillage, 46% stated that nobody was harmed during the incident. The remaining 54% of the respondents mentioned that someone did get harmed, which could reflect instances where spillage management protocols may not have been followed correctly, or unforeseen circumstances made the situation more hazardous.

91% responded to the biohazard spillage by becoming alert, showing a heightened awareness of the situation. A smaller group 11% experienced panic as their initial reaction, which may reflect a lack of preparedness or anxiety in such scenarios. Only 8% remained calm during the spillage. Overall, the data reveals that most individuals quickly transitioned into an alert state, indicating a readiness to manage or respond to the spill effectively. 62% of respondents encountered challenges during biohazard spillage management, highlighting the need for improved protocols and support systems to address these issues.

The survey results reveal that during a spillage, 59% of respondents managed the situation on their own, while 42% called for help, and 19% informed the in-charge. When it came to documenting the incident, 47% did not document it, 36% took the initiative to record the event, and 17% reported that the in-charge handled the documentation. In terms of disposal of materials, an overwhelming 94% adhered to the Standard Operating Procedure (SOP), with only 6% failing to follow the correct disposal guidelines. This indicates that while most respondents handled spillage independently and followed proper disposal procedures, documentation practices need improvement.

Nearly half of the respondents (47%) reported receiving training on biohazard spillage management once a year, while 43% were trained twice annually. However, 10% stated they had never undergone such training. Encouragingly, 80% of respondents felt confident enough to train others in biohazard spillage management, and an equal percentage also demonstrated awareness of managing other types of spills. This highlights a strong foundation of knowledge in spill response, though there's room to improve training frequency for a small portion of the group.

**Graph 1:** Knowledge on Biohazard Spillage




When questioned about the type of spillage management training they received, 96% of the respondents reported receiving training specifically for managing body fluids spillage. 52% had received training for mercury spillage, while 24% mentioned receiving training in managing cytotoxic spills. This shows that there is a variety of training provided depending on the types of hazards present in their workplaces. It also highlights that body fluids spillage is the most common hazard for which healthcare professionals and personnel are trained, reflecting its frequency and the associated risks.

**Table 2:** Level of Knowledge on Biohazard Spillage Management

| VARIABLES | TOTAL PERCENTAGE |
|---|---|
| **FIRST REACTION FOR SPILLAGE** | |
| **Alert** | 91% |
| **Panic** | 11% |
| **Calm** | 8% |
| **FIRST RESPONSE FOR SPILLAGE** | |
| **Manage it alone** | 59% |
| **Call for help** | 42% |
| **Informed the incharge** | 19% |
| **DOCUMENT THE SPILLAGE INCIDENT** | |
| **Documented by own** | 36% |
| **Not documented** | 47% |
| **Incharge documented** | 17% |
| **TRAINING FOR SPILLAGE** | |
| **Once in a year** | 47% |
| **Twice in a year** | 43% |
| **Never got training** | 10% |
| **RECEIVED TRAINING ON** | |
| **Body fluids spillage** | 96% |
| **Mercury spillage** | 52% |
| **Cytotoxic spillage** | 24% |
| **CAUSES OF SPILLAGE** | |
| **Improper handling or transportation of chemicals** | 97% |
| **Insufficient handling or experience among personnel** | 47% |
| **Equipment failure or malfunction** | 23% |
| **Improper storage** | 35% |
| **Slippery floor** | 6% |

In terms of spillage causes, the survey respondents cited several common reasons. Around 97% attributed spillage incidents to improper handling or transportation of chemicals. This was followed by 47% and 35% of the respondents identifying insufficient handling or experience among personnel and improper storage, while 23% pointed to equipment failure and malfunction and 6% pointed to slippery floor as contributing to these incidents. These findings suggest that human error and equipment-related issues are the leading causes of biohazard spillages in healthcare environments, emphasizing the need for continued education, equipment checks, and adherence to safety protocols.

Another significant finding of the survey is that 100% of the respondents agreed that all hospital personnel should be trained on spillage management. This unanimous response underscores the critical role that comprehensive training plays in ensuring safety across healthcare environments. It also reflects the understanding that biohazard spills can occur in various forms and locations within a hospital, not just in laboratories or clinical settings. Therefore, ensuring that every employee, regardless of their role, is well-equipped to respond to such incidents is vital for minimizing risks to staff, patients, and visitors.

## VI. DISCUSSION

The findings of this study highlight a high level of awareness among healthcare professionals and personnel regarding biohazard spillages, with 97% of respondents demonstrating an understanding of biohazards and their associated risks. This indicates that healthcare institutions are prioritizing education on hazardous materials. Additionally, 90% of respondents had undergone formal training on spillage management, emphasizing the importance of structured learning in reducing risks. However, despite this training, 21% of participants had never encountered a spillage incident, suggesting that practical exposure to such events remains limited.

One key concern is that only 95% of those who encountered a spillage followed safety precautions, leaving 5% who did not, potentially increasing risks to themselves and others. Among those who experienced a spill, nearly half (46%) confirmed that no damage occurred, while 54% indicated harm, highlighting the

need for improved response strategies. Furthermore, while 91% of respondents reacted with heightened awareness (alert) during a spill, 11% panicked, and 8% remained calm. The presence of panic suggests a gap in confidence and preparedness, which may require additional hands-on training and emergency drills. Another critical finding relates to the response to spill incidents. While 59% of respondents managed spillages independently, 42% sought assistance, and only 19% informed an in-charge, raising concerns about accountability and documentation. Proper reporting is crucial for preventing future incidents, yet 47% of respondents failed to document spillages, indicating a need for stricter policies and improved compliance with documentation protocols. Training frequency also varied among respondents, with 47% receiving training once a year, 43% twice a year, and 10% never having received formal training. Encouragingly, 80% felt confident in training others, suggesting that reinforcement through peer learning could be beneficial. Additionally, 96% of respondents received training on body fluid spillage, 52% on mercury spillage, and 24% on cytotoxic spillage, demonstrating that training efforts are tailored to specific hazards. However, this also indicates that certain areas, such as cytotoxic spills, may require more attention. Regarding causes of spillages, improper handling or transportation of chemicals was identified as the leading factor (97%), followed by insufficient handling experience (47%), improper storage (35%), equipment failure (23%), and slippery floors (6%). These findings underscore the role of human error and equipment-related issues in spill incidents, stressing the need for ongoing education, proper storage protocols, and regular safety checks. A particularly significant takeaway is that 100% of respondents agreed that all hospital personnel should be trained in spillage management, reinforcing the necessity for universal training across all departments. This consensus highlights that spill incidents are not confined to laboratories or specific clinical areas but can occur anywhere in a healthcare setting. Ensuring that all employees, regardless of role, are adequately trained is crucial to minimizing risks to staff, patients, and visitors.

Overall, while healthcare professionals and personnel exhibit strong awareness and training in spillage management, areas such as documentation, response consistency, and panic management require further attention. Implementing stricter protocols, increasing hands-on training sessions, and reinforcing the importance of reporting can enhance overall spill management effectiveness, leading to a safer healthcare environment.

## VII. CONCLUSION

The Biohazard Spillage Management Survey highlights a strong foundation of knowledge and training among healthcare professionals and personnel regarding biohazard spillage. It emphasizes that while healthcare professionals and personnel are generally well-prepared, there are still areas for improvement that need attention. These areas include updating protocols, conducting regular drills, and addressing human error and equipment malfunctions, all of which are crucial for maintaining safety standards. The survey results suggest that knowledge alone is not sufficient; practical application through consistent training and preparedness is equally important. Regular drills can help healthcare professionals and personnel respond swiftly and effectively during real incidents, minimizing risks to patients, staff, and visitors. Additionally, updating protocols ensures that safety measures remain current with advancements in technology and best practices. Addressing human error through continuous education and training can significantly reduce the likelihood of accidents caused by oversight or miscommunication. Equipment malfunctions, another critical issue, highlight the importance of regular maintenance and staff familiarity with safety tools and procedures. Furthermore, the survey underscores that continued education and reinforcement of safety practices are essential for ensuring that all hospital professionals and personnel can effectively manage biohazard spillages. Ongoing training programs help healthcare professionals and personnel stay updated on new techniques and protocols, promoting a culture of safety within the hospital environment. While the current level of preparedness among healthcare professionals and personnel is commendable, the survey highlights those consistent improvements through education, protocol updates, regular drills, and error management are vital for ensuring a safe and effective response to biohazard spillages in healthcare settings.

## VIII. ACKNOWLEDGMENT

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