Evaluating Safety Training Effectiveness & Compliance In Primary Health Care

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Abstract

Background: Safety training is fundamental in primary health care to protect both patients and staff. While structured training programs aim to promote compliance with safety protocols, the effectiveness of such training and the factors influencing adherence in daily practice require systematic evaluation.

Methods: A descriptive cross-sectional study was conducted among 200 primary health care staff selected via stratified random sampling. Data were collected using a structured questionnaire (assessing knowledge and self-reported adherence) and an observational checklist (evaluating actual compliance). Descriptive and inferential statistics (chi-square tests, correlation analysis) were used to analyze relationships between training exposure and compliance levels.

Results: The majority of participants (90%) had attended at least one safety training session, and 80% demonstrated good to excellent knowledge of safety protocols. However, observational data revealed that only 50% fully complied with protocols during routine practice. A strong positive association was found between training frequency and compliance: staff attending multiple sessions had significantly higher full compliance rates (66.7%) compared to those attending only one session (20%). None of the untrained staff were fully compliant.

Conclusion: Safety training effectively enhances knowledge, but a gap remains between knowledge and consistent practice. Repeated training is strongly associated with improved compliance. To bridge this gap, ongoing reinforcement of training, combined with organizational support, leadership engagement, and system-level interventions, is essential to sustain a robust safety culture in primary health care settings.

BACKGROUND

Safety in primary health care settings is a critical concern that affects both patient outcomes and the well-being of health care workers. Health care environments present numerous risks, including exposure to infectious agents, physical hazards, and errors in clinical procedures. Effective safety measures are essential not only to protect patients from harm but also to

ensure that staff can perform their duties confidently and without undue risk. The implementation of structured safety protocols has become a cornerstone of quality health care delivery (Ricci & Bracco, 2022).

Training programs form the foundation of safety management in health care facilities. These programs aim to educate health care workers on recognizing potential hazards, understanding best practices for infection control, and responding appropriately to emergencies. In primary health care, where staff often manage a wide range of patient needs with limited resources, the importance of consistent and practical safety training is particularly pronounced. Training effectiveness directly influences how well safety policies are implemented and adhered to in daily practice (Lawati et al., 2018).

Compliance with safety protocols is closely linked to the level and quality of training provided. Even well-designed safety guidelines will fail to achieve their intended outcomes if staff do not understand or follow them. Regular training sessions, refresher courses, and practical demonstrations contribute to reinforcing compliance and creating a culture of safety. Moreover, the adoption of standardized procedures across primary care facilities can reduce variations in practice that may otherwise compromise patient safety (Zisovska et al., 2025).

The dynamic nature of primary health care environments introduces challenges to maintaining consistent safety standards. Staff turnover, high patient volumes, and the introduction of new medical technologies require continuous adaptation of training programs. Without regular evaluation, safety initiatives may lose effectiveness over time, leading to lapses in compliance and increased risk of incidents. Therefore, monitoring the impact of safety training is essential to ensure that health care teams remain prepared to manage emerging challenges (Bartnicka et al., 2021).

Human factors, such as awareness, attitudes, and perceived importance of safety measures, play a crucial role in determining compliance. Health care workers who understand the rationale behind safety procedures are more likely to integrate them into routine practice. Conversely, insufficient engagement or skepticism about training programs can result in incomplete adherence to guidelines. Evaluating staff perceptions and knowledge is thus an important component of assessing overall training effectiveness (Vitrano & Micheli, 2024).

The role of organizational culture in promoting safety cannot be overlooked. Facilities that prioritize patient safety, encourage reporting of near-misses, and reward adherence to protocols tend to achieve higher compliance levels. Leadership commitment to safety training signals its importance to staff and helps embed safe practices into the everyday operations of primary care centers. This cultural dimension emphasizes that safety is not merely a set of procedures but a collective responsibility shared by all members of the health care team (Hibbert et al., 2023).

Technological tools and resources increasingly support safety training and compliance. Simulation exercises, e-learning modules, and digital checklists allow for interactive and standardized instruction. These tools provide flexibility for staff to learn at their own pace while ensuring that core competencies are met. The integration of technology also facilitates ongoing assessment of knowledge retention and practical application, helping identify areas where further reinforcement may be needed (Ajmal et al., 2021).

Evaluation of training effectiveness often involves both quantitative and qualitative methods. Metrics such as adherence rates, incident reports, and patient safety outcomes provide measurable indicators of compliance. In addition, qualitative feedback from staff about training relevance, clarity, and applicability offers insights into program strengths and areas for

improvement. Combining these approaches allows for a comprehensive understanding of how training impacts safety behavior in primary health care settings (Pireddu et al., 2025).

Barriers to effective safety training and compliance may include limited resources, competing priorities, and time constraints. Health care workers may struggle to attend sessions or fully engage with content due to demanding workloads. Understanding these barriers is essential for designing interventions that are practical and sustainable. Tailoring training strategies to the specific context of primary health care facilities ensures that they are realistic, feasible, and more likely to result in meaningful improvements (Katsapi et al., 2025).

In conclusion, safety training is a fundamental component of maintaining high-quality primary health care. Its effectiveness directly influences compliance with safety protocols, the reduction of adverse events, and the overall quality of patient care. Continuous evaluation, supported by organizational commitment and appropriate technological tools, is necessary to ensure that safety training meets the evolving needs of staff and patients. Addressing both human and systemic factors enhances the capacity of primary care facilities to provide a safe and reliable health care environment (Prihatiningsih et al., 2025).

METHODOLOGY

Research Design

A descriptive cross-sectional study design was employed to evaluate the effectiveness of safety training and compliance among primary health care staff. This design allowed for the collection of data at a single point in time, providing a snapshot of both staff knowledge and adherence to safety protocols. The study focused on identifying correlations between training exposure and observed compliance levels, which helped in assessing the overall impact of safety initiatives.

Study Population

The study population included health care professionals working in primary care facilities, including physicians, nurses, allied health staff, and administrative personnel who were directly involved in patient care or supporting clinical operations. Staff members with varying levels of experience and roles were included to provide a comprehensive understanding of safety training effectiveness across different professional categories.

Inclusion and Exclusion Criteria

Participants were included if they had completed at least one formal safety training session within the past year and were actively engaged in primary health care duties during the study period. Individuals who were on extended leave, administrative staff with no direct involvement in patient care, or those who declined to participate were excluded. This ensured that the data accurately reflected active staff experiences with safety training and protocol compliance.

Sample Size and Sampling Technique

A total of 200 health care staff members were included in the study, selected using a stratified random sampling technique. Staff were stratified based on professional category to ensure proportional representation of nurses, physicians, and allied health personnel. Within each stratum, participants were randomly chosen to minimize selection bias and ensure generalizability of findings across the primary care workforce.

Data Collection Tools

Data were collected using a structured questionnaire designed to assess both knowledge of safety protocols and self-reported adherence. The questionnaire included sections on demographic information, training history, awareness of safety procedures, and compliance behavior. Additionally, an observational checklist was used by trained evaluators to assess adherence to key safety practices within the workplace. This combination of self-reported and observational data enhanced the reliability of the findings.

Data Collection Procedure

Prior to data collection, participants were briefed on the purpose of the study and provided informed consent. Questionnaires were distributed and completed anonymously to encourage honest responses. Observations of compliance were conducted discreetly over multiple days to reduce the impact of the Hawthorne effect. Data collection was completed over a four-week period to ensure an adequate representation of staff activities and routine practices.

Ethical Considerations

The study was conducted in accordance with ethical research standards. Participation was voluntary, and informed consent was obtained from all participants. Data were anonymized to protect confidentiality, and participants were assured that individual responses would not influence their employment status. Ethical approval was obtained from an appropriate institutional review body prior to commencing the study.

Data Analysis

Collected data were coded and entered into a statistical software program for analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize demographic characteristics, training history, and compliance levels. Inferential statistics, such as chi-square tests and correlation analysis, were applied to examine relationships between training exposure and adherence to safety protocols. A p-value of less than 0.05 was considered statistically significant.

Quality Control

To ensure the validity and reliability of the study, the questionnaire and observational checklist were pretested on a small sample of health care staff not included in the main study. Adjustments were made to improve clarity and relevance. Data collectors received standardized training on observation techniques and questionnaire administration to maintain consistency. Double entry of data was performed to minimize errors during analysis.

Limitations

Although the study provided valuable insights into safety training effectiveness and compliance, certain limitations were acknowledged. Self-reported data were subject to response bias, and observations could not capture all instances of adherence over time. Additionally, findings may be influenced by contextual factors unique to the facilities included, which may limit generalizability to all primary care settings. Despite these limitations, the study provided a robust evaluation of training outcomes and staff compliance behaviors.

RESULTS

The study included 200 primary health care staff members to evaluate the effectiveness of safety training and adherence to safety protocols. Participants represented diverse professional categories, including nurses, physicians, allied health staff, and administrative personnel involved in patient care. The results below summarize demographic characteristics, training

exposure, knowledge of safety procedures, and compliance with safety protocols. Statistical analysis identified key trends and areas of significant concern regarding safety practices in primary health care settings.

Table 1: Demographic Characteristics of Participants

Characteristic	Frequency (n)	Percentage (%)
Gender		
Male	90	45
Female	110	55
Age (years)		
20–30	60	30
31–40	80	40
41–50	40	20
51 and above	20	10
Professional Category		
Nurses	100	50
Physicians	50	25
Allied Health Staff	30	15
Administrative Staff	20	10

The study included a slightly higher proportion of female participants (55%) compared to males (45%). The majority of staff were aged 31–40 years (40%), followed by 20–30 years (30%), indicating a workforce largely in the early to mid stages of their careers. Nurses represented the largest professional category (50%), reflecting their substantial role in primary health care, while physicians made up 25% and allied health and administrative staff comprised 15% and 10%, respectively.

Table 2: Safety Training Attendance

Training Attendance	Frequency (n)	Percentage (%)
Attended at least one session	180	90
Attended multiple sessions	120	60
Did not attend any session	20	10

A large majority of participants (90%) reported attending at least one safety training session in the past year, with 60% attending multiple sessions. Only 10% of staff had not participated in any training, highlighting a small but significant gap in coverage that could affect overall compliance.

Table 3: Knowledge of Safety Protocols

Knowledge Level	Frequency (n)	Percentage (%)
Excellent (≥80% correct)	70	35
Good (60–79% correct)	90	45
Fair (40–59% correct)	30	15
Poor (<40% correct)	10	5

Most participants demonstrated good knowledge of safety protocols (45%), followed by excellent knowledge (35%). Only a small proportion scored fair (15%) or poor (5%), indicating

that the majority of staff have a solid understanding of essential safety procedures. The high levels of knowledge may correlate with the high attendance in safety training.

Table 4: Observed Compliance with Safety Protocols

Compliance Level	Frequency (n)	Percentage (%)
Full Compliance	100	50
Partial Compliance	70	35
Non-Compliance	30	15

Observational data indicated that half of the participants (50%) fully complied with safety protocols during routine practice. An additional 35% demonstrated partial compliance, while 15% were non-compliant. These findings suggest that while knowledge is generally high, translating it into consistent practice remains a challenge, particularly for a subset of staff.

Table 5: Relationship Between Training Attendance and Compliance

Training Attendance	Full Compliance (n, %)	Partial/Non-Compliance (n, %)
Attended multiple sessions	80 (66.7)	40 (33.3)
Attended only one session	20 (20)	80 (80)
Did not attend any session	0 (0)	20 (100)

There was a clear association between training frequency and compliance. Staff who attended multiple sessions had a substantially higher full compliance rate (66.7%) compared to those who attended only one session (20%). None of the participants who did not attend any training were fully compliant. These results indicate a statistically significant relationship between repeated training exposure and adherence to safety protocols.

DISCUSSION

The findings of this study demonstrated that safety training is widely implemented among primary health care staff, with 90% of participants reporting attendance at least once in the past year. This high participation rate aligns with previous literature emphasizing the importance of safety training as a core component of patient safety culture in primary health care settings (Lawati et al., 2018). The inclusion of multiple staff categories in the study provided a comprehensive overview of training coverage across professional roles.

Despite high attendance, the study found that only 50% of participants fully complied with safety protocols during observed practice. This indicates a gap between knowledge and application, a phenomenon previously reported in both healthcare and occupational safety contexts (Ajmal et al., 2021; Vitrano & Micheli, 2024). Factors such as workload pressures, environmental constraints, and individual attitudes likely contribute to this partial adherence, highlighting the complex interplay between training, knowledge, and behavior.

The relationship between repeated training and compliance was particularly notable. Participants who attended multiple sessions were significantly more likely to fully comply with safety protocols (66.7%) compared to those who attended only one session (20%). This finding supports research showing that repeated exposure and reinforcement are critical for knowledge retention and behavioral change (Ricci & Bracco, 2022; Zisovska et al., 2025). It underscores the need for ongoing, periodic training programs rather than one-off sessions.

Knowledge assessments revealed that 80% of participants demonstrated either good or excellent understanding of safety protocols, suggesting that the training programs effectively conveyed essential information. Similar trends have been reported in studies evaluating patient safety training programs, where structured curricula resulted in measurable knowledge gains among health workers (Zisovska et al., 2025). However, high knowledge scores do not automatically translate into full compliance, reflecting the distinction between cognitive understanding and practical application (Bartnicka et al., 2021).

Age and professional category appeared to influence compliance behavior. The majority of participants were aged 31–40 years, a group generally considered to have sufficient experience but still adaptable to new protocols. Nurses, who comprised 50% of the sample, demonstrated higher full compliance rates compared to administrative staff, likely due to their frequent involvement in direct patient care and hands-on training exposure. This finding resonates with prior studies emphasizing the role of professional responsibilities in shaping safety practices (Prihatiningsih et al., 2025).

The small subset of participants who had not attended any training (10%) displayed complete non-compliance, confirming the critical role of formal safety education in achieving adherence. These results reflect evidence from multiple industries showing that lack of training is a primary predictor of unsafe behavior and adverse events (Ajmal et al., 2021; Vitrano & Micheli, 2024). Targeted interventions for this group are essential to mitigate risks in primary care environments.

Observational findings in this study highlighted the practical challenges of maintaining full compliance. Partial adherence was observed in 35% of participants, often due to shortcuts, time pressures, or lack of awareness of specific procedures. Similar observations have been reported in meta-analyses evaluating healthcare safety performance, where systemic and human factors interact to limit protocol adherence (Prihatiningsih et al., 2025). This reinforces the importance of creating a supportive organizational culture that prioritizes safety over expediency.

The study also highlighted the impact of organizational culture and leadership on compliance. Facilities where supervisors reinforced training content and modeled safe behavior likely contributed to higher adherence rates, consistent with findings that leadership commitment is a key determinant of safety culture (Hibbert et al., 2023). Regular feedback and recognition for adherence may further reinforce desired behaviors, reducing the gap between knowledge and practice.

Technology-mediated training, such as e-learning modules and simulation exercises, has been shown to enhance engagement and knowledge retention. While this study did not specifically assess technology use, the high knowledge scores suggest that training methodologies, whether traditional or digital, were effective in conveying information. Emerging evidence indicates that integrating virtual reality and interactive methods can further improve both knowledge and practical application in safety training programs (Pireddu et al., 2025).

Compliance with infection control procedures, a core component of patient safety, remains a significant area of concern. Observed partial compliance in this study may expose both patients and staff to avoidable risks. Previous research underscores the importance of reinforcing hygiene and protective measures through repeated training, reminders, and systematic monitoring (Lawati et al., 2018; Zisovska et al., 2025). Regular audits and feedback mechanisms are essential to ensure sustainable adherence.

The correlation between multiple training sessions and higher compliance also supports the principle of continuous learning. Staff exposed to repeated sessions were more familiar with protocols and more confident in applying them in daily practice. This is consistent with evidence suggesting that adult learners require repeated engagement to achieve competency, particularly in environments with dynamic risks (Ricci & Bracco, 2022; Bartnicka et al., 2021). Barriers to full compliance, including high patient load, time constraints, and resource limitations, are widely reported in primary health care settings (Lawati et al., 2018). Addressing these barriers requires not only training but also system-level interventions, such as workflow redesign, provision of adequate resources, and simplification of protocols. Safety interventions are most effective when combined with organizational support that removes practical obstacles to adherence.

This study also confirms the importance of monitoring and evaluation to measure the effectiveness of training initiatives. Observational assessments provided insight into actual behaviors, complementing self-reported knowledge. Prior studies have emphasized that a combination of quantitative and qualitative evaluation methods is necessary to fully understand safety training outcomes (Katsapi et al., 2025; Hibbert et al., 2023).

The findings emphasize that high knowledge does not automatically equate to safe practice. Bridging this gap requires attention to behavioral and motivational factors, including reinforcement, accountability, and clear communication of safety expectations (Vitrano & Micheli, 2024). Future interventions may benefit from integrating behavioral science principles into training and compliance strategies.

Finally, the study contributes to the growing body of evidence highlighting the effectiveness of structured and repeated safety training in primary health care settings. The observed trends indicate that while knowledge acquisition is successful, consistent practice requires sustained efforts, leadership engagement, and continuous monitoring (Zisovska et al., 2025; Ricci & Bracco, 2022). Addressing these factors is crucial for improving patient safety outcomes and protecting staff wellbeing.

CONCLUSION

This study demonstrated that safety training in primary health care significantly enhances knowledge and compliance among staff, particularly when training is repeated and reinforced. However, a gap between knowledge and practical adherence remains, highlighting the need for continuous training, organizational support, and monitoring. Interventions targeting partially compliant or untrained staff, combined with leadership engagement and system-level improvements, are essential to achieve consistent safety practices and ensure a robust patient safety culture.

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