ISSN 2616-5791 Vol. 6, Issue 5: 7-12, DOI: 10.25236/AJMHS.2025.060502

Application Practice of MDT Model in Medical Adverse Events Management

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Abstract: *This study sought to explore the practical effects of the multidisciplinary team (MDT) approach in reducing adverse events in hospitals. To achieve this, an MDT project team was formed alongside corresponding management and operational mechanisms, and regular MDT meetings were conducted to identify major issues, determine direct and root causes, and implement improvement actions for adverse events. By comparing inpatients admitted from January to December 2022, prior to MDT implementation, with those admitted from January to December 2023, after its implementation, significant changes were observed. The total number of reported adverse events in 2023 increased by 40.32% compared to 2022, the annual average timely reporting rate climbed from 79.63% to 90.46%, and the timely handling rate of adverse events by various departments rose from 81.24% to 94.88%. Concurrently, the hospital-department two-level working system and workflows were refined and optimized. Overall, the MDT model, through collaborative efforts of multiple functional and clinical departments, enhanced the hospital's management of medical adverse events, boosted staff reporting awareness, improved interdepartmental cooperation efficiency, and ensured medical quality and safety by continuously enhancing work systems and processes.*

Keywords: *MDT Model; Adverse Events; Safety Management*

1. Introduction

Medical adverse events are any factors and events in clinical diagnosis and treatment activities and in the process of hospital operation that may affect the diagnosis and treatment results of patients, increase the pain and burden of patients, prolong the hospitalization time and may lead to medical disputes or accidents, as well as affecting the normal operation of medical work and the personal safety of medical personnel [1]. According to the standards of the China Hospital Association, adverse events are divided into 11 categories: medical management, nursing management, drug management, medical technology management, blood transfusion management, device management, nosocomial infection management, occupational protection management, information management, logistics management, and security management [2]. Medical adverse event management is an important method for medical institutions to strengthen self-management, identify the risks and hidden dangers of medical services, prevent the occurrence of negative events, and protect medical quality and safety. In order to strengthen the management of medical quality and safety and continuously improve the level of medical quality and safety, the General Office of the National Health and Health Commission has included "improving the reporting rate of medical quality and safety adverse events" into the "National Healthcare Quality and Safety Improvement Goal" for four consecutive years since 2021 [3,4]. This shows the importance of strengthening the management of adverse events in providing patients with safer and better quality healthcare services. The application of Multidisciplinary Team (MDT) model in hospital adverse events management is an important strategy to ensure patient safety and improve the quality of healthcare services [5], and the application effect is obvious [6]. This model emphasizes communication, cooperation, and coordination among healthcare professionals from different professional backgrounds in order to jointly respond to a variety of adverse events that may occur during the healthcare process [7]. Our hospital applied this model to the management of adverse events in 2023.

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2. Information and Methods

2.1 Clinical data

The data of adverse events actively reported in our hospital from 2022 to 2023 were taken as the research object. 107,809 patients were discharged in 2022, and 1188 adverse events were actively reported; 109,568 patients were discharged in 2023, and 1767 adverse events were actively reported. The data of the two groups were comparable in terms of reporting categories and processing departments, and the differences were not statistically significant ($P > 0.05$). Inclusion criteria: reporting standardization and the relevant department audit passed; exclusion criteria: for various reasons the audit did not pass.

2.2 Methods

2.2.1 Establishment of MDT mode management mechanism

(1) the establishment of adverse events MDT project team The lead department is the hospital quality and safety management committee, set up an office in the quality control office, responsible for the day-to-day management of the work, MDT project team leader in charge of the dean, members of the Medical Department, Nursing Department, Sensory Control Division, Department of Pharmacy, Outpatient Clinic,Information Technology, Medical Engineering Center, Patient Comprehensive Service Center, Logistic Service Center, etc. Functional department heads, in case of special events to invite the relevant hospital leaders and relevant department heads to temporarily join the MDT organization. (2) Determine the responsibilities of the MDT project team Responsible for the management and continuous quality improvement of medical adverse events (including investigation, verification, analysis, feedback, learning, implementation of corrective actions, and evaluation of effects, etc.) as well as the management and monitoring of the hospital's adverse event reporting system; identify, analyze, and coordinate the adverse events involving the management of two or more functional departments; and supervise and oversee the other functional departments to find out the causes of the events under their management, Root cause analysis, development of corrective measures and implementation. (3) Determine the principles of reporting and handling of adverse events: voluntary, factual, and report when found; mandatory reporting of Level I and II events; and reflecting the principles of voluntariness, confidentiality, non-punishability and openness for Level III and IV events. The relevant departments keep confidential the information of the reporter as well as other people and departments involved in the report; the medical safety information disclosed and publicized within the hospital is used for the continuous improvement of the medical quality of the hospital and the departments, and the disclosure is limited to the information of the instance itself and does not involve the personal information of the reporter and the person being reported, and the content of the report does not serve as a basis for the penalty of violation of law for the reporter or the people and departments involved. (4) Formulate the MDT work plan, including the time and content of the MDT, evaluation criteria for improvement cases, and report templates for each department. (5) Develop the MDT work system to clarify the moderator, participants, the form of participation and requirements, the formal meeting process and management regulations. (6) Develop the MDT meeting process Firstly, report on the improvement of legacy problems,the data of adverse events related indicators in the month, and understand the overall situation of adverse events in the hospital; then discuss the adverse events proposed by each department through the brainstorming method, and find out the root causes of the events and the improvement measures; then each management department reports on the rectification of the problems in their departments, the problems in this month, and the next step of the work plan. Finally, the department president summarizes the meeting discussions, aligns them with each department’s responsibilities, and deploys tasks using the 5W1H principle to ensure timely problem resolution.

2.2.2 Ensure the effective operation of the MDT model

(1) Organize and hold MDT meetings according to the plan, convene at any time in the event of special events, and invite the relevant hospital leaders and relevant department heads to join the MDT organization temporarily. Each MDT meeting lasts about 1.5 hours. (2) Adequate preparation before the meeting to ensure the effectiveness of the meeting One week before the MDT meeting, we will collect and determine the events proposed by each department for discussion, and notify the participants, meeting place and time three days in advance. (3) Publicize the implementation of the MDT work system and the completion of monitoring indicators every month. (4) Supervise and guide clinical departments to implement countermeasures Members of the MDT project team supervise relevant departments to

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implement countermeasures in accordance with the countermeasure implementation schedule and confirm the implementation effect: if the target is not met, find out the reasons, reformulate the countermeasures or measures, reimplement them, and confirm the effect; if there are obvious unacceptable side-effects, modify the countermeasures or measures, reimplement them, and verify the effect. (5) Tracking the effect of countermeasure implementation Implemented according to the principles of piecemeal handling, matter tracking, and real-time feedback. After the implementation of all countermeasures is completed, the subordinate office or the relevant competent department verifies the overall implementation effect and tracks the stability of the implementation effect, and adopts the RCA procedure, if necessary, to further screen the risk factors that may lead to defects or to analyze the failure modes in the relevant operation processes after improvement, and to improve the measures to break the chain that may lead to future events. (6) Evaluation of results Evaluation of the implementation of the improvement results of the real, substantial, specific, statistical analysis methods appropriate, standardized, complete and logical steps.

2.2.3 Cultivate a safety culture of proactively reporting adverse events in the whole hospital

(1) Optimize the process of reporting adverse events, adverse events are first reported to the Quality Control Office, and then distributed to each department by the Quality Control Office, which reduces the resistance of the functional departments in the reporting process, and avoids the situation of each department doing its own thing. (2) Improve the efficiency of reporting with the help of information technology. When reporting, the structured form is used to fill in the form in an optional way without the signature of the head of the department, and the reporter does not need to classify and analyze the event, which makes the reporting simple and easy to be carried out. (3) Implementing a non-punitive reporting mechanism to reward individuals who take the initiative to report and outstanding improvement cases; timely publicizing the improvement results at the hospital and departmental levels, and linking the award-winning cases to departmental assessment and individual promotion.

2.2.4 Strengthening training and education

Share medical safety information and its results, research results and countermeasures, and effective management methods within an appropriate scope for peer reference. Also strengthen the training of medical staff on management tools and methods such as cause and effect diagrams, 5why method, correlation diagrams, IDT, SAC, time-series tables, bar charts, line graphs, histograms, control charts, and PDPC method.

2.2.5 Promote MDT in the whole hospital

Each functional department or division carries out MDT in its own area with reference to the hospital's MDT model, and makes continuous improvement for adverse events.

2.3 Observation Indicators

The data of reported adverse events in 2022 and 2023 were compiled, and then the number of cases of actively reported adverse events per 100 discharged patients, the timely rate of actively reported adverse events, the composition of personnel who actively reported adverse events, the timely rate of handling adverse events by the functional departments, and the related improvement outcomes were compared between 2022 and 2023.

2.4 Statistical methods

IBM SPSS 26.0 statistical analysis software was used to analyze the data. Measurement information was expressed as mean ± standard deviation , and the difference in distribution between groups was compared using the χ^2 test, with $P<0.05$ being considered a statistically significant difference.

3. Results

3.1 Comparison of the number of actively reported adverse events per 100 discharged patients

The information on adverse event reporting in 2023 was summarized and compared with the data in 2022, and the results showed that the number of cases of actively reported adverse events per 100 discharged patients increased in 2023 compared with 2022 after the implementation of the MDT model of management ($P < 0.05$). See Table 1 for details.

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Table 1 Comparison of the number of actively reported adverse events per 100 discharged patients in 2022 and 2023

Year	Number of reported cases per 100 discharged patients($\bar{x}\pm s$)	t	P
2022	1.14±0.033	78.39	<0.001
2023	1.58±0.037		

Note: Number of actively reported adverse events per 100 discharged patients: number of actively reported adverse events in a certain period/total number of discharged patients in the same period × 100.

3.2 Comparison of the timeliness of proactive reporting of adverse events

After the implementation of MDT model management, the timeliness of active reporting of adverse events increased from 81.73% in 2022 to 95.47% in 2023, and the timeliness of reported adverse events improved compared with 2022 ($P < 0.05$), as shown in Table 2.

Table 2 Comparison of Timely Reporting Rate of Adverse Event in 2022 vs. 2023

Timely reporting of adverse events	2022	2023	χ^2	P
Yes	971	1687	148.313	<0.001
No	217	80		

Note: Timely rate of proactive reporting of adverse events: the number of adverse events reported proactively within the required time (Grade I and II events reported within 6 hours; Grade III and IV events reported within 3 working days) / the total number of proactive reports.

3.3 Composition of personnel actively reporting adverse events

In addition to physicians and nurses, there was a significant increase in the number of personnel actively reporting adverse events in 2023 ($P < 0.05$) in the technician and other categories, and the expansion of the range of personnel suggests that the participation of the entire hospital staff has increased. See Table 3 for details.

Table 3 Composition of Active Adverse Event Reporters in 2022 vs. 2023

Profession	2022		2023		χ^2	P
	Number of reported cases	Component ratio %	Number of reported cases	Component ratio %		
Doctor	600	50.51	821	46.46	103.467	<0.001
Nurse	547	46.04	706	39.95		
Technician	35	2.95	86	4.87		
Other	6	0.51	154	8.72		
Total	1188	100.00	1767	100.00		

3.4 Comparison of timeliness of handling adverse events in functional departments

The timeliness of handling adverse events in functional departments increased from 83.50% in 2022 to 89.08% in 2023, and the timeliness of handling adverse events improved compared to 2022 (P <0.05) See Table 4 for details.

Table 4 Comparison of Timeliness of Adverse Event Management in 2022 vs. 2023

Timely reporting of adverse events	2022	2023	χ^2	P
Yes	992	1574	19.321	<0.001
No	196	193		

Note: Timely rate of handling by functional departments: number of adverse events handled by each department within the specified time (handling advice given within 3 working days after receiving adverse events)/total number of reports initiated.

ISSN 2616-5791 Vol. 6, Issue 5: 7-12, DOI: 10.25236/AJMHS.2025.060502

4. Discussion

4.1 MDT model significantly improves the awareness and sensitivity of adverse event reporting

MDT refers to bringing together experts from different medical fields to provide comprehensive and integrated diagnosis and treatment recommendations for patients through in-depth discussion and close cooperation [8]. In this study, compared with the control group, the rate of reported adverse events in patients in the MDT group increased significantly, and this difference was statistically significant (P<0.05). This result clearly indicates that the MDT model effectively raised the awareness of reporting adverse events among the entire hospital staff and significantly enhanced their sensitivity to adverse events. This finding coincides with that of Chen [9]. According to Chen, clinical nurses will be more active in reporting adverse events in the nursing adverse event management model under multidisciplinary collaborative intervention. When adverse events occur, they are able to take prompt measures to effectively avoid risks, thus improving the quality of care and ensuring patient safety. The results of this study further validate this viewpoint and emphasize the important role of the MDT model in promoting adverse event reporting, improving risk avoidance, and ensuring patient safety.

4.2 MDT model improves the timely reporting of adverse events by integrating medical resources and enhances organizational risk management capability

The results of the study showed that there was a significant increase in the timely reporting rate in the MDT group compared with the control group.The MDT model improves the timely reporting rate of adverse events by integrating medical resources and realizing complementary strengths, indicating that the organization's or institution's ability in monitoring, identifying, and reporting adverse events has been enhanced. Timely reporting of adverse events is essential for timely identification of potential risks, taking corrective actions, and preventing recurrence of similar events. Employees and related personnel have gained a deeper understanding of the importance of adverse events and their reporting, and have increased their awareness of proactive reporting. Timely detection and handling of adverse events effectively reduces potential safety risks. It reflects the organization's efforts and effectiveness in risk management. However, in order to maintain this trend and further enhance the effectiveness, the organization needs to continuously focus on and improve the related processes and techniques.

4.3 When the MDT model manages hospital adverse events, the scope of people reporting adverse events is expanded and the participation of the whole hospital is increased

The reason for this is that the MDT model breaks the boundaries between hospital departments, avoids the conflict of interdepartmental functions, and effectively solves systemic problems that cannot be handled by a single department.The MDT model requires the formation of a team containing multidisciplinary experts from different departments and divisions with different professional backgrounds and knowledge. As a result, when adverse events are reported, more people are included in the reporting system, and the scope of the reporting staff is naturally expanded. This promotes communication and exchange between employees within the hospital. In this atmosphere, the staff's awareness of and attention to adverse event reporting was increased, and more people were willing to participate in the reporting of adverse events.The MDT model promotes the sharing and learning of private information and professional knowledge. In the process of adverse event reporting, staff from different departments and divisions can learn from each other and their experiences to improve their professionalism and response ability. This information sharing and learning mechanism also improves staff participation and motivation in adverse event reporting.

4.4 Functional departments' timely rate of handling adverse events significantly improved

The results of the study show that the response rate of functional departments in dealing with adverse events was significantly accelerated in FY2023.The application of MDT model in the management of adverse events has significant advantages and effects, especially the participation of hospital leaders in the MDT, the importance of each department to the adverse events was significantly increased, and delayed processing and shirking phenomenon was significantly reduced, it not only improves the rate of reporting and resolution of the adverse events and efficiency, but also protects the medical It not only improves the reporting rate and resolution efficiency of adverse events, but also guarantees medical quality and safety, and promotes communication and close cooperation among various disciplines.The MDT model plays a crucial role in managing adverse events. It can effectively improve the hospital's

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management of adverse events and ensure medical quality and patient safety.

4.5 The hospital management system is continuously sound and the operation process is constantly refined

MDT mode plays an important role in improving and optimizing the work system and workflow at the hospital and department levels. By clarifying responsibilities and authorities, establishing a multidisciplinary collaboration mechanism, improving the performance appraisal system, optimizing the workflow and strengthening training and education, the MDT model can further improve the management efficiency and service quality of hospitals, and promote the sustainable development and innovation of hospitals.The MDT model can provide more comprehensive, coordinated and personalized healthcare services by integrating the wisdom and experience of healthcare personnel from different professional backgrounds when managing adverse events in hospitals, and facilitate the provision of more comprehensive, coordinated and personalized healthcare services. and personalized healthcare services, which is conducive to the improvement of work efficiency, better hospital systems, more optimized processes, and reduced medical safety risks.

5. Conclusion

This study combines the real needs of clinical hospital management with its innovative application in hospital management, effectively reducing the occurrence of adverse events in the hospital. However, there are still some limitations in this study, due to the MDT management of medical adverse events in our hospital is still short, to a certain extent, the members of the MDT team are not yet fully familiar with the system and work mode of the team, the communication and cooperation among team members did not reach the best state, and the management of a variety of adverse events is different, and different service processes, which makes our improvement effect may not be optimal, which is to be further verified in the MDT This needs to be further verified in the continued practice of the MDT program team.

Acknowledgement

Fund Project: Affiliated Hospital of Hebei University Youth Research Fund Project (No.2021Q046)

References

[1] Rafter N,Hickey A,Condell S,et al. Adverse events in healthcare: learning from mistakes[J]. QJM,2015, 108(4):273-277.
[2] WANG X, XIA M, GAO X J. Analysis of adverse events and countermeasures in a tertiary specialized hospital [J]. Jiangsu Health Care Management, 2024, 35(07): 961-964.
[3] YIN C, LI X Y, WANG J W. Enhancing safety awareness to reduce patient harm--Interpretation of improving medical quality and safety adverse event reporting rate[J]. China Health, 2023, 05:34-35.
[4] Letter of Medical Affairs of the State Health Office, Circular of the General Office of the National Health Commission on the Issuance of National Healthcare Quality and Safety Improvement Targets for 2024 [2024-2-1].
[5] Liang H F, Qiu Q J, Zhou S B. Impact of multidisciplinary collaborative management on the incidence of adverse medical events[J]. Journal of Chinese Medicine Management, 2021, 29(08):237-238.
[6] Qin N,Zhang P L. Application of multidisciplinary collaborative care model in the care of perioperative type 2 diabetes mellitus patients[J]. Nursing Research,2020,34(04):711-714.
[7] Staudt M D. The Multidisciplinary Team in Pain Management[J]. Neurosurg Clin N Am,2022,33(3): 241-249.
[8] Song P,Wu Q,Huang Y. Multidisciplinary team and team oncology medicine research and development in China[J]. Biosci Trends,2010,4(4):151-60.
[9] Chen H W, Gao M X. Clinical analysis based on multidisciplinary cooperation to explore nursing adverse events[J]. Chinese Drugs and Clinics, 2019, 19(09): 1572-1574.