

# Practical Exploration of the Stratified Teaching Model in Multidisciplinary Team (MDT) Teaching for Gastric Cancer

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**Abstract:** *Objective:* To explore the application effect of the stratified teaching model in multidisciplinary team (MDT) teaching for gastric cancer, providing practical evidence for improving the quality of medical talent training in gastric cancer MDT diagnosis and treatment capabilities. *Methods:* Sixty learners who participated in gastric cancer MDT teaching at our hospital from July 2024 to July 2025 were selected as the research subjects and randomly divided into an observation group ( $n = 30$ ) and a control group ( $n = 30$ ) using a random number table method. The control group adopted the traditional “one-size-fits-all” teaching model, while the observation group employed a stratified teaching model. Students in the observation group were divided into basic, intermediate, and advanced levels based on their foundational knowledge and learning abilities, with differentiated teaching objectives, content, and evaluation systems implemented accordingly. The theoretical assessment scores, clinical skill operation scores, MDT case discussion ability ratings, and teaching satisfaction of students in both groups were compared after instruction. *Results:* After the teaching period, students in the observation group scored significantly higher than those in the control group in theoretical assessments, clinical skill operations, and MDT case discussion ability ( $P < 0.001$ ). Teaching satisfaction was also significantly higher in the observation group compared to the control group ( $P < 0.05$ ). Within the observation group, advanced-level students scored significantly higher than intermediate- and basic-level students in theoretical assessments, clinical skill operations, and MDT case discussion ability, while intermediate-level students outperformed basic-level students in all areas (all  $P < 0.001$ ). *Conclusion:* The stratified teaching model effectively enhances the quality of MDT teaching for gastric cancer, improving students' theoretical knowledge, clinical skills, and MDT case discussion abilities, as well as increasing teaching satisfaction. It is worthy of promotion and application in medical education.

**Keywords:** Stratified teaching; Gastric cancer; Multidisciplinary team; MDT teaching; Clinical teaching

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## 1. Introduction

Gastric cancer is one of the most common malignant tumors worldwide, with high morbidity and mortality

rates, posing a serious threat to human health<sup>[1]</sup>. With the transformation of medical models and the deepening of the concept of precision medicine, the multidisciplinary team (MDT) approach has become the core model for the diagnosis and treatment of gastric cancer. This model integrates resources from multiple disciplines, including surgery, gastroenterology, radiology, pathology, and oncology, to develop individualized diagnosis and treatment plans for patients, significantly enhancing the standardization and effectiveness of gastric cancer diagnosis and treatment<sup>[2]</sup>. However, gastric cancer MDT involves the cross-integration of knowledge from multiple disciplines, placing higher demands on the comprehensive qualities and professional capabilities of medical personnel, which also poses significant challenges to medical education. Traditional gastric cancer MDT teaching adopts a one-size-fits-all approach, neglecting individual differences among learners in terms of foundational knowledge, learning ability, attitude, and career planning. This teaching model often results in learners with weaker foundations struggling to keep up with the teaching pace and failing to grasp core knowledge and skills effectively, while those with stronger foundations may find the content too simple, leading to reduced learning motivation and unfulfilled potential, ultimately affecting overall teaching effectiveness. The stratified teaching model takes individual differences among students as its starting point, providing personalized learning support to learners at different levels through scientific stratification, differentiated instruction, and dynamic evaluation, thereby maximizing the satisfaction of diverse learning needs. This approach has achieved positive results in various medical education fields<sup>[3,4]</sup>. This study aims to apply the stratified teaching model to gastric cancer MDT teaching by constructing a scientific stratification system and designing differentiated teaching plans. It explores the impact of this model on learners' learning outcomes and teaching satisfaction, providing practical references for optimizing gastric cancer MDT teaching models and enhancing the quality of medical talent cultivation.

## **2. Materials and methods**

### **2.1. Study subjects**

A total of 60 students who participated in the gastric cancer MDT teaching program at our hospital from July 2024 to July 2025 were selected as the study subjects. Using a random number table method, the students were divided into an observation group ( $n = 30$ ) and a control group ( $n = 30$ ). In the observation group, there were 16 males and 14 females; the average age was  $26.51 \pm 3.12$  years; in terms of educational background, there were 13 undergraduates, 14 master's degree holders, and 3 doctoral degree holders; regarding professional backgrounds, there were 9 from surgery, 8 from gastroenterology, 4 from radiology, 3 from pathology, and 6 from oncology. In the control group, there were 15 males and 15 females; the average age was  $27.12 \pm 3.36$  years; in terms of educational background, there were 12 undergraduates, 14 master's degree holders, and 4 doctoral degree holders; regarding professional backgrounds, there were 9 from surgery, 7 from gastroenterology, 4 from radiology, 4 from pathology, and 6 from oncology. There were no statistically significant differences in general information, such as gender, age, educational background, and professional background, between the two groups of students ( $P > 0.05$ ), indicating comparability.

### **2.2. Teaching methods**

Both groups of students were taught by the same team of gastric cancer MDT experts. The teaching duration was 8 weeks, with 6 class hours per week, totaling 48 class hours.

The control group adopted the traditional teaching model. The teaching content centered on the gastric cancer diagnosis and treatment guidelines, with instructors delivering concentrated lectures to explain theoretical

knowledge such as pathological classification, clinical staging, and diagnosis and treatment principles of gastric cancer. Once a week, an MDT case discussion was organized, led by the instructors, with standardized training physicians passively participating and recording relevant case information. The teaching period lasted for three months.

The observation group adopted a stratified teaching model, with the implementation process as follows: (1) Stratified assessment: Prior to teaching, standardized training physicians were stratified into basic, intermediate, and advanced levels (10 cases each) based on their educational background and years of work experience, through a 100-point theoretical test and clinical skill assessment. Stratification criteria: Basic level (theory score < 60 or work experience < 6 months), intermediate level ( $60 \leq$  theory score  $\leq 80$  or 6 months  $\leq$  work experience  $\leq 1.5$  years), advanced level (theory score > 80 or work experience > 1.5 years). (2) Stratified objectives: The basic level was expected to master the basic pathology, symptoms, and routine examinations of gastric cancer, and be able to participate in MDT and record key information; the intermediate level was expected to proficiently grasp the MDT diagnosis and treatment process for gastric cancer and independently analyze the key points of simple cases; the advanced level was expected to possess the ability to formulate MDT plans for complex cases and provide constructive opinions on difficult cases. (3) Stratified teaching: The basic level focused on theoretical instruction and basic skill training, with one-on-one tutoring, two theoretical classes and one skill training session per week, and participation in MDT to record core information; the intermediate level concentrated on case analysis and skill enhancement, with group discussions of five people plus instructor feedback, one theoretical class and two skill training sessions per week, and presenting cases and offering preliminary suggestions during MDT; the advanced level emphasized the discussion of difficult cases and scientific research innovation, with leading the MDT analysis of difficult cases once a week and formulating individualized plans in conjunction with the guidelines. (4) Hierarchical assessment: Establish a differentiated system focusing separately on basic theoretical skills, case analysis abilities, and plan formulation capabilities, with a teaching period of 3 months.

### 2.3. Evaluation indicators

- (1) Learning outcomes: After the completion of the teaching program, both groups of students will undergo unified theoretical assessments, clinical skills operation assessments, and MDT case discussion ability evaluations. The theoretical assessment will be conducted through a closed-book examination with a full score of 100 points, primarily examining basic theories of gastric cancer, MDT diagnosis and treatment processes, and strategies. The clinical skills operation assessment, also with a full score of 100 points, will mainly evaluate the proficiency and accuracy of clinical skills related to gastric cancer (such as endoscopic examination coordination, interpretation of imaging data, and analysis of pathology reports). The MDT case discussion ability evaluation, with a full score of 100 points, will be conducted by three gastric cancer MDT experts who will provide comprehensive scores based on the students' preparation of case materials, logical analysis, formulation of diagnosis and treatment plans, and multidisciplinary collaborative thinking during the case discussions. The average score will be taken as the final score.
- (2) Teaching satisfaction: A self-designed teaching satisfaction questionnaire will be used to survey both groups of students. The questionnaire will include six dimensions, such as teaching content, teaching methods, teaching effectiveness, and faculty proficiency, with a total of 20 items. Each item will be scored using a Likert 5-point scale (1 point = very dissatisfied, 5 points = very satisfied). A total

score of  $\geq 85$  points indicates very satisfied, 60–84 points indicates satisfied, and  $<60$  points indicates dissatisfied. Teaching satisfaction = (number of very satisfied cases + number of satisfied cases) / total number of cases  $\times 100\%$ .

## 2.4. Statistical methods

Data analysis was performed using SPSS 26.0 statistical software. Measurement data are presented as mean  $\pm$  standard deviation (SD), with comparisons between groups conducted using independent sample *t*-tests and *F*-tests. Count data are expressed as [*n* (%)], with comparisons between groups made using the  $\chi^2$  test. A *P*-value of less than 0.05 was considered statistically significant.

## 3. Results

### 3.1. Comparison of learning outcomes between two groups of students

After the teaching period, the theoretical examination scores, clinical skill operation scores, and MDT case discussion ability ratings of the students in the observation group were significantly higher than those in the control group ( $P < 0.001$ ). See **Table 1**.

**Table 1.** Comparison of learning outcomes between two groups of students

Group	Theoretical assessment score (points, mean $\pm$ SD)	Clinical skill operation score (points, mean $\pm$ SD)	MDT case discussion ability score (points, mean $\pm$ SD)
Observation group ( <i>n</i> = 30)	89.65 $\pm$ 4.23	90.32 $\pm$ 3.87	88.76 $\pm$ 4.15
Control group ( <i>n</i> = 30)	82.14 $\pm$ 5.67	81.56 $\pm$ 5.24	80.23 $\pm$ 5.89
<i>t</i> -value	5.815	7.366	6.490
<i>P</i> -value	<0.001	<0.001	<0.001

### 3.2. Comparison of teaching satisfaction between two groups of students

Teaching satisfaction among students in the observation group was significantly higher than that in the control group ( $P < 0.05$ ). See **Table 2**.

**Table 2.** Comparison of teaching satisfaction between two groups of students

Group	Very satisfied ( <i>n</i> , %)	Satisfied ( <i>n</i> , %)	Dissatisfied ( <i>n</i> , %)	Teaching satisfaction rate (%)
Observation group ( <i>n</i> = 30)	18 (60.00)	11 (36.67)	1 (3.33)	29 (96.67)
Control group ( <i>n</i> = 30)	10 (33.33)	12 (40.00)	7 (22.67)	22 (73.33)
$\chi^2$	—	—	—	4.706
<i>P</i> -value	—	—	—	0.030

### 3.3. Comparison of learning outcomes among different levels of students in the observation group

After the teaching period, the theoretical examination scores, clinical skill operation scores, and MDT case discussion ability ratings of advanced-level students in the observation group were significantly higher than those of intermediate-level and basic-level students. Additionally, the scores of intermediate-level students were

significantly higher than those of basic-level students (all  $P < 0.001$ ). See **Table 3**.

**Table 3.** Comparison of learning outcomes among different levels of students in the observation group

Level	Theoretical assessment score (points, mean $\pm$ SD)	Clinical skill operation score (points, mean $\pm$ SD)	MDT case discussion ability score (points, mean $\pm$ SD)
Basic level ( $n = 10$ )	83.25 $\pm$ 3.67	84.12 $\pm$ 3.24	82.34 $\pm$ 3.89
Intermediate level ( $n = 15$ )	90.12 $\pm$ 2.89	91.34 $\pm$ 2.67	89.45 $\pm$ 3.21
Advanced level ( $n = 5$ )	95.67 $\pm$ 2.13	96.89 $\pm$ 1.87	94.56 $\pm$ 2.45
<i>F</i> -value	30.028	39.503	25.138
<i>P</i> -value	<0.001	<0.001	<0.001

## 4. Discussion

The core challenges of MDT teaching in gastric cancer lie in the interdisciplinary integration of knowledge across multiple fields and the significant individual differences among learners. The traditional “one-size-fits-all” teaching model fails to meet the diverse learning needs of learners at different levels due to its neglect of individual differences, thereby limiting teaching effectiveness<sup>[5]</sup>. In contrast, the stratified teaching model effectively addresses this issue by employing scientific stratification, differentiated instruction, and dynamic assessment, demonstrating significant core advantages.

The stratified teaching model offers the dual benefits of precise teaching objectives and tailored teaching content and methods<sup>[6]</sup>. Through comprehensive preliminary assessments, learners are categorized into three levels: basic, intermediate, and advanced. Targeted teaching objectives are then formulated for each level, preventing learners with weaker foundations from losing confidence due to overly ambitious goals and ensuring that high-achieving learners remain motivated by appropriately challenging objectives. In practice, learners at the basic level have achieved a good standard in theoretical and practical skills assessments, while those at the advanced level have demonstrated significant progress in managing complex cases and developing research capabilities. Furthermore, the model aligns differentiated teaching methods with each level’s learning pace—basic learners receive centralized lectures and one-on-one guidance, intermediate learners engage in group discussions and clinical observations, and advanced learners participate in problem-based learning (PBL) and research projects. The results show that learners in the observation group scored significantly higher than those in the control group in theoretical knowledge, practical skills, and MDT case discussions, fully validating the effectiveness of this model.

The MDT approach for gastric cancer has become mainstream, and cultivating medical professionals with solid MDT diagnostic and treatment capabilities is one of the core objectives of medical education<sup>[7]</sup>. Applying stratified teaching models to gastric cancer MDT education not only significantly enhances students’ learning outcomes but also holds substantial practical guiding value. On the one hand, this model effectively improves students’ collaborative MDT diagnostic and treatment capabilities<sup>[8,9]</sup>. MDT diagnosis and treatment of gastric cancer rely on close interdisciplinary collaboration; however, students from different professional backgrounds exhibit varying levels of proficiency in cross-disciplinary knowledge. Stratified teaching provides a platform for cross-professional exchange through group discussions, case simulations, and other methods, facilitating the integration of multidisciplinary knowledge. For instance, during case discussions at the advanced and elite levels, students from surgery, gastroenterology, radiology, and other specialties exchange viewpoints and

analyze cases together, significantly enhancing their multidisciplinary collaborative thinking abilities. Research data indicate that students in the observation group scored significantly higher in MDT case discussion abilities than those in the control group, confirming the model's crucial role in cultivating collaborative diagnostic and treatment capabilities. On the other hand, stratified teaching significantly enhances teaching satisfaction<sup>[10]</sup>. Differentiated teaching content and methods precisely meet students' needs, allowing them to experience a sense of accomplishment and belonging during their studies. The dynamic evaluation system enables students to clearly perceive their progress, further strengthening their motivation to learn. In the study, teaching satisfaction in the observation group was significantly higher than that in the control group, fully reflecting students' high recognition of this model.

Implementing stratified teaching requires grasping three key aspects: First, scientific stratification serves as the foundation. This involves clarifying students' foundations, abilities, and career plans through multi-dimensional assessments, publicly communicating the purpose of stratification and the mechanism for dynamic adjustments to avoid the "labeling" mentality. Second, differentiated instruction is the core. This entails precisely designing teaching objectives, content, and methods while simultaneously strengthening teachers' capabilities in stratified teaching. Third, dynamic evaluation acts as the safeguard. This involves establishing a comprehensive evaluation system and making real-time adjustments to stratification and teaching plans based on students' learning performance to ensure their continuous improvement.

## 5. Conclusion

In summary, the stratified teaching model can effectively enhance the quality of MDT teaching for gastric cancer, improve students' theoretical knowledge, clinical skills, and MDT case discussion abilities, and increase teaching satisfaction, making it worthy of promotion and application in medical education. In the future, it is necessary to further refine the stratified teaching model and expand the scope of research to enhance its application value in medical education.

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## Disclosure statement

The authors declare no conflict of interest.

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