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Thinking on the Application of Internet in the Standardized Training of General Surgery Specialists

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Abstract: *In order to explore the effect of network teaching in the standardized training of general surgery specialists, 60 cases of doctors who received standardized training in general surgery from April 2022 to April 2024 were selected for analysis, and were randomly divided into 30 cases in the control group and 30 cases in the experimental group. By comparing the training satisfaction, assessment results, training quality and knowledge mastery rate, the results showed that the improvement of general surgery specialists' interest, knowledge consolidation effect, literature retrieval learning, clinical thinking improvement and doctor-patient communication ability in the control group was lower than that in the experimental group. The experimental group was superior to the control group in case analysis, medical record writing, physical examination and other clinical practices and basic theoretical knowledge, and the knowledge mastery rate and training satisfaction rate were superior to the control group, with statistical significance between groups ($P < 0.05$). Therefore, the application of Internet technology in the standardized training of general surgery specialists can effectively improve the training satisfaction and teaching training quality, make up for the deficiency of traditional training guidance, improve the comprehensive level of general surgery specialists, and promote the perfect combination of their practical ability and basic knowledge theory.*

Keywords: *General surgery; A specialist physician; Standardized training; Internet technology; Teaching and training effect*

1. Introduction

At present, with the progress of medical technology in China, modern medicine is gradually developing in the direction of specialization, especially in the medical field, the division of diseases is more detailed, and the demand for systematic knowledge and professional skill level of medical workers has increased significantly. According to the research, China's medical field draws on the development experience of the international medical field, and proposes standardized training and teaching of general surgery specialists in clinical practice. This process is an important teaching and training content for medical students after graduation, and it is also an optimization content for standardized training of residents, requiring the training of talents who can engage in the diagnosis and treatment of diseases [1]. In recent years, with the progress of minimally invasive technology, more minimally invasive operations have been applied in general surgery, especially with the gradual maturity of endoscopy technology, which has higher requirements for the technical operation level of general surgery specialists. In the Content and Standard of Standardized Training for Specialists (Trial), it is proposed that general surgery specialists should understand the surgical operation skills and theoretical knowledge of various diseases during the training, including being familiar with and mastering various general surgery operations, such as cholecystectomy and laparoscopic appendectomy. Another study pointed out that the standardized training of residents originated in 1993 and is an important teaching stage for medical students after graduation, covering professional courses, public compulsory courses, professional compulsory courses, clinical practice, etc. Through standardized training of residents, medical quality can be guaranteed and the comprehensive level of clinicians can be actively improved. However, the conventional training guidance process is mostly found in the offline infusion teaching and training content, which does not combine the training and teaching needs of the current social development, and cannot meet the clinical medical needs of general surgery, resulting in unsatisfactory standardized training results for general surgery specialists [2]. Therefore, it is required to use Internet technology for teaching and training during the standardized training of residents, so as to improve the satisfaction of teaching and training while ensuring the training effect and training quality. During the standardized training, the Internet should be applied to fully improve the organic integration of information technology in teaching and training,

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establish and promote a new talent training model of Internet teaching in the medical field, and fully ensure the quality and level of standardized training. In this paper, 60 general surgery specialists with standardized training were selected for research, and the training and teaching effects were recorded as follows.

2. Data and methods

2.1. Clinical data

A total of 60 general surgery specialists with standardized training from April 2022 to April 2024 were randomly divided into experimental group and control group with 30 students in each group, respectively. The 30 control group included 11 males and 19 females, aged 21-26 years, with an average age of (23.61±1.02) years. The age of the experimental group was 20-27 years old, with an average age of (23.58±11.08) years. Among the 30 patients in the experimental group, 9 were males and 21 were females. There was no statistical significance in age and gender data comparison ($P > 0.05$), indicating comparability.

Inclusion criteria: (1) All signed informed consent; (2) Do not quit during the period; (3) Do not go out during the period.

Exclusion criteria: (1) inability to communicate normally; (2) Withdrawal from the study; (3) There are infectious diseases.

2.2. Method

(1) Control group - routine teaching and training guidance: teachers should be in charge of interns in their own group, make regular rounds and write medical records, participate in duty, pass the assessment of theoretical knowledge and skills after the training, and check the final assessment results.

(2) Teaching and training guidance in the experimental group-Internet mode: ① Training program: a. The first stage: general surgery specialists were trained and instructed in theoretical knowledge, such as drug knowledge, anatomical and physiological knowledge, ultrasound knowledge, minimally invasive surgery knowledge, etc. The training duration is 10 class hours, each class time is 45 minutes, and the form is online teaching, Q&A, communication, and completed under live streaming. Collaborate online team analysis, submit homework online, watch video, download courseware, etc. b. The second stage: This stage needs to provide specialized operational training, including communication and communication with patients, disease classification and drug selection, surgical procedures and indications; A total of 20 class hours of training, the teaching mode includes online teaching, Q&A, communication, and live watching; Collaborate online team analysis, submit homework online, watch video, download courseware, etc. c. The third stage: This stage provides clinical practice training for general surgery specialists, including the operation of various surgeries, the specific content of minimally invasive techniques, the implementation process of advanced surgeries, and the management of complications. A total of 40 class hours, the teaching mode includes online teaching, Q&A and communication, which is completed under live streaming; Collaborate online team analysis, submit homework online, watch video, download courseware, etc. (2) Implementation process: a. Theoretical knowledge training guidance: teaching through the Internet cloud platform, choosing H5 web system to teach, and guiding doctors waiting for training to enter the cloud platform online training system through web links or mobile phones before the class starts. First of all, complete the registration and login, upload the teaching courseware and knowledge expansion materials in advance, and select professional staff to guide students how to use the cloud platform. During the class, the class reminder will be issued 3 days before and on the same day of each class, and the number of leave for each student will be controlled within 2 times. After the end of the course, students are required to complete the homework within 3 days, and the system is used to analyze the recording, live broadcasting and function assessment of the day after tomorrow. b. Specialized operation training: Before the training, it is necessary to upload the operation videos related to general surgery to the cloud platform, requiring students to understand and watch them in advance, and then requiring students to come to the laboratory for study and explain their feelings after watching the videos to the teacher. Students and teachers communicate with each other, and the teacher answers questions for them; After that, two students were selected as a group to guide each other in the exercise. During the exercise, the teacher should provide supervision and guidance and point out the shortcomings in time. c. Clinical practice operation guidance: general surgery specialists need to enter clinical practice operation training and teaching after passing the specialized operation

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training. In this stage, students are required to enter clinical practice and practice, and teachers are required to teach and teach one by one, and guide and supervise the whole process. ③ Result assessment: After the completion of the teaching, it is necessary to summarize common problems and difficult problems, analyze them in detail by the teaching teachers, observe the actual clinical situation in China and foreign research data, and comment on the speeches of general surgery specialists, put forward some points for their shortcomings, and give corresponding suggestions for improvement. Completion theory assessment: After the students have completed the first 3 stages of assessment, the paper version of the closed book examination will be taken. Exam questions by the teachers according to the training objectives of each module, set the weight of each module, full score 100, students 84 points and above are qualified.

2.3. Observation index

(1) Teaching and training quality: The teaching quality assessment analyzed the improvement of enrolled students' interest, knowledge consolidation effect, literature search and learning, clinical thinking improvement, and doctor-patient communication ability improvement, all of which were evaluated according to yes or no, and the proportion of answers answered yes was summarized.

(2) Objective score: Each score is worth 100 points, the higher the score, the more ideal the score.

(3) Training satisfaction: including the number of very satisfied, relatively satisfied and dissatisfied cases.

(4) Knowledge mastery rate: students' knowledge mastery rate includes complete mastery, general mastery and non-mastery.

2.4. Statistical significance

The analysis data were analyzed using SPSS 23.0 software, with a percentage (%) to describe the counting data, and the comparison between groups was conducted by $\chi 2$. The measurement data were described by (±s), and the independent sample t test or paired t test was used for comparison between groups. $P<0.05$ was considered statistically significant.

3. Results

3.1. Teaching and training quality

The improvement of general surgery specialists' interest, knowledge consolidation, literature searching and learning, clinical thinking and doctor-patient communication ability were less in the control group than in the experimental group ($P < 0.05$).(As shown in table 1)

Table 1:Students' interest improvement, knowledge consolidation effect, literature search learning, clinical thinking improvement, and doctor-patient communication ability improvement of the two groups of general surgery specialists (%)

Group	Number of cases	Student interest promotion	Knowledge consolidation effect	Document search learning	Clinical thinking enhancement	Improved doctor-patient communication
Control group	30	22(73.3%)	21(70%)	23(76.7%)	23(76.7%)	20(66.7%)
Experimental group	30	29(96.7%)	29(96.7%)	30(100%)	30(100%)	29(96.7%)
X^2		6.4052	7.6800	7.9245	7.9245	9.0167
P		<0.05	<0.05	<0.05	<0.05	<0.05

3.2.Objective achievement

The scores of case analysis, clinical practice such as medical record writing, physical examination and basic theoretical knowledge were significantly different ($P < 0.05$).(As shown in table 2)

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Table 2:Case analysis, clinical practice, such as medical record writing, physical examination, and basic theoretical knowledge of the two groups of general surgery specialists ($\bar{x}$ ±s)

Group	Number of cases	Case analysis	Medical record writing	Physical examination	Basic theoretical knowledge
Control group	30	70.22±1.65	69.88±1.62	71.48±1.72	79.23±1.28
Experimental group	30	83.25±1.46	86.33±1.75	89.66±1.55	93.11±1.64
t		32.3929	37.7823	43.0066	36.5431
P		<0.05	<0.05	<0.05	<0.05

3.3.Training satisfaction

The training satisfaction of the experimental group was higher than that of the control group, P < 0.05.(As shown in table 3)

Table 3:Training satisfaction of general surgical specialists in the two groups (%)

Group	Number of cases	Very satisfied	Relatively satisfied	Dissatisfy	Overall satisfaction
Control group	30	9	11	10	66.7%
Experimental group	30	19	10	1	96.7%
X^2		-	-	-	9.0167
P		-	-	-	<0.05

3.4. Knowledge mastery rate

The knowledge mastery rate of the experimental group was higher than that of the control group (P < 0.05).(As shown in table 4)

Table 4: Knowledge mastery rate of general surgery specialists in the two groups

Group	Number of cases	Complete mastery	General mastery	Not master	Knowledge mastery rate
Control group	30	12	10	8	73.3%
Experimental group	30	18	11	1	96.7%
X^2		-	-	-	6.4052
P		-	-	-	<0.05

4. Discuss

The standardized training of resident doctors is an important content of the training of clinical medical talents in China, especially under the changes of social economy at the present stage, people's demand for medical treatment has increased significantly. General surgery Department is one of the core departments in the field of clinical medicine. Patients treated in this department have complex and diverse conditions with certain differences in the severity of their conditions, which requires high skill level and comprehensive literacy of physicians. According to the research [3], although residents have clinical practice experience or internship experience, under the current social development, the practice of residents during the internship is less, and most of them are theoretical knowledge learning, which makes it impossible to ensure the combination of practice and theoretical knowledge, thus affecting the cultivation of comprehensive level and practical skills, and cannot improve the practical ability of residents [4]. At the same time, in the current medical education, newly graduated medical students are often directly put into the society, which makes them unable to meet the clinical requirements, resulting in serious impact on the career of medical students, and even irresponsible to the society and patients [5].

Under the traditional teaching methods, teachers did not fully explain the basic medical courses during the course of teaching, and only took practical, sufficient and necessary teaching principles as the

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main principles. The training of general surgery specialists did not keep up with the development direction of social medicine, which affected the practical operation ability and skill level of residents, and could not meet the needs of diagnosis and treatment of general surgery diseases [6]. In addition, under the current progress of minimally invasive technology, general surgery is widely used during the diagnosis and treatment of diseases, which requires general surgery specialists to understand advanced basic diagnosis and treatment knowledge and surgical skills, improve personal comprehensive level, and promote personal ability progress. Based on this, this paper proposes to provide standardized training and teaching guidance for general surgery specialists under the Internet information technology to make up for the shortcomings of traditional training guidance and ensure the quality of teaching and training and the satisfaction of teaching. The Internet is an important part of teaching informatization. With the development of society, people can use the Internet through computers or mobile phones to conduct teaching and training in busy departments, so as to ensure students' flexible learning, make up for the shortcomings of offline special training in the past, and update the traditional fixed teaching mode. In addition, the Internet platform also ensures the diversified teaching effect of standardized training. Compared with the previous teaching mode of a single specialized training base, the use of information technology in teaching not only enrichis the teaching content, but also increases the teaching resources to meet the learning needs of minimally invasive surgery skills of different skills, so that students can master more practical skills. Including remote robot operation, VR, MOOC, etc. [7]. The experimental results of this paper show that the improvement of general surgery specialists' interest, knowledge consolidation, literature searching and learning, clinical thinking improvement and doctor-patient communication ability of the control group is less than that of the experimental group, and the results of case analysis, clinical practice such as medical record writing, physical examination and basic theoretical knowledge of the experimental group are superior to the control group. The knowledge mastery rate and training satisfaction rate of the experimental group were better than those of the control group, and there were significant differences between the groups ($P < 0.05$). It can be seen that standardized training through Internet information technology can effectively improve the learning effect of general surgery specialists, improve students' learning enthusiasm and initiative, enhance students' academic performance, and have a high degree of teaching satisfaction. Another report pointed out that with the advancement of the Internet era, "Internet +" has become the general trend. In the face of the increasingly updated medical knowledge and technological progress, the education of general surgery specialty training should conform to the trend of "Internet +" and develop towards the combination of network, information and intelligence, so that students can learn more, updated and more cutting-edge medical knowledge [8]. At the same time, teaching under the Internet information technology can broaden the interns' thinking, enrich the teaching knowledge content, facilitate the interns to deepen the understanding of the teaching content, and ensure the effectiveness of training and teaching.

In summary, the application of Internet information technology during the standardized training of general surgery specialists can effectively ensure the training effect and training satisfaction, improve the quality of training, ensure the practical ability and basic knowledge level of specialists, make up for the shortcomings of traditional training and teaching mode, improve the teaching environment and methods, and have application significance in the standardized training of doctors.

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