Analysis of the Effect of the Application of Comprehensive Designed Experiments in the Clinical Teaching of Diabetes Mellitus

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Abstract: Objective: It's to investigate the effect of the application of integrated design experiment in the clinical teaching of diabetes mellitus. Methods: 102 students interned in the Department of Endocrinology of our hospital were selected, and the time interval of the selected cases was set from June 2023 to June 2024, and the research subjects were grouped with reference to the method of randomized numerical table, in which there were 51 students in the control group and 51 students in the observation group. The control group was taught by conventional teaching methods, and the observation group was taught by integrated designed experimental teaching, and the two groups of students were taught continuously for 12 weeks. And the two groups of students' comprehensive ability and teaching satisfaction were compared statistically. Result: After teaching, the scores of independent learning ability, cooperation ability and critical thinking ability of the observation group were higher than those of the control group; after teaching, the total satisfaction rate of teaching of the observation group was higher than that of the control group, with $P<0.05$. Conclusion: The application of integrated design experimental teaching in diabetes clinical teaching is conducive to improving the comprehensive ability of the students and enhancing their satisfaction of teaching.

***Keywords*:** diabetes mellitus; clinical teaching; integrated designed experiments

1. Introduction

As a common chronic metabolic disease, the prevalence of diabetes mellitus is increasing year by year globally, and it has become a public health problem that seriously threatens human health. The pathogenesis of diabetes mellitus is complex and involves a variety of factors such as genetics, environment, lifestyle, etc. It triggers a variety of complications such as cardiovascular disease, renal disease, etc., which seriously reduces the quality of life of the patients and increases the burden of social healthcare. In the clinical teaching of diabetes mellitus, the traditional teaching mode is mostly based on the teacher's lecture, and the students passively accept the knowledge, which lacks the in-depth understanding of knowledge and the cultivation of practical application ability. With the development of medical education, the demand for the cultivation of medical talents with innovative thinking, practical ability and clinical decision-making ability is increasingly urgent, and the integrated design experimental teaching mode has emerged [1]. Based on this, the purpose of this paper is to explore the application effect of comprehensive designed experiments in the clinical teaching of diabetes mellitus, which is reported as follows.

2. Information and methodology

2.1 General information

102 students who were interns in the Department of Endocrinology of our hospital were selected and the time interval of the cases was set from June 2023 to June 2024, and the study subjects were grouped with reference to randomized numerical table method, including 51 control group and 51 observation group. The male to female ratio was 29:22 and 30:21 in the observation and control groups, respectively; the ages were 21-26 and 21-27 years, respectively; and the mean ages were (22.65±1.09) and (22.71±1.07) years. By comparing the above data (gender and age) between the two groups, it can be concluded that there is no significant difference between the two groups ($P>0.05$), so the results of this study are not affected by the underlying data and are comparable. Inclusion criteria: those whose education was not less than full-time undergraduate; those who entered the endocrinology department for the first time; those whose previous study base was compatible, etc. Exclusion criteria: those whose internship period was <3 months; those who were transferred to the hospital for study in the middle of the study; and those who were on leave of absence for more than 1 week during the study period, etc.

2.2 Methods

The control group adopts conventional teaching. Before the class, the teacher issued a notice in WeChat group in advance, asking students to comprehensively review the theoretical knowledge of diabetes, and at the same time familiarize themselves with the standardized process and key points of the physical examination, in order to prepare for the classroom practice. During the class, after a short introduction with common diabetes cases, the teacher divided the students into 5 groups, each group was equipped with a teacher. Under the guidance of the teacher, the students took medical history at the patient's bedside in an orderly manner, inquiring in detail about the patient's past history, family history, living habits, etc., and then carried out the physical examination in a standardized manner. The teacher then explains the personalized treatment plan and carries out health promotion according to the actual situation of the patient. After the class, students returned to the classroom to systematically organize the information and standardize the writing of medical records. The lead teacher summarized the comments in terms of content completeness and writing standardization. The observation group carried out comprehensive designed experimental teaching. Two weeks before the class, the lead teacher divides the students into 5 groups and releases the flow and requirements of the class. Each group reviewed theories and skills independently, reviewed the literature according to their interests or the teacher's guidelines, formulated questions and hypotheses, and discussed the design of clinical practice content and experimental methods. Three days before the class, the groups submitted their proposals, the teacher accepted them and provided feedback and guidance, and the students revised and improved them. In the middle of the class, each group made a PPT report, which included the topic of review, problem hypothesis, experimental design ideas, etc. The teacher listened attentively on the stage and discussed the design of clinical practice and experimental methods. Teachers listen carefully on the stage, supervise and evaluate, expand knowledge at the right time, and help students deepen their understanding. After the debriefing, the teacher-student interaction began, with students actively asking questions and teachers patiently answering them. Afterwards, the teacher leads the students to the ward to collect medical history and conduct experiments, providing assistance and guidance throughout the process. After the experiment, students returned to the classroom to analyze the medical records, discuss the results of the experiment, reflect on the shortcomings and think about improvement measures. At the end, the instructor provided a comprehensive summary and critique. Both groups were required to continue teaching for 12 weeks.

2.3 Observation indicators

①Comprehensive ability, after teaching, students' comprehensive ability is evaluated using our self-made questionnaire, which contains three aspects, namely, independent learning ability, cooperation ability, and critical thinking ability, with a full score of 100 points for each aspect. The higher the score, the stronger the corresponding ability. ② Teaching satisfaction, using our own teaching satisfaction questionnaire for evaluation, full score is 10 points, 0~3 is unsatisfied, 4~6 is more satisfied, 7~10 is very satisfied, the higher the score is the higher the satisfaction, the total satisfaction rate = 1-unsatisfied cases/total cases×100%.

2.4 Statistical methods

SPSS 26.0 was used to detect, [case (%)] for count data, line $\chi 2$ test; ($\bar{x} \pm s$) for measurement data, line t-test; using statistical software calculated data results $P < 0.05$, that is, the difference is statistically significant.

3. Results

3.1 Comprehensive capacity

Table 1: After teaching, the scores of independent learning ability, cooperation ability and critical thinking ability of the observation group were higher than those of the control group, P<0.05.

Table 1. Combined competencies ($\bar{x} \pm s$, points)

groups	number of examples	Self-directed learning capacity	Ability to cooperate	Critical thinking skills
control subjects	51	76.34±3.65	82.55±3.32	77.45±2.76
Observation Group	51	87.43±2.34	90.27±2.35	89.34±3.09
t-value		18.267	13.554	20.494
P-value		<0.001	<0.001	<0.001

3.2 Teaching Satisfaction

Table 2: After teaching, the total satisfaction rate of teaching in the observation group was higher than that of the control

group, P<0.05.

Table 2. Teaching satisfaction [Example (%)]

groups	number of examples	very happy	more satisfied	unsatisfactory	Overall satisfaction rate
control subjects	51	15(29.41)	23(45.10)	13(25.49)	38(74.51)
Observation Group	51	21(41.18)	27(52.94)	3(5.88)	48(94.12)
χ2-value					12.500
P-value					<0.001

4. Discussion

In recent years, the number of patients with diabetes mellitus has increased dramatically, and the various complications caused by diabetes mellitus, such as diabetic nephropathy, diabetic retinopathy, etc., have a serious impact on the quality of life of the patients, and also bring a heavy burden of medical treatment on the family and the society. Accurate diagnosis, effective treatment and scientific nursing interventions are essential for controlling the development of diabetes mellitus and improving the prognosis of patients, which also puts forward a very high demand for clinical teaching of diabetes mellitus. The traditional clinical teaching mode of diabetes mellitus is dominated by teachers' lectures and students' passive acceptance of knowledge. With the continuous updating and development of medical education concepts, cultivating high-quality medical talents with innovative thinking, practical ability and clinical decision-making ability has become the core goal of education. Comprehensive design experimental teaching mode came into being, which emphasizes the student's main position and encourages students' independent investigation, practical operation and teamwork.

The results of this study showed that after the teaching, the scores of independent learning ability, cooperation ability and critical thinking ability of the observation group were higher than those of the control group, suggesting that the application of integrated design experimental teaching in the clinical teaching of diabetes mellitus is conducive to the improvement of students' comprehensive ability. The reason for this may be: in comprehensive design experimental teaching, students need to independently consult a large amount of information, in-depth investigation of all aspects of the comprehensive management of diabetes clinic, this process to get rid of the passive acceptance mode of the traditional teaching, the students take the initiative to think, explore, and in the continuous problem solving, gradually master the methods and skills of independent learning, so as to improve the ability to learn independently. Experiments are usually carried out in small groups, in which students divide the work and work together to complete the tasks of history collection, program design, results analysis and other tasks. In the process of cooperation, students need to learn to communicate, coordinate the views of all parties, learn to listen to others and play to their strengths, and solve complex problems through mutual cooperation, which is a series of practical activities to effectively exercise the students' teamwork skills. Comprehensive design experiments require students to analyze, evaluate and judge the information obtained, not blindly accept existing conclusions, which prompts them to think about the reasonableness and limitations of different solutions, and cultivate their ability to question, reflect and innovate, which in turn improves their critical thinking ability.

The results of this study show that the total satisfaction rate of the observation group is higher than that of the control group, suggesting that the application of integrated design experimental teaching in the clinical teaching of diabetes mellitus is conducive to the enhancement of their teaching satisfaction. The reason may be: integrated design experimental teaching focuses on the actual scene of comprehensive management of diabetes, students can contact real cases, learn how to formulate personalized treatment plans, diet and exercise guidance and blood glucose monitoring and management, etc., and what they have learned is closely integrated with clinical practice, which meets the students' desire for practical skills, and is therefore more accepted [2]. Moreover, in comprehensive design experimental teaching, students are the main body actively involved in experimental design, implementation and analysis of the results, which is conducive to letting students get a sense of achievement, feel their own value, and thus have a higher degree of satisfaction with the teaching.

5. Conclusion

In summary, the application of integrated design experimental teaching in diabetes clinical teaching is conducive to improving students' comprehensive ability and enhancing their teaching satisfaction, and this teaching method has a high value of popularization and application in clinical teaching.

References

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