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Research on the Cultivation of Scientific Research Quality of Medical Undergraduates——Based on the Perspective of Sense of Acquisition

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Abstract: To studies the current situation of medical undergraduates' scientific research training quality training, and provides reference for the development of medical personnel training. A questionnaire survey was conducted among 509 medical undergraduates in a local medical university in China, and Logistic regression model was used to explore the situation of medical undergraduates' scientific research training and the factors influencing their satisfaction with scientific research training from the perspective of sense of gain. It was found that 87.82% of the subjects were interested in scientific research training; 75.44% of the subjects had participated in scientific research training at least once; 84.64% of the medical undergraduates were satisfied with the tutors' guidance; The satisfaction of the subjects to the school hardware, scientific research and training resources and academic atmosphere accounted for 77.87%, 71.1% and 75% respectively; 60.93% of the subjects thought that the current medical undergraduate students' sense of scientific research training gained more. It is suggested that the opportunities for medical undergraduates to participate in scientific research training should be increased in multiple ways, the integrity of scientific research training and guidance of ideas should be strengthened. At the same time, it is necessary to increase the investment in scientific research training facilities, equipment and resources, and the scientific research training of medical undergraduates who are not clinical majors should be emphasized.

Keywords: Medical Undergraduates, Scientific Research Quality, Sense of Acquisition, Talents Training

1. Introduction

In recent years, with the improvement of living and economic standards, people put forward higher requirements for health, which indirectly puts forward higher requirements for the professional ability of medical staff. As the foundation stage of medical students' professional ability, undergraduate stage plays a crucial role. How to effectively cultivate medical students' professional ability in this stage is a problem we should actively consider.

Sense of acquisition, as the unity of individual's material interests and subjective spirit, has become one of the important value standards to measure the development of governance in the new era through the re-elaboration of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, which has the concept of "Chinese characteristics" [1]. This concept enlightens us that we can study how to improve the professional ability of medical undergraduates from the perspective of medical undergraduates, who is the subject of obtaining sense.

Scientific research quality, as the name implies, refers to the quality that the personnel engaged in scientific research should possess, but there is no exact definition yet. This paper adopts the viewpoint of Researcher Han

Yanping (2012): scientific research quality refers to the conditions that researchers have in scientific research morality, scientific research knowledge and scientific research ability [2].

For this reason, this study is based on the perspective of the sense of gain and the principle of demand orientation. Through a questionnaire survey, the research training situation of medical undergraduates in a local medical university is discussed, in order to provide feedback on the actual scientific research quality training situation through the scientific research quality training objects. Think, find the problems existing in the cultivation of scientific research quality, provide reference and suggestions for personnel training units, and finally achieve the purpose of improving the professional ability of medical undergraduates.

2. Research Status of Medical Undergraduate Scientific Research Training at Home and Abroad

2.1. Research Status of Medical Undergraduate Scientific Research Training in China

In this study, the topic of medical undergraduate research was searched on CNKI, and four related literatures were published in 2011, 2014, 2019 and 2021 respectively. Although the Ministry of Education of China began to implement the National College Students Innovative Experiment Program in 2006, and adjusted to National College Students Innovation and Entrepreneurship Training Program in 2012, the data show that there is little research on medical undergraduate research training in China [3, 4].

2.2. Research Status of Scientific Research Training for Medical Undergraduates in Foreign Countries

In PubMed database, this study takes "Medical Undergraduate Research" as the key word, and a total of 14,926 relevant literatures are searched. The key words "medical undergraduate scientific research training" from 1970 to 2021 were published in the statistical chart, and the key words co-occurrence network map were shown in Figure 1 and Figure 2.

As can be seen from Figure 2, research hotspots of medical undergraduate research include "Humans", "education, medical, undergraduate", "female", "male", "Students, medical", "Curriculum" and so on. It can be seen that "education, medical, undergraduate" is a research hotspot abroad.

TMS Collaborative (2021), Enhui Yong (2022), Ka Ying (2020), Ahmed (2013), Ackerman (2016), Tartaglia (2015) and other organizations and researchers discuss medical student education from the perspective of curriculum, and put forward overall evaluation procedures and models to evaluate medical students' professional ability [5-10]. Organizations and researchers such as InciSioN UK Collaborative (2021), Eric Mugabo (2021), Frei E (2010), Hamza M (2014) et al. explored the influencing factors of medical undergraduates' professional ability through qualitative and quantitative methods [11-14]. Stephanie N (2019), Rochelle P (2018), Suzanne Minor (2022), Finkel (2016), Frances Gunn (2017), Antonius Ratte (2018) and other researchers from the perspective of medical students to study ways and means to enhance the professional ability of medical students [15-20].

To sum up, the research on the scientific research quality of medical undergraduates in China is slower than that in foreign countries, and the depth and breadth of the research is relatively deficient, so this research field needs to be further studied by researchers.

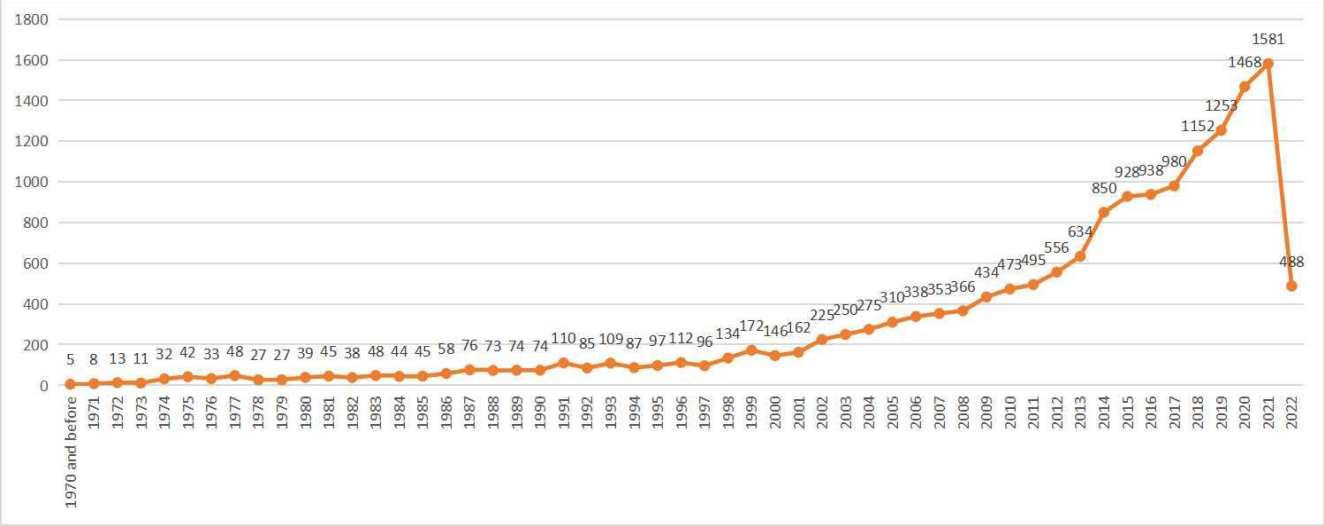

Figure 1. *Number of overseas key words "Medical Undergraduate Research" published during 1970-2021.*

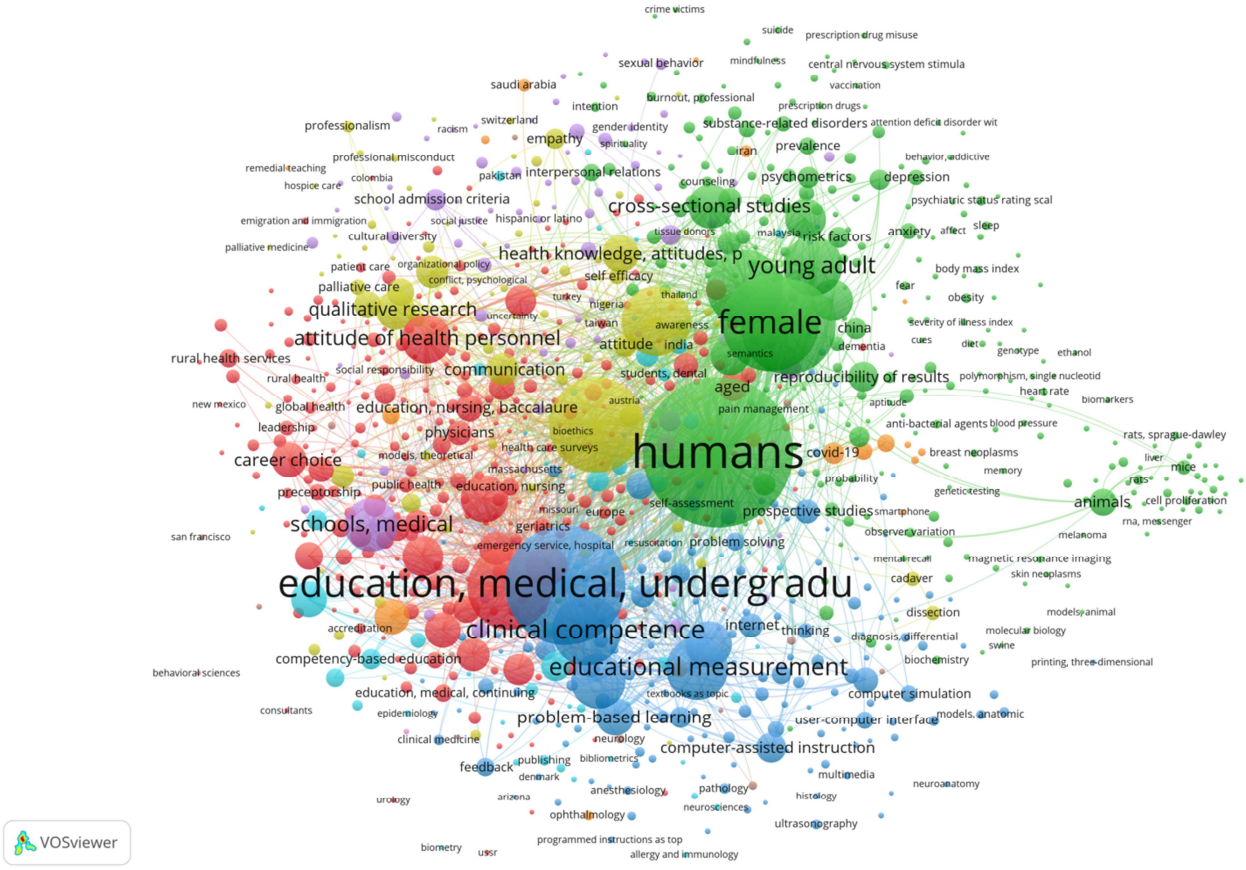

Figure 2. *Keywords co-occurrence network map.*

3. Methods

3.1. Participants

At present the domestic medical school has four years and five years of professional points, the research object of this paper for medical colleges and universities in reading all professional medical undergraduates. Therefore, this study investigated the clinical and non-clinical undergraduates of a medical university through questionnaires. The questionnaire was collected from November 1, 2021 to November 11, 2021, and 509 questionnaires were collected.

3.2. Statistical Analyses

The data were analyzed by SPSS 22.0. Descriptive statistics were used to analyze the basic information, attitude of scientific research training, purpose, satisfaction and other aspects of the respondents. Logistic regression model was used to further analyze the factors that were significant in the univariate analysis results. P<0.05 was considered statistically significant.

4. Results

4.1. Scientific Research and Training Situation

The results showed that 447 subjects (87.82%) were interested in scientific research training, most of them (75.44%) had participated in scientific research training at least once, but 125 subjects (24.56%) had not participated in scientific research training. The main reason was that they had no chance to participate (68.25%). See Table 1.

Table 1. *Current status of scientific research and training of the subjects.*

Variables	Frequency	Percentage (%)
interested		
Yes	447	87.82
No	62	12.18
Number of participation		
0	125	24.56
1	248	48.72
2 times and above	136	26.72
Reason for not attending		
Busy with studies	20	15.87
No opportunity	86	68.25
Disinterest	20	15.87

4.2. Satisfaction of Medical Undergraduates with Scientific Research Training

The results showed that the main way of communication between students and tutors was negotiation (38.54%); Most of the medical undergraduates (84.64%) were satisfied with the tutors' guidance, and few of them (15.36%) were not satisfied. Among them, more medical undergraduates thought that the tutors' guidance was insufficient in the overall framework and ideas (40.68%). In addition, this study found that medical undergraduates think that the tutor's guidance in

enhancing the value of innovation is very good, and no one chooses this option, which shows that the tutor of scientific research training in China has done a good job in innovation, and has been unanimously recognized by students.

The satisfaction of the subjects to the school hardware, scientific research and training resources and academic atmosphere accounted for 77.87%, 71.1% and 75% respectively. Overall, more (60.93%) of the subjects think that the current college students' overall scientific research training gains a greater harvest. This shows that the construction of scientific research and training facilities and equipment in China needs to be further improved, especially in terms of scientific research and training resources. In order to facilitate data analysis, this study merged the five types of satisfaction into three types of satisfaction; The sense of acquisition is classified, no harvest and less harvest are combined, as shown in Table 2.

Table 2. *Status of satisfaction with scientific research training of medical undergraduates.*

Variables	Frequency	Percentage (%)
How your mentor guides you		
Leading	130	33.85
Tangent	148	38.54
Infusion	69	17.97
Releasing	37	9.64
Are you satisfied with the guidance of your supervisor?		
Yes	325	84.64
No	59	15.36
What aspects of your tutor's guidance are you dissatisfied with?		
Research Methods and Selection	15	25.42
Overall framework and ideas	24	40.68
Literature Collection and Citation	16	27.12
Promoting the value of innovation	0	0
Other	4	6.78
Hardware Status		
satisfaction	299	77.87
General	82	21.35
Dissatisfy	3	0.78
Status of scientific research and training resources		
satisfaction	273	71.1
General	103	26.82
Dissatisfy	8	2.08
Academic Atmosphere		
satisfaction	109	75
General	90	23.44
Dissatisfy	6	1.56
What do you think of the overall sense of achievement of college students?		
The harvest is bigger	234	60.93
Harvest in general	108	28.13
Less harvest	42	10.94

4.3. Univariate Analysis of Acquire Sense of Scientific Research Training of Medical Undergraduate

The results showed that there were significant differences in the interest in scientific research training, the attitude towards scientific research training and the academic atmosphere among different majors ($P < 0.05$). See Table 3.

Table 3. *Single factor analysis.*

Variables	How about a sense of gain			x^2	P
	The harvest is bigger	Harvest in general	Less harvest		
Sex				1.267	0.531
Male	112	52	24		
Female	122	56	18		
Grade				8.425	0.393
College freshman	46	20	10		
Sophomore	46	22	9		
Junior year of college	43	29	7		
Senior year of college	55	26	12		
Fifth year of university	44	11	4		
Major				37.606	0.000
Clinic	142	54	4		
Non-clinical	92	54	38		

Variables	How about a sense of gain			x^2	P
	The harvest is bigger	Harvest in general	Less harvest		
Interested				53.758	0.000
Yes	228	102	28		
No	6	6	14		
Attitude				14.500	0.006
Positive	148	61	18		
General	84	40	21		
Perfunctory	2	7	3		
objective				6.231	0.621
College Regulation	33	23	7		
Interest	101	42	14		
In order to obtain the corresponding credit	35	14	6		
Help with employment	61	25	13		
Follow the crowd	4	4	2		
Hardware Status				6.700	0.153
satisfaction	184	86	29		
General	50	20	12		
Dissatisfy	0	2	1		
Status of scientific research and training resources				8.483	0.075
satisfaction	161	83	29		
General	71	21	11		
Dissatisfy	2	4	2		
Academic Atmosphere				10.441	0.034
satisfaction	174	82	32		
General	58	25	7		
Dissatisfy	2	1	3		

4.4. Multi-factor Analysis of Sense of Acquisition in Scientific Research Training of Medical Undergraduates

In order to further analyze the relationship between the sense of scientific research training acquisition and specialty, interest, attitude and academic atmosphere of medical undergraduates. We set more gains, average gains and less gains as the dependent variables, and the less gains as the reference group. The factors with significant single-factor results were included in the multinomial Logistic regression model as independent variables; Variable assignment is shown in Table 4.

Table 4. *Multivariate logistic regression analysis variable attributes and definitions.*

Factor	Variables	Variable Interpretation		
Overall Scientific Research of College Students	Y	0=Less harvest	1=Harvest in general	2=The harvest is bigger
Major	X2	0=Non-clinical	1=Clinic	
Academic Atmosphere	X3	0=Dissatisfy	1=General	2=satisfaction
Interested	X4	0=No	1=Yes	
Attitude	X5	0=Perfunctory	1=General	2=Positive

The results of regression analysis showed that the specialty of medical undergraduates and their interest in scientific research training had a significant impact on their satisfaction with scientific research training ($P < 0.05$). In the model of more gains, compared with the less gains of scientific research training, the more gains of scientific research training were significantly affected by their majors and interests ($P < 0.05$), and the medical undergraduates of clinical majors were more inclined to get more than those of non-clinical majors (or = 9.977, P = 0.000). 9.977 times of the same kind ratio of the non-clinical professional; The undergraduates who were interested in scientific research training were more inclined to gain more (or = 8. 438, P = 0. 000), which was 8. 438 times of those who were not interested. In the average gain model, compared with those who gained less in scientific research training, the general gain of scientific research training was significantly affected by their specialty and interest ($P < 0.05$), and the medical undergraduates of clinical specialty were more inclined to average gain than those of non-clinical specialty (or = 7.466, P = 0.000). 7.466 times of that of the non-clinical professionals; The undergraduates who were interested in scientific research training were more inclined to gain in general than those who were not interested (or = 4. 916, P = 0. 005), which was 4. 916 times of those who were not interested. See Table 5.

Table 5. *Multiple logistics regression analysis.*

		The harvest is bigger			Harvest in general		
		P	**OR**	**95%CI**	**P**	**OR**	**95%CI**
Major							
	Clinic 0=Non-clinical	0.000	9.977	3.337~29.825	0.000	7.466	2.409~23.142
Academic Atmosphere							
	satisfaction	0.373	2.526	0.328~19.443	0.321	3.353	0.308~36.533
	General 0=Dissatisfy	0.194	4.212	0.482~36.798	0.194	5.306	0.428~65.804
Interested							
	Yes 0=No	0.000	8.438	2.822~25.225	0.005	4.916	1.623~14.889
Attitude							
	Positive	0.293	2.964	0.391~22.485	0.331	0.441	0.085~2.229
	General 0=Perfunctory	0.534	1.903	0.251~14.444	0.174	0.319	0.061~1.655

5. Discussion

5.1. Increasing Opportunities for Scientific Research Training and Stimulating Medical Students' Interest in Scientific Research

This is probably because our medical undergraduate research training opportunities are mainly provided by the government, schools and tutors, the rest of the research training opportunities are less, and undergraduates are not interested in research training, even if they participate in research training, their initiative is not enough to support them to complete a good quality research project [21, 22]. To this end, the school can strengthen cooperation with universities and enterprises at home and abroad, learn excellent experience, broaden the opportunities for scientific research training, and promote excellent scientific research training projects, attract the attention of undergraduates, so that they can actively and actively participate in scientific research training.

5.2. Scientific Research Training Should Focus on the Overall Framework and Thinking Guidance

In the aspect of tutor guidance, the satisfaction of medical undergraduates on the overall framework and thinking guidance is low, which is consistent with the research results of Tian Yu (2014) and Liu Li (2014) [23, 24]. This suggests that supervisors should pay attention to the guidance of the overall framework and ideas of medical undergraduates when guiding scientific research training, so that they can start scientific research training as a whole, and exercise scientific research thinking in scientific research training, which can lay a good foundation for future scientific research.

5.3. Increase the Construction of Scientific Research and Training Facilities, Equipment and Resources

This study found that medical undergraduates' satisfaction with the facilities, equipment and resource platform of scientific research training needs to be further improved, which may be related to the large number of medical undergraduates in China and their higher requirements for facilities and equipment. However, foreign scientific research training can provide advanced experimental equipment and sufficient research funds for undergraduate scientific research training due to its relatively sound management system and operation mechanism, and multi-channel scientific research funding model. Such as the federal government, state government, etc., enterprises, private foundations, etc., of which non-government funds are the most important source [25-31]. Therefore, while actively striving for the support of government projects, colleges and universities in China can also strengthen the links with enterprises, strive for their financial and resource support, and equip more research training facilities, equipment and resources for medical undergraduate research training to meet their research training needs.

5.4. Promoting the Scientific Research Training of Non-clinical Medical Undergraduate

The study found that clinical medical undergraduates were more inclined to choose scientific research training than non-clinical medical undergraduates. This may be related to the requirements for scientific research ability between majors, but for medical undergraduates, whether clinical or non-clinical, scientific research training can not only improve their scientific research ability, innovative thinking and social development, but also help to enhance student initiative, improving student achievement, and promoting choice for further study [32-35]. Therefore, higher medical schools should incorporate scientific research training into the curriculum system in the future, and use credit incentives or material incentives to promote non-clinical medical students to participate in scientific research training, so as to further improve the scientific research ability, innovative thinking and social development of non-clinical medical undergraduates.

There are some limitations in this study. The survey method of collecting data through the network may lead to insufficient representativeness of the sample size, and the extrapolation of the results is limited to some extent; In addition, the research dimensions of this study are less, resulting in fewer variables eventually included in the multi-factor model analysis, follow-up studies can increase the research dimensions, such as management ability, personal effectiveness, thinking style, etc to further explore from different perspectives.

6. Conclusion

87.82% of the research subjects were interested in scientific research training, and the communication between students and supervisors was mainly based on exchanges. The research subjects were generally satisfied with the university hardware, scientific research training resources and academic atmosphere, accounting for 77.87%, 71.1%, 75% and 60.93%, respectively. Research object that scientific research training a sense of harvest is bigger, the scientific research training get interested in large harvest by its professional and significant effect, clinical medical professional undergraduate research training have more sense than the clinical field tend to be "big harvest", get interested in undergraduate research training are less interested in more inclined to "big harvest", Compared with non-clinical medical undergraduates, clinical undergraduates tend to have "average gain" in scientific research training, while those who are interested in scientific research training tend to have "average gain". It is suggested to increase the opportunities for medical undergraduates to participate in scientific research training by multiple ways, strengthen the integrity of scientific research training and the training of thinking guidance. At the same time, it is necessary to increase the investment of scientific research training facilities, equipment and resources, and pay attention to the scientific research training of non-clinical medical undergraduates.

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