Investigation and Study on Medical Students' Fear of Experimental Animals under the Background of Cultivating Applied Talents

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Abstract: This paper studies the psychological state of students in animal experiments, and finds out disadvantageous factors that affect students in animal experiments, so as to quell students' fear and improve the quality of animal experiment teaching. The study finds that most of the students fear of animal experiments, and there are differences between genders and majors. Students who have experienced slaughter have different pressure degrees from those who have not. There are differences between genders in the reasons for opposing animal experiments, but there is no difference between majors. There is no difference in the origin of fear in animal experiments. Starting from problems existing in experiments, we carry out in-depth research, adopt the methods of increasing class hours and replacing with animal models to find out solutions and put forward teaching reform plans, in order to improve the teaching methods of animal experiment courses.

1. Introduction

Animal experiment is still an indispensable way in medical research. With the rapid development of medical research, the application of experimental animals is increasing. In order to enable medical students to adapt to their work quickly in the future, it is necessary to appropriately increase courses of animal experiment. Therefore, medical students have more opportunities to contact with experimental animals. But in recent years, because of the rise of animal protection movement, the voice of protecting animal rights becomes increasingly high; the animal experiment is hindered to some extent. How to improve the effect of animal experiment has become a hot topic, and affects the progress of medical research. [1] Many factors can affect the teaching effect, but students' own situations, especially their mental states, are the most important one. In animal experiments, the main situation that affects the mental state of medical students is fear, that is, the feared state of mind. Through observation teaching, it is found that many students have resistance to experimental animals. Because of the psychological fear, some experimental animals are killed or maimed by accident in the process of experimental operation, resulting in the failure of experimental operations. It affects the teaching effect as well as students' physical and mental health. Therefore, in order to improve the teaching effect of animal experiment courses, it is necessary to grasp students' mental state and quell their fear. [2-3]

This study selects students from a medical college to investigate their psychological states in front of experimental animals. In view of students' fear of animal experiments, we should innovate the teaching contents and experimental design in the future. Combining teaching with practice closely, enriching the experimental experience of medical students, finding out psychological methods to guide medical students in the experiment and further stimulating students' enthusiasm for animal experiments through assessment mechanism can eliminate students' fear of animal experiments from the source, and achieve the purpose of training students' experimental skills and improving teaching effects.

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2. Objects and Methods

2.1 Research Object

This investigation was conducted from April to May 2019, with undergraduates of a medical college as the research object. Using the method of random cluster sampling, students from medical specialties (clinical, anesthesia and so on) and non medical specialties (pharmacy, rehabilitation and so on) were investigated. 352 questionnaires were sent out.

2.2 Investigation Design

This study used the method of questionnaire, which was self-developed. With the help of psychology teachers in our schools, authors referred to the design of questionnaire in literature. According to existing literature and books at home and abroad, we designed and completed the questionnaire, *Survey of College Students' Attitude Towards the Life Value of Experimental Animals*, and then invited relevant experts in psychology and experimental animal to discuss and revise the questionnaire for several times. Finally, we improved the questionnaire items and options. According to the difficulty of questions, researchers sorted questions, and finally formed the questionnaire. It mainly includes basic information, relevant experience of experimental animals, pressure in experimental animals, views on experimental animals, influence of preparation before animal experiments on mental states and how to treat test animals. There are 27 questions in total.

2.3 Investigation Methods

After asking for students' understanding and consent, questionnaires were sent out on the spot, and then be filled in by students themselves and retrieved on the spot. During the process of filling, investigators were present at the scene. In case of unclear places, they could give simple and popular explanations, but they did not intervene and induce the results.

2.4 Statistical Treatment

After eliminating unqualified questionnaires, effective questionnaires were sorted out systematically. Using Excel to build the database, we input survey data by two people, and proofread carefully. The SPSS 22.0 software was used for frequency statistics, and the cross table was used for χ^2 test. The difference with $P < 0.05$ was regarded as statistically significant.

3. Results

3.1 Basic Information of Investigation

In this field survey, 352 questionnaires were distributed; 350 questionnaires were effective, with a recovery rate of 99.43%. There are 159 boys (45.43%) and 191 girls (54.57%). The age was 22.48 ± 1.97 years old. Medical and non-medical students were 210 (60.00%) and 140 (40.00%) respectively. Students had and had not seen slaughter were 283 (80.86%) and 67 (19.14%). Students had and had not slaughtered animals were 48 (13.71%) and 302 (86.29%).

3.2 Pressure Brought by Experimental Animals to Students

There were 145 (45.31%) students who had psychological pressure for experimental animals. The psychological pressure of medical students (31.90%) was lower than that of non-medical students (55.71%), and that of male students (27.67%) was lower than that of female students (52.88%) ($P < 0.05$). Specific results are shown in Table 1.

Table 1 Comparison of Stress Brought by Experimental Animals to Students; Number of People (%)

group	stress	no stress	total	X^2	P
medical	67(31.90)	143(68.10)	210	19.624	0.000
non-medical	78(55.71)	62(44.29)	140		
male	44(27.67)	115(72.33)	159	22.713	0.000
female	101(52.88)	90(47.12)	191		

3.3 Influence of Past Experience on Students' Psychology during Animal Experiments

The psychological stresses of students who had watched and had not watched slaughter scenes were similar (40.28% and 46.27%, respectively), and the difference was not statistically significant (P>0.05). The psychological pressure of students who had slaughtered animals (27.08%) was lower than that of the students who had not (43.71%); the difference was statistically significant (P < 0.05). Specific results are shown in Table 2.

Table 2 Comparison of the Psychological Stress of Students with Different Experiences Duing Animal Experiments; Number Of People (%)

group	stress	no stress	total	X^2	P
watched slaughter	114(40.28)	169(59.72)	283	0.800	0.371
not watched slaughter	31(46.27)	36(53.73)	67		
had slaughtered animals	13(27.08)	35(72.92)	48	4.718	0.030
Had not slaughtered animals	132(43.71)	170(56.29)	302		

3.4 Analysis of Students' Fear Factors toward Experimental Animals

The fear factors of male and female students are slightly different in the face of experimental animals. The fear rates for basic operation (21.38%) and execution (54.72%) were lower in male than in female (30.89% and 70.68% respectively). The rate of male students who had no fear and could complete the experiment independently (20.13%) was higher than the rate of female students (5.76%); the difference was statistically significant (P < 0.05). Specific results are shown in Table 3.

Table 3 Comparison of Fear Factors in the Face of Experimental Animals; Number of People (%)

gender	A	B	C	D
male	26(16.35)	34(21.38)	87(54.72)	38(23.90)
female	43(22.51)	59(30.89)	135(70.68)	11(5.76)
X^2	2.081	4.019	9.532	23.721
P	0.149	0.045	0.002	0.000

Note: *A: touch experimental animals; B: operations such as gavage; C: anatomic death; D without pressure, can complete the experiment alone

3.5 Influence of Various Preparatory Measures on Students' Psychological States during Animal Experiments

Before the animal experiment, through various preparatory measures, 50.57% of the student relieved their psychological pressure. The effect of relieving among medical students (53.33%) was similar to that of non-medical students (46.43%); the difference was not statistically significant (P > 0.05). The effect of relieving psychological stress was higher in male students (57.23%) than that in female students (45.03%); the difference was statistically significant (P < 0.05). Specific results are shown in Table 4.

Table 4 Influence of Preparatory Measures on Students' Psychological Effects in Animal Experiments; Number of People (%)

group	relieved	not relieved	total	X^2	P
medical	112(53.33)	98(46.67)	210	1.602	0.206
Non-medical	65(46.43)	75(53.57)	140		
male	91(57.23)	68(42.77)	159	5.172	0.023
female	86(45.03)	105(54.97)	191		

3.6 Effect of Students' Grades on Experimental Animals

Combining the animal experiment with students' grades, we found that 81.43% of the students overcame their fear to carry out the animal experiment because of grades. 56.29% of the students could grasp, fill the stomach and inject the animal in experiments for higher grades. 44.86% of the students could behead and dissect experimental animals for higher grades. Specific results are shown in Table 5.

Table 5 Influence of Students' Grades on Experimental Animals; Number of People (%)

content	yes	no
give up part of grades for fear of experimental animals	65(18.57)	285(81.43)
perform animal experiments for higher grades	197(56.29)	153(43.71)
Kill experimental animals for higher grades	157(44.86)	193(55.14)

4. Discussion

According to the investigation and analysis, it is found that students' psychological fear of experimental animals is slightly different among students with different genders, specialties and experiences. According to the performance of medical students in animal experiments, we found problems caused by psychological fear and further our study.

4.1 Psychological Status

Psychological stress refers to a kind of physical and mental tension of tendentious physiological reaction when people perceive or realize that they are facing vital and difficult environmental requirements. The animal experiment is a skill that medical students must master. In animal experiments, the psychological states of students are the key to the success of the experiment and the focus of this investigation.[4] Most of the students seldom contact with the anatomy and slaughter of living animals before entering the medical college; there will be some psychological pressure when entering the medical college to carry out animal experiments. Under the condition of psychological pressure, medical students are easy to have psychological problems in their study. For most students, they refuse to do animal experiments because they think these experiments are too cruel to animals. After the questionnaire, we found that most students felt uncomfortable in the experiment. There were 145 (45.31%) medical students with psychological pressure. Bacchi and other researchers found that 47.9% of medical students and 55.1% of psychological students were suffering from certain psychological problems.[5] Similar to the results of this study (45.31%), most students have psychological pressure. At the same time, the observation found that most students are able to complete the experimental operation, which shows that the fear of medical students in animal experiments is not very serious.

4.2 Analysis of Factors Affecting Students' Fear

In the face of experimental animals, non-medical students (31.905) felt more psychological pressure than medical students (55.71%). Maybe because medical students know that they need to contact with more people and experimental animals in the future, and they have certain psychological preparation. Moreover, compared with non-medical students, they are exposed to biological knowledge and medical operation, so they have less psychological pressure. The psychological pressure of male students (27.67%) was lower than that of female students (52.88%). Some studies have suggested that students in animal experiments have several different psychology attitudes towards animals: curiosity, fear, sympathy and doting. Gender has a great influence on students' experimental psychology; female students' psychological fluctuation is especially obvious.

When operating experimental animals, whether medical students have watched the scene of slaughtering animal had little effect on their psychological status (40.28% and 46.27% respectively), but whether they had experienced the slaughtering process can influence psychological conditions (27.08% and 43.71% respectively). Before the animal experiment, let students operate more animals can effectively reduce students' fear. Some scholars have found that only after practical operation can students master the knowledge, can they carry out animal experiments better and achieve better teaching effects. In the investigation of whether they had any killing experience, it was found that moat students have less practical abilities because of the resistance and bite of experimental animals. Some studies have shown that it is common for students to treat experimental animals mercilessly after being bitten, since it would not cause unnecessary pain.

There was no difference in the sources of stress between boys and girls in animal experiments, but there was a difference in sources of fear factors. Male students' fear of basic operation of

experimental animals (21.38%) and execution (54.72%) was lower than that of female students (30.89% and 70.68% respectively). 20.13% male students have no fear and can carry out the experiment independently, which was higher than that of female students (5.76%). When there was no intervention, boys have less fear and have strong abilities to complete the experiment alone, which may be related to the inborn psychological differences between men and women. Some scholars have found that most of the experimental animals are rats, and medical students are prone to fear them. In future teaching, we should strengthen publicity and education, so that students can fully understand the living habits and value of animals.

4.3 After Different Kinds of Intervention Measures, Medical Students' Psychological States in Front of Experimental Animals Changed Slightly.

The intervention measures mainly include, watching videos before class, teachers' demonstration, silent activities, giving simple psychological guidance and other activities. 50.57% students can relieve their fear. Among them, medical students (53.33%) and non-medical students (46.43%) had similar changes, while boys (57.23%) had more obvious changes than girls (45.03%). A possible reason is that boys are more adventurous for unknown courage, so their psychological pressure is less. Trying to overcome the timid nature of girls in the experiment is a key point to solve the problem of students' fear in experiments. It has been found that teaching students experimental skills, animal welfare and animal values can produce positive effects on clarifying the purpose of animal experiments and establishing a correct bioethical view. Finding a relatively relaxed method of killing and anatomy is also important to solve the fear in experiments.

As the saying goes, “grades are the lifeblood of students”. Combining part of students' grades with animal experiments, 81.43% of the students can overcome their fears and carry out animal experiments; 56.29% of the students grasp, fill the stomach, and inject experimental animals in order to get higher scores; 44.86% of the students carry out decapitation and anatomical extraction of experimental animals in order to get higher scores. Some scholars have found that experimental results are a kind of learning need which produces positive learning stress on students. The results have a greater driving force for the smooth development of animal experiments. In the process of teaching, teachers should timely conduct psychological counselling for students' problems. If students do not have stable interests, there is no urgent need to learn.

5. Conclusion

In a word, most medical students have psychological pressure in front of experimental animals, but the situation can be improved through some measures. In medical colleges and universities, animal experiments are experimental items that medical students need to master. In animal teaching, teachers should have targeted psychological guidance and take measures, which can effectively reduce the fear of students in animal experiments and improve the teaching level. Psychology in the animal experiment is an important factor affecting the result of the experiment. To help students overcome the psychological fear in experiments is important content to improve the experimental teaching effect. According to this survey, medical students, male students and students who have slaughtered animals have better psychological states. The methods of increasing credits and pre experiment prediction can be used to find the solution to psychological fears, and effectively stimulate the enthusiasm of students for animal experiments. Therefore, we should innovate in teaching contents and experimental design, combine teaching with practice closely, and enrich students' experimental experience. At the same time, we should find psychological methods to guide students in experiment and further stimulate students' enthusiasm for animal experiments through the assessment mechanism, eliminate their resistance and fear of animal experiments from the source, so as to exercise students' experiments skills and improve the teaching effect.

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