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Determination of the Ideas and Expectations of the Students Taking the Laboratory Animal Breeding Course towards their Clinical Skills Acquisition and their Achievements and Anxiety Levels at the end of the Application

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Abstract: This study aimed to determine the thoughts and expectations of the students who took laboratory animal breeding courses about clinical skill acquisition and their achievements and anxiety levels at the end of the application with a survey study. One hundred thirtyeight students participated in the survey. The questionnaire method was applied to the propositions and questions created using the State-Trait Anxiety Scale and the literature. A statistically significant difference (P<0.05) was found between the students' total scores of opinions and expectations towards the practice before and after the practice course. The total score of opinion and expectation towards the application after the application lesson was found to be higher (P<0.01) than the total score of opinion and expectation towards the application before the application lesson. State anxiety (P<0.05) and trait anxiety total score (P<0.01) were lower after the application lesson than before the application lesson. It was concluded that the applied education made a difference in the students' clinical skill acquisition and positively affected their mood.
Keywords: Clinic, emotion, laboratory animal, practice, student

Laboratuvar hayvanı yetiştiriciliği dersi alan öğrencilerin klinik beceri kazanımlarına yönelik düşünce ve beklentileri ile uygulama sonunda kazanımları ve kaygı düzeylerinin belirlenmesi

Öz: Bu çalışmada, laboratuvar hayvanı yetiştiriciliği dersi alan öğrencilerin klinik beceri kazanımına yönelik düşünce ve beklentileri ile uygulama sonundaki başarıları ve kaygı düzeylerinin anket çalışması ile belirlenmesi amaçlanmıştır. Ankete yüz otuzsekiz öğrenci katılmıştır. Durumluk-Sürekli Kaygı Ölçeği ve literatür kullanılarak oluşturulan önerme ve sorulara anket yöntemi uygulanmıştır. Öğrencilerin uygulama dersi öncesi ve sonrasında uygulamaya ilişkin görüş ve beklentileri toplam puanları arasında istatistiksel olarak anlamlı bir fark (P<0.05) bulunmuştur. Uygulama dersi sonrası uygulamaya yönelik görüş ve beklenti toplam puanı, uygulama dersi öncesi uygulamaya yönelik görüş ve beklenti toplam puanından yüksek bulunmuştur (P<0.01). Uygulama dersi sonrasında durumluk kaygı (P<0.05) ve sürekli kaygı toplam puanı (P<0.01) öncesine göre daha düşük bulunmuştur. Uygulanan eğitimin öğrencilerin klinik beceri kazanımlarında fark yarattığı ve duygu durumlarını olumlu yönde etkilediği sonucuna varılmıştır.
Anahtar kelimeler: Duygu, klinik, laboratuvar hayvanı, öğrenci, uygulama

Introduction

Clinical practice and theoretical knowledge constitute an essential part of veterinary medicine education and are inseparable. Veterinarian candidates are offered the opportunity to reinforce the theoretical knowledge they have acquired through the courses in the education programs with clinical skills (Özen and Özen, 2006). Clinical skill is the name given to all of the procedures and interventions that a clinician veterinarian will do in practice to her patients throughout her/his professional life. Usage areas of laboratory animals are; basic science research, veterinary and human medicine research, production and breeding, reliability and validity testing, and education. The purpose of use in the field of education is to develop basic and unique clinical skills for those who work or will work in areas where clinical skills are needed, as well as ensuring that researchers understand the physiology, anatomy, and manipulation of these animals and become competent in scientific studies with animal experiments. However, no study was found that followed and determined the development of clinical skills of veterinary medicine students studying. In studies (Çiftçili et al., 2006; Tosun et al., 2008; Sabancıoğulları et al., 2012) on the development of practice skills of medical and nursing profession candidates, it has been determined that the practice program contributes to the increase of professional com-

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petence of the students, making them feel safe and ready for the profession. Clinical skill practice can create anxiety in clinician veterinarian candidates for the procedures and interventions to be performed in practice. Anxiety is a feeling of worry about a non-objective problem. In studies conducted with university students studying in different fields in our country, it has been determined that the high level of anxiety in students is affected by many variables related to the field of education as well as individual and environmental factors (Bayar et al., 2009; Deveci et al., 2012). Anxiety about the chosen department and profession in biology and medicine students was associated with high anxiety levels (Çakmak ve Hevedanlı, 2005; Canbaz et al., 2007). Considering the anxiety level of the students before the clinical practice may be a guiding finding for the educator in terms of developing a sense of relaxation and confidence in the students during the practice. Lack of adequate training and self-control in this area can threaten animal health in clinical and surgical treatments and practices and affect the results of scientific research and animal welfare. In order to prevent this potential negatif effect, different applications are made, and training using live animals in these applications have been the subject of discussions for a long time (Hansen and Boss, 2002; Daly et al., 2014). In a study of animal welfare, Platto et al. (2022) reported that the attitudes towards animal welfare of students who had previously participated in a laboratory study using an animal were positively affected. Daly et al. (2014) reported that more than 90% of students in the field of health should have an education using live animals in the curriculum. Another advantage of using laboratory animals in student education is that different animal species' physiological and anatomical characteristics (Daly et al., 2014) provide study diversity. In this study, it was aimed to determine the anxiety levels of students who took a laboratory animal breeding course, their achievements in basic surgical techniques at the end of clinical practice, and the relationship between their feelings, thoughts, and expectations for clinical practice and their anxiety level.

Materials and Methods

This cross-sectional study was conducted at Erciyes University, Faculty of Veterinary Medicine. The participants of the study were second-year students taking the Laboratory Animal Breeding course at Erciyes University Faculty of Veterinary Medicine in the 2016-2017 and 2017-2018 academic years. The study aimed to reach the entire participant population (n=138) without making a sample selection. Before starting the research, permission was obtained from The Erciyes University Clinical Research Ethics Committee (Decision no: 2017/ 81; Date: 03.02.2017). The research data were obtained by the questionnaire applied and collected with the State-Trait Anxiety Scale and Form A: Student Introduction and Pre-Application Questionnaire Form, and Form B: Post-Application Questionnaire, which were created by the researchers by using the literature.

Clinical practice method

All the students participating in the study were shown the techniques of animal holding, blood collection, injection, drug administration, oral gavage, anesthesia, incision, suturing, abdominal dissection, and necropsy used in clinical practices. As animal material, 40 mice (BALB/c), 40 rats (Wistar albino), and 20 rabbits (New Zealand) were used.

Tools used

Form A: Student Introduction and Pre-Application Questionnaire Form. This questionnaire consists of 8 questions with more than one proposition/question content. The questionnaire includes questions to determine the students' sociodemographic characteristics, their views on the department they are studying, their feelings and thoughts about clinical practice, and their views and expectations about clinical practice. Before the practice lesson, the positive views and expectations of the students were determined with a question consisting of 8 positive propositions. Responses to each suggestion were evaluated using a five-point Likert method (1: totally agree- 5: strongly disagree). In the analysis, "strongly agree" and "agree" were grouped as "agree", "disagree" and "strongly disagree" as "disagree".

Form B: Post Implementation Questionnaire Form. This questionnaire consists of 3 questions with more than one proposition/question content. The questionnaire includes questions to determine the student's feelings during the clinical practice and their views on their achievements after it. After the practical lesson, the students' positive views and expectations about the application were determined with a question consisting of 8 positive propositions. Responses to each suggestion were evaluated using a five-point Likert (1: strongly agree - 5: strongly disagree) method.

State-Trait anxiety inventory: The state-trait anxiety scale developed by Spielberg et al. (1983) was used in the study. The scale was used to determine how people felt at that moment with some expressions they used to describe their feelings. The Turkish language validity and reliability study of the scale used in the study was carried out according to the statement of Öner and Le Compte (1983). This inventory includes two separate scales containing 40 items in total. The State Anxiety Inventory is concerned with identifying the emotions of the individuals participating in the research at a certain time and in specific conditions and responding according to these emotions. The Trait Anxiety Scale is intended to describe the feelings of individuals in the general process.

Both scales contain two types of statements with twenty items. A high scale score indicates a high anxiety level (Öner and Le Compte, 1983). The data were analyzed using the SPSS for Windows 22.0 (IBM 2013) statistical package program. Categorical variables are presented with number and percentage distributions. The mean and standard deviation of continuous variables were calculated. The conformity of the variables to the normal distribution was made with the Kolmogorov-Smirnov test, and it was determined that the data showed normal distribution. In statistical analysis, t test for independent groups, (Homogeneity of variances was evaluated with Levene test), and Pearson correlation analysis were used. The statistical significance level was accepted as $P<0.05$.

Results

The percentage values (%) of the opinions and thoughts of the students about the department they study are shown in Table 1.

The male students constitute 65.2% of the participants and the females correspond to 34.8%. The mean age was 20.17±2.18. Most of the students (96.4%) who participated in the research stated that they preferred the department for their goals and were satisfied with their studies. Most students (94.9%) stated that they consider it appropriate to do veterinary medicine, and 96.4% of them think of doing this profession after graduation (Table 1). The relationship between pre-clinical students' feelings and thoughts (Mean±SD) about clinical practice and their anxiety level is shown in Table 2.

About two-thirds of the students (68.1%) stated that they felt ready for preclinical practice, 83.3% stated that their theoretical knowledge was insufficient for clinical practice, and 94.2% were not afraid of contacting animals. When the relationship between the emotions and thoughts of the students about the clinical practice and their anxiety levels were examined before the clinical practice, it was determined that the state anxiety score was significantly higher only in the

Table 1. The percentage values (%) of the opinions and thoughts of the students about the department they study

Opinions	Yes n (%)	No n (%)
Did you choose your department willingly?	133 (96.4)	5 (3.6)
Are you satisfied with studying in your department?	133 (96.4)	5 (3.6)
Do you feel suitable for this department?	131 (94.9)	7 (5.1)
Have you received counseling/advice on your career choice?	62 (44.9)	76 (55.1)
Is there anyone in your family or close circle who is a veterinarian?	52 (37.7)	86 (62.3)
Do you intend to pursue this profession after graduation?	133 (96.4)	5 (3.6)

Table 2. The relationship between pre-clinical students' feelings and thoughts (Mean±SD) about clinical practice and their anxiety level

Feelings and thoughts			SATS	TATS
		n (%)	Mean±SD	Mean±SD
Do you feel ready for clinical practice?	**Yes**	94 (68.1)	38.04±8.56	54.12±3.72
	No	44 (31.9)	40.50±13.73	54.20±5.39
Do you think your theoretical knowledge is sufficient for clinical practice?	**Yes**	23 (16.7)	35.43±7.86	55.39±3.40
	No	115 (83.3)	39.50±10.85	53.90±4.44
Are you afraid of handling/contacting animals?	**Yes**	8 (5.8)	51.87±21.30*	52.37±1.92
	No	130 (94.2)	38.02±9.01	54.26±4.39
Is there an application that you are afraid of doing?	**Yes**	40 (29.0)	40.87±13.11	53.52±3.82
	No	98 (71.0)	37.98±9.18	54.40±4.48
Are you afraid of having a negative experience during the application?	**Yes**	69 (50.0)	40.02±11.59	54.34±4.66
	No	69 (50.0)	37.62±9.21	53.95±3.94

***P<0.05, T-test in independent groups. SATS: State anxiety total score, TATS: Trait anxiety total score**

Table 3. The change of the percentage values (%) in students' feelings about clinical practice before and after the practice

Feeling about clinical practice	Before n (%)	After n (%)
Fear	17 (12.3)	15 (10.9)
Exictement	98 (71.0)	80 (58.0)
Anxiety	51 (37.0)	40 (29.0)
Comfort	31 (22.5)	49 (35.5)
Reluctance	6 (4.3)	9 (6.5)
Mixed feelings	33 (23.9)	36 (26.1)

students who were afraid of dealing/contacting with animals (P<0.05, Table 2). The change of the percentage values (%) in students' feelings about clinical practice before and after the practice are shown in Table 3.

The percentage values (%) of student's views and expectations about the practice before the practice lesson are shown in Table 4. It was observed that the feelings of fear, excitement, and anxiety that existed before the application decreased, and the proportion of students with feelings of reluctance, comfort, and mixed feelings increased. When the positive opinions and expectations of the students about the practice were evaluated before the practice lesson (8 items), it was found that approximately three-quarters of the students had positive expectations; 81.2% of them agreed that this application would make it easier for them to adapt to clinical science courses, 89.2% of them agree that this application will provide clinical practice skills, and 85.5% of them agree that this application will create awareness about the use of personal protective equipment (Table 4).

The total score of the student's opinions and expectations towards the application before the practice lesson was higher than that of the students' opinions and expectations after the application lesson (P<0.01). It was observed that the students' state anxiety and trait anxiety total scores were lower after the practice course than before the practice course (respectively: P<0.05, P<0.01) (Table 5).

A low level of positive correlation was found between the student's total score of opinions and expectations about the practice before the practice lesson and the state anxiety level before the practice (r= 0.25, P<0.01). After the practice course, there was a low level of positive correlation between the total score of opinion and expectation towards the application and the level of state anxiety (r= 0.41, P<0.01), and a low level of negative correlation between the total score of trait anxiety (r= -0.23, P< 0.01) was found (Data not shown).

Table 4. The percentage values (%) of student's views and expectations about the practice before the practice lesson

Propositions	Agree (%)	Undecided (%)	Disagree (%)
This practice will facilitate my adaptation to clinical science courses	112 (81.1)	22 (15.9)	4 (2.8)
This practice will enable me to gain clinical practice skills	123 (89.2)	10 (7.2)	5 (3.6)
This practice will contribute to the development of my basic intervention skills	123 (89.2)	10 (7.2)	5 (3.6)
This practice will enable me to feel my responsibilities as a physician	117 (84.8)	14 (10.1)	7 (5.1)
I have a lot to learn from this practice	107 (77.6)	26 (18.8)	5 (3.6)
This application will create my awareness of the use of individual protective equipment.	118 (85.5)	17 (12.3)	3 (2.1)
This application will give me the habit of using individual protective equipment.	114 (82.6)	21 (15.2)	3 (2.1)
This practice will encourage me to learn more	117 (84.8)	17 (12.3)	4 (2.8)

Changes (Mean±SD) in the student's views and expectations about the practice before and after the practice lesson, and the state and trait anxiety levels are shown in Table 5.

Table 5. Changes (Mean±SD) in the student's views and expectations about the practice before and after the practice lesson, and the state and trait anxiety levels

Factors	Mean±SD	P*
Opinion and expectation score before the practice lesson	14.78±5.40	**<0.01**
Opinion and expectation score after the application lesson	15.05±4.99	
State anxiety total score before the practice lesson	38.82±10.50	**<0.05**
Post-practice state anxiety total score	37.03±8.67	
Trait anxiety total score before the practice lesson	54.15±4.31	**<0.01**
Trait anxiety total score after the practice lesson	40.76±8.04	

*** T test in dependent groups**

Discussion and Conclusion

Dewhurst et al. (1994) had conducted a study on learning intestinal epithelial absorption efficiency with 2nd-year students studying physiology. In the study, they compared the effects of using rat intestines on the learning levels of students with modeling in the computer environment. It has been emphasized that computer systems are more economical, protect animal welfare and create less stress for students. Dewhurst et al. (1994) and Costa et al. (2019) had reported that the e-learning platform could positively affect students' practical learning and effectively reduce their pre-study anxiety in a study comparing e-learning with face-to-face classroom applications in laboratory animal science education. However, although these alternative learning applications help close a crucial theoretical gap in a way that protects animal welfare, they will not be enough to meet all the requirements in the development of clinical dexterity, which is essential in both research and medicine. The results of our research reveal the advantages of practicing with animal models to consolidate the theoretical knowledge given in the lessons and to overlap with the dynamics of practice, to create the competence of the practitioners and the ability to work away from the risk of emotional approach. To confirm this determination, Guenther and Miller (2011) had reported in their research that students prefer the use of live animals in their education to virtual methods, and with this method, students can interact more. Elcoro and Trundle (2013) reported that students found the learning method using live animals more fun and exciting in an experiment they conducted using virtual and live rats. They reported that with this method, the concept of responsibility towards laboratory animals was better understood, the results obtained were more generalizable, and the level of fear before the application was reduced. Although there are answers that virtual applications can replace the use of live animals in the perception of animal behavior, 54.17% of the students participating in the research did not agree with the fact that studies with virtual mice would give generalizable results to human behavior and it was emphasized that the use of live animals in other manipulative processes could be more advantageous. The definition of "active learning that encourages participation", which is characterized in Cherney (2011) research, is also emphasized in the study of Elcoro and Trundle (2013). Again, Elcoro and Trundle (2013) state that it is an active learning way for students to have direct contact with objects relevant to the subject in the laboratory environment. It is seen that these results are in harmony with the data obtained from the changes in the opinions and expectations of the students determined in our research about the practice before and after the practice lesson and the changes in their state and trait anxiety levels. Similarly, the findings on the "reduction of fear level" seen in that research (Elcoro and Trundle, 2013) again support our results. In their study, Liddell et al. (2002) found that students receiving education in the field of health will increase their self-confidence with practices aimed at increasing procedural skills in the early period, which may increase skill-based effectiveness in the long term. In our study, the fact that students' fear, anxiety, and excitement levels were lower and comfort levels were higher after the intervention is in line with these explanations. Likewise, the data on students' opinions and expectations about the practice before and after the practicum course and the change in continuity anxiety levels also supported this approach. De Masi et al. (2016) reported that in their training study to improve the surgical skills of medical students using live animals, the student's practical skills improved at the end of the applications, and the feeling of self-confidence required during the operation changed positively. In our study, students' opinions and expectations about the practice before and after the practice course, the change in state and trait anxiety levels, and their gains from the practices align with this study's results. Schoeb et al. (2016) reported that students' theoretical knowledge and self-confidence levels were significantly affected by the practice in a realistic surgical education study organized to evaluate preclinical surgical skill development. The results obtained are supportive when we look at the change in status before and after the application in our research. The increase in the value of opinion and expectation and the decrease in the value of trait anxiety status after the practice lesson seem to be identical to the relevant literature (Schoeb et al., 2016). In a study (Redondo et al., 2010) in which the use of live animals in animal science education was investigated in terms of students' attitudes and welfare perception, it was reported that the teaching-learning process was positively affected after training with live rabbits and that this method was able to reach a level higher than the previous level of knowledge. In our study, it has seen that the students' "I agree" responses to the propositions "I have a lot to learn from this application" and "This application will encourage me to learn more" were at a high level before the application and that this expectation was realized positively and at a statistically significant level after the application. Küçükaslan et al. (2019) had reported that written print materials were more effective with the use of animals in the learning skills of veterinary faculty students. They concluded that in the training using plastic modeling, there was difficulty in grasping the systems in which the internal organs were located, and that the training in general with the animal use method was more successful than plastic models and internet-based training.

In this study, it has seen that the application made

with the students taking laboratory animal husbandry course positively affected the opinions and expectations of the students and that the application reduced the state and trait anxiety levels, which may make the education that the students will receive in this field more useful. It was concluded that training in the field of laboratory animal science that includes interventional procedures using live animals could increase clinical skill gains and positively affect emotional states and that this training can be beneficial in adapting to professional life more successfully. On the other hand, it may be considered that the availability of interventional practice training, which is the subject of our research, may be helpful to ensure standardization in the curriculum of courses in the field of laboratory animal science.

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Conflict of interest

The authors declare that they have no conflict of interest in this study.

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