

Nursing Students' Anxiety, Self-Satisfaction and Attitudes Toward Electronic Online Exams

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Abstract

Background: Nursing universities have a short history of using electronic online exams as an integral part of students' assessment that have the potential to trigger anxiety in nursing students. The success of the electronic online exams can be measured based on students' self-satisfaction and attitudes. **Aim:** Identify nursing students' anxiety, self-satisfaction and attitudes toward electronic online exams. **Design:** Descriptive exploratory research design was used. **Setting:** The study conducted at the Faculty of Nursing, Tanta University. **Tools:** Three tools were used. **Tool (I):** Test Anxiety Questionnaire, **Tool (II):** Student's satisfaction toward electronic online exams and **Tool (III):** Student's attitudes toward electronic online exams. **Results:** 63.4 % of nursing students had moderate level of anxiety toward electronic online exam, and 62.9% of students expressed moderate level of satisfaction. Whereas, 83% of nursing students in first academic year had positive attitude toward online exam compared to 49.1% of fourth academic year. There was a highly statistically significant relation between sex, academic years and student' anxiety. Also, it was a highly statistically significant relation between academic year, number of previous online exams and student' attitudes. **Conclusion:** Female students had a higher anxiety than male toward online exam and first year students had higher scores of positive attitude toward online exam than other students. Moreover, student's anxiety correlates positively with the poor attitude and negatively with student's satisfaction. **Recommendations:** The nursing students on the third and fourth academic year should be prepared well with frequent electronic online quizzes or exams.

Keywords: *Electronic online exams, Students' anxiety, Students' attitudes & Students' self-satisfaction*

Introduction

Electronic online learning is becoming very popular in nursing educational settings since the outbreak of COVID-19 and nursing students are no longer satisfied with traditional classroom education as well as have a great interest in electronic learning and distance education. Consequently, the method of nursing students' evaluation in different nursing institutions is recently changed (Chen et al., 2021). Currently, electronic online exams are a crucial component in electronic learning; this has created some important challenges for nursing educational institutions to organize examinations. Therefore, electronic online exams were introduced as an effective mode of nursing students' assessment with particular importance to provide immediate exams feedback, which is considered very useful and effective for academic staff members due to the increase numbers of students (Elsalem et al., 2020).

Electronic online exams approach is a good alternative to traditional assessment and facilitating the realization of educational goals at lower costs. It is a method that entails giving tests online (Amer, 2020). It refers to internet-based exams that students take through using a computer

and a special examination software. It enables students to answer a greater number of questions, offers students feedback and enables instructors to use various format. Having an electronic examination system enables academic institutions to store and organize numerous exams for different courses (Zahedi et al., 2021).

Moreover, electronic online exams are timed and controlled. Indeed, it is a crucial component of the learning process and a significant part of the electronic learning system in universities. So, it needs continuous evaluation to improve students' education and assessment (Khan & Khan, 2019). Investigating the quality of electronic exams plays a vital role to determine the strengths and weaknesses of the electronic learning system.

There are many benefits seen with transitioning to electronic online exams include paper saving and decreased fears over security of transporting test papers. Randomization of exam questions, the possibility of repeating the test several times, saves the time takes to review papers and schedule the marking sheets as well as automatic record keeping for item analysis also, was add to the advantages of online assessments (Elsalem et al., 2020). Almost, all the top universities of world are using general

purpose/customized solutions to manage electronic online examination systems like Smartphone application, Oracle and Blackboard (Qureshi, & Rizwan, 2015).

The use of electronic online exams has several limitations. For instance, technical issues like poor internet connectivity and power failure, a defect in the computer software, or hardware may be experienced. Also, the server performance may be poor which hinder the e-examination process (Amer, 2020). Electronic online exams can be vulnerable to cheating like screen sharing with other examiners. In fact, this can influence the reliability pertaining to the online examination systems (Albazar, 2020). In addition, some concerns of learners in developed countries were also being reported by learners in developing countries regarding online exams such as risk of technical failures (Adanir, 2020).

Nursing universities have a short history of using electronic online exams although it is considering an integral part of nursing students' assessment. Recently, many features have been introduced to minimize the use of unfair means in assessments; however synchronous online exams have the potential to trigger anxiety in nursing students (Shaheen et al., 2022). Besides that, anxiety is common in nursing education such as when students are exposed to assignments, projects on clinical experiences, various examinations, such as the objective structured clinical examination (OSCE) in clinical practice and online exams that have currently been implemented for nursing student's assessment (Khaira et al., 2023).

One of the main reasons why students perform poorly is anxiety. Anxious students usually have trouble in preparing for exams. Students who experience an acceptable level of anxiety are motivated to work hard and benefit from its positive consequences (Hanfesa et al., 2020). University nursing students are a special group of people that are enduring a critical transitory period in which they are going from adolescence to adulthood that can be one of the most stressful times in a person's life (Abdelwahed, & Hassan, 2017).

Anxiety is a most common feeling related to specific situation, which students experience frequently. This can effect on students' academic achievement and their personal well-being. In other words, it is often leading to negative cognitive evaluation, lack of concentration, poor academic performance, and undesirable physical responses. Student's anxiety is related to various factors, including method of evaluation and exams, test preparation, discomfort with testing situation, test-taking skills and students perception regarding technology use (Malakar, 2016).

The success of the online exams can be evaluated based on student self-satisfaction. Student's satisfaction can be defined as a good sense resulting

from an assessment of students' educational experience, services and facilities provided by the institution. It is a multidimensional process that is influenced by a variety of factors such as: personal and institutional factors. Firstly; personal factors include age, gender, preferred learning style, and student Grade Point Average (GPA). Secondly; institutional factors such as instruction quality, promptness of instructor feedback, clarity of expectation, teaching style and students' evaluation methods (Kanwar, 2022). So, the evaluation of student satisfaction toward electronic online exams as a part of online learning system will primarily assist students in getting better academic achievements (Younaset al., 2022).

Attitude of nursing students is a crucial variable to perform a behavior with its cognitive and affective dimensions. Attitudes make the behavior easier; therefore, increasing positive attitudes will increase the commitment of the student to academic development and enhance the achievement in the learning process, while negative attitudes can cause failure (Dikmen, 2020). Hence the current study aims to identify nursing students' anxiety, self-satisfaction and attitudes toward electronic online exams.

Significant of the study:

Students' evaluation methods usually affect how students learn, and online assessments must be created to encourage students' good learning behaviors. Electronic online exams as a method of nursing student's assessment can be seen as a positive development for online learning system (Rahim, 2020). Despite the widespread use of the electronic online exams as a way of student evaluation, studies on nursing students' anxiety, self-satisfaction and attitudes toward electronic online exams in Gharbia Governorate, Egypt are limited. Moreover, the infra structures are weak, the network are not always founding, and nursing students also are not well prepared to online exams. Therefore, this study will provide the nursing academic staff with necessary information to help them to intervene in the future electronic online exams. (Amer, 2020).

Aim of the study:

Identify nursing students' anxiety, self-satisfaction and attitudes toward electronic online exams.

Research Questions:

1. What are the levels of nursing students' anxiety and satisfaction toward electronic online exams?
2. What are the nursing students' attitudes toward electronic online exams?
3. Is there any relationship between nursing students' anxiety, satisfaction and attitudes toward electronic online exams?

Subjects and Method:

Research design:

Descriptive exploratory research design was used to achieve the aim of this study.

Setting:

The present study was conducted at the faculty of nursing and electronic online exams' center in the central library under the authority of Tanta University which affiliated to Ministry of Higher Education and Scientific Research, where the electronic online exams for nursing's students were applied. The electronic online exams' center consists of two floors, each one composed of six labs with 564 computers in each.

Subjects:

The sample was 350 undergraduate nursing students that were enrolled in the second semester of the academic years (2022-2023). The students name lists were obtained from the statistical records of the student's affairs office, Faculty of Nursing, Tanta University, 2023. Students were selected by using proportional allocation sampling design. Total nursing students were 3339 actual number of students and the sample size estimated 350 students represented 60 students from first academic years, 155 students from second academic year, 120 students from third academic year, and 55 students from fourth academic year. The sample size calculation was done by using equation (Thompson, 2012) From Next Formula.

$$n = \frac{Nxp(1-p)}{\{[N - 1x(d^2 \div z^2)] + p(1-p)\}}$$

Where **n**: Sample size, **N**: Population size in every grade first year 553 students, 1100 students in second year, third year were 1146 students, and fourth year were 540 students, whereas **Z**: confidence level at 95%, **d**: error proportion (0.05), **p**: probability (50%).

Tools:

Three tools were used for data collection:

Tool (I): "Test Anxiety Questionnaire ": This tool consisted of two parts as the following:

Part (1): "Student's Socio- Demographic Characteristics": It includes items as students' code, sex, age, marital status, residence, numbers of previous electronic online exams, student s' placement in nursing faculty either first or second or third or fourth year.

Part (2): "Test Anxiety Questionnaire". This tool developed by **Nist & Diehl, (1990)** and adopted by researchers. It was used to measure anxiety that experienced by students toward electronic online exam, it consisted of 10 items to determine how often participants experience the feeling that mentioned in each account and rated on 5- point likert scale, ranged from (1) never to (5) always. Example of the items of this questionnaire are as follows; I make mistakes on easy questions or put answers in the wrong places and I read through the

test and feel that I do not know any of the answers and I remember the information that I blanked on once I get out of the testing situation.

The scoring system:

The overall score on this scale was between 10 and 50 and the higher score (50) means unhealthy anxiety or sever level of anxiety. The levels of anxiety were calculated by cut off points and summing scores of all levels as the following: Less than 20% considered low anxiety (healthy anxiety), 20- to 35 % considered moderate level of anxiety (healthy) and more than 35% indicating severe level of anxiety (unhealthy anxiety).

Tool (II): "Student's Satisfaction toward Electronic Online Exams": This tool was adapted from (**Qalawa et al., 2021**) by researchers, it was used to measure nursing students' satisfaction toward electronic online exam, it was consisted of 16 items on a five-point Likert scale ranged from strongly disagree (1) to strongly agree (5). Example of items of this tool is as follows; the course's academic staff present or available at the time of electronic online exam.

The scoring system:

The total score ranged from (16 to 80) and the higher score (80) means higher level of nursing student's satisfaction toward online exam. The satisfaction was calculated by cut off points and summing scores of all levels as the following: Less than 50 % were considered low level of satisfaction, 50% to less than 75% indicating moderate level of satisfaction and more than 75% indicating high level of satisfaction.

Tool (III): "Student's Attitudes toward Online Electronic Exams ": This tool adapted from (**Chin et al., 1991**) by the researchers. It was used to determine attitude of nursing students toward electronic online exam, it consisted of 10 items that were rating on six-point Likert scale from strongly disagree (1) to strongly agree (6). The total score will be ranged from (10 to 60). Example of modified items of this tool are as the following: I felt aggressive and hostile toward the electronic online exam and taking the electronic online exam made me very nervous.

The scoring system:

The total score of this scale ranged from (10-60) and the higher score (60) means more negative attitude. The attitude was calculated by cut off points and summing scores of all levels as the following: Less than 60% indicating positive attitude while, more than 60% indicating negative attitude.

Methods:

An Official permission to clarify the purpose of the study that was addressed to the Dean of Faculty of Nursing, Vice Dean of Student Affairs, Vice dean of postgraduate studies and researches and head of departments of different specialty as Medical Surgical Nursing, Pediatric Nursing, Critical Care

Nursing, Maternal and Neonatal Health Nursing, Community Health Nursing, Nursing Administration, Psychiatric and Mental Health Nursing Departments to obtain permission for data collection.

Ethical considerations:

- Ethical approval was obtained from ethical committee of Faculty of Nursing, Tanta University (code. no. 244-4-2023).
- Informed consent was got from the participants after explanation of the study purpose.
- Anonymity was assured to all students.
- Respecting the students' right to cancel their participation at any time during the data collection process.

Validity of tools:

A jury composed of five experts who evaluated the content validity of each tools; four were professional in nursing as medical surgical nursing, pediatric nursing, psychiatric and mental health nursing and nursing administration and one was professional in IT informatics.

Reliability of The Tools:

Using the Cronbach's alpha test, the study tools' reliability was calculated as: Tool (I) Test anxiety questionnaire reliability was 0.845, tool (II) student's satisfaction toward electronic online exams was 0.728 and tool (III) student's attitudes toward online electronic exams was 0.738.

A Pilot study:

Before embarking the actual study, a pilot was carried out on 10% of the study subjects to ascertain the clarity and applicability of the study tools and to identify obstacles that might be faced during data collection. Modifications were done by the researcher before the main study. Those subjects were selected proportionally and were excluded from the actual study sample.

The actual study:

The researchers were collecting the data for one month started from 30 may to the end of June, second semester of academic year (2022-2023) during the exams period. The tools of the study were created in Google form and send to all the participants via WhatsApp for their smart phone through link below:
https://docs.google.com/forms/d/e/1FAIpQLSf95p70tGBuwjZbadrA9E22Sn2Yvh3yrFnZQXS8xBRvgH0Liw/viewform?usp=sf_link). Daily reminders were sent to the participants to increase the response rate during the data collection. The students' response was prevented from being recorded more than once.

Statistical analysis:

The collected data were arranged, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 26, SPSS Inc. Chicago, IL, USA). Range, mean and standard deviation were calculated for quantitative

data. For qualitative data, that described a categorical set of data by frequency, percentage or proportion of each category. The t-test was used to compare the means of two groups of parametric data of independent samples. The F value of the ANOVA test was generated to compare parametric data that had more than two means but for comparison between more than two means of parametric data, F value of ANOVA test was calculated (White, 2019). The correlation between variables were evaluated by using Pearson's correlation coefficient (r). Significance was adopted at $P < 0.05$, and highly significance was adopted at $P < 0.001$ for interpretation of results of tests of significance.

Results:

Table (1): Distribution of Studied Nursing Students According to Socio-demographic and Students' Placement Characteristics

Socio-demographic Characteristics	The studied students(n=350)	
	no.	%
Age (Years):		
17 – < 18	14	4.0
18 - < 21	256	73.1
≥21	80	22.9
Sex:		
Male	108	30.9
Female	242	69.1
Marital status:		
Single	324	92.6
Married	26	7.4
Place of residence		
Rural	254	72.6
Urban	96	27.4
Academic year		
First year	60	17.1
Second year	115	32.9
Third year	120	34.3
Fourth year	55	15.7
Numbers of previous electronic online exams		
1 – 5	103	29.4
6 – 10	60	17.1
More than 10	187	53.4

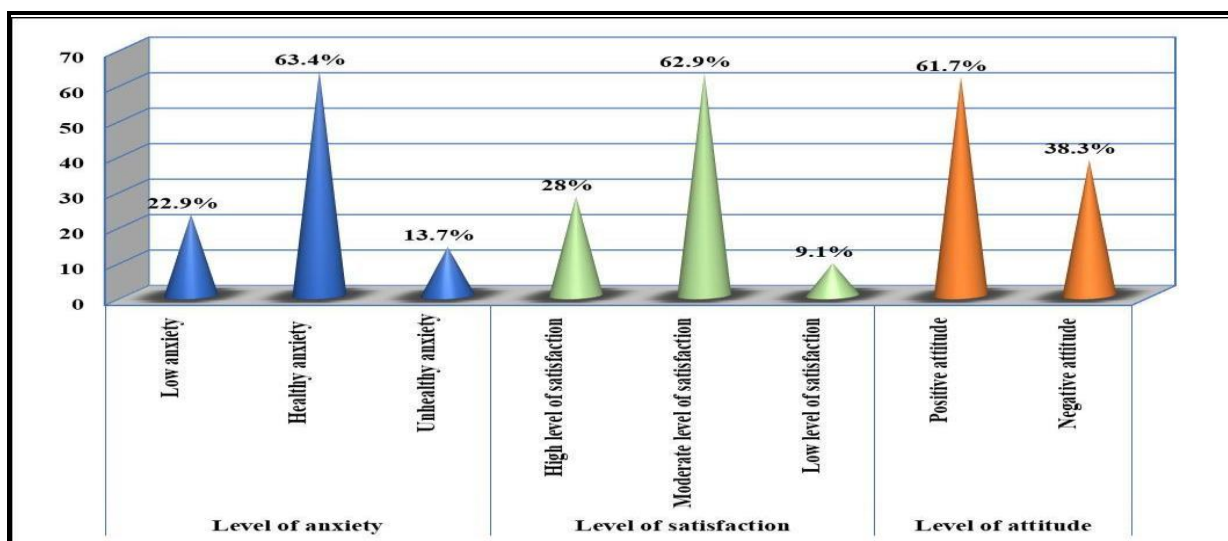


Figure (1): Anxiety and Satisfaction levels among nursing students, and their Attitudes toward the Electronic Online Exam

Table (2): Levels and mean scores of anxieties, satisfaction and attitude of nursing students in 1st, 2nd, 3rd, and 4th academic years toward electronic online exam.

Items	Levels and mean scores of variables						
	Levels and mean scores of anxiety among nursing students						
	Academic year	Mean ± SD	Level of anxiety				
Low (Healthy)			Moderate (Healthy)		Severe (Unhealthy)		
		no.	%	no.	%	no.	%
First year	22.83 ± 6.98	19	31.7	39	65.0	2	3.3
Second year	27.69 ± 8.50	15	13.0	80	69.6	20	17.4
Third year	25.56 ± 9.39	34	28.4	67	55.8	19	15.8
Fourth year	25.89 ± 7.99	12	21.8	36	65.5	7	12.7

2- Levels and mean scores of satisfaction among nursing students							
Academic year	Mean \pm SD	Low		Moderate		High	
		no.	%	no.	%	no.	%
First year	56.86 \pm 9.37	29	48.3	29	48.3	2	3.4
Second year	52.35 \pm 10.23	26	22.6	80	69.6	9	7.8
Third year	51.09 \pm 11.50	31	25.8	74	61.7	15	12.5
Fourth year	51.01 \pm 9.47	12	21.8	37	67.3	6	10.9

3- Mean scores of attitudes among nursing students					
Academic year	Mean \pm SD	Positive		Negative	
		no.	%	no.	%
First year	25.02 \pm 9.66	50	83.3	10	16.7
Second year	34.04 \pm 11.54	66	57.4	49	42.6
Third year	32.41 \pm 10.36	73	60.8	47	39.2
Fourth year	34.05 \pm 9.14	27	49.1	28	50.9

Table (3): Correlation between students' anxiety, satisfaction, and attitudes toward electronic online exam

Variables		Anxiety score	Satisfaction score
Satisfaction score	R	- 0.450	-----
	P	0.0001**	-----
Attitude score	R	0.581	- 0.541
	P	0.0001**	0.0001**

** Highly Statistically significant difference at ($P < 0.01$).

Table (4): Relation between students' anxiety and their sociodemographic and students' placement characteristics toward electronic online exams.

Sample characteristics (n= 350).	Mean \pm SD	F value / t-test P
Age (Years)	17 - < 18	25.74 \pm 8.64
	18 - < 21	26.36 \pm 9.13
	≥ 21	24.85 \pm 6.34
Sex	Male	22.79 \pm 8.07
	Female	27.21 \pm 8.54
Numbers of previous online exams	1 - 5	27.48 \pm 9.12
	6 - 10	25.85 \pm 8.12
	More than 10	24.94 \pm 8.42
Academic year	First year	22.83 \pm 6.98
	Second year	27.69 \pm 8.50
	Third year	25.56 \pm 9.39
	Fourth year	25.89 \pm 7.99

** Highly Statistically significant difference at ($P < 0.01$)

Table (5): Relation between students' satisfaction and their sociodemographic characteristics toward electronic online exam.

Sample characteristics (n= 350).	Mean \pm SD	F value / t-test P
Age (Years)	17 - < 18	52.61 \pm 10.63
	18 - < 21	51.47 \pm 10.38
	≥ 21	55.85 \pm 11.23
Sex	Male	52.31 \pm 11.51
	Female	52.56 \pm 1.019
Numbers of previous online exams	1 - 5	50.16 \pm 9.82
	6 - 10	51.90 \pm 9.49
	More than 10	53.95 \pm 11.14
Academic year	First year	56.86 \pm 9.37
	Second year	52.35 \pm 10.23
	Third year	51.09 \pm 11.50
	Fourth year	51.01 \pm 9.47

* Statistically significant difference at ($P < 0.05$)

** Highly Statistically significant difference at ($P < 0.01$)

Table (6): Relation between students' attitude and their sociodemographic characteristics toward electronic online exam

Sample characteristics (n= 350).	Mean ± SD	F value / t-test P
Age (Years)	17 – 18	31.44 ± 10.98
	19 – 21	34.06 ± 10.45
	≤ 22	28.92 ± 11.47
Sex	Male	29.42 ± 11.55
	Female	33.06 ± 10.46
Numbers of previous online exams	1 – 5	35.37 ± 11.08
	6 – 10	31.58 ± 10.04
	More than 10	30.16 ± 10.72
Academic year	First year	25.02 ± 9.66
	Second year	34.04 ± 11.54
	Third year	32.41 ± 10.36
	Fourth year	34.05 ± 9.14

** Highly Statistically significant difference at ($P < 0.01$)

Table (1): Shows the characteristics of nursing students, it appears that most of nursing students (73%) aged between 18 to less than 21 years, and 69.1 % are female, and 30.9% are male. The majority of study sample (92.6%) are single, and 72.6% of them inhabiting in rural area.

As regarding to students' academic years, around one third of them (34.3%) were ruled in third academic years, and 32.9% of study students in second academic years, while only 17.1% and 15.7 from first and fourth academic years respectively. In addition to, more than half of students (53.4%) have more than ten experiences of electronic online exams.

Figure (1): Illustrates anxiety and satisfaction levels among nursing students, and their attitudes toward the electronic online exam. Regarding to students' anxiety the most students (63.4%) have moderate level of healthy anxiety toward electronic online exam, and 22.9 % have lower level, and only (13.7%) complain from unhealthy or severe level of anxiety. Concerning to levels of nursing students' satisfaction toward electronic online exam, more than half of students (62.9 %) expressed about feeling of moderate level of satisfaction, and 28% have high level, and only 9.1% have low level of satisfaction. Moreover, the figure explores that more than half of nursing students (61, 7%) have positive attitude and 38.3 % have negative attitude toward electronic online exam.

Table (2): Represents levels and mean scores of nursing students' anxiety, satisfaction, and their attitude in the four academic years toward electronic online exam. It shows that (69.6%) of 2nd academic years' nursing students had moderate level of anxiety, followed by students in 4th and 1st academic years (65.5%, 65%) respectively, whereby the students who enrolled in 3rd academic year have lower levels (55.8%) of anxiety than others. Furthermore, the table show levels of satisfaction among nursing students, 69.6% of students' who enrolled in 2nd academic year have

moderate level of satisfaction, followed by students in 4th academic year (67.6%) and students in 3rd academic year (61.7%), and lastly students in 1st academic (48.3%). while the students who in 1st academic year have mean score of satisfaction more than other students. In another line, almost students (83%) in 1st academic year have positive attitude toward online exam with mean score 25.02 ± 9.66 followed by students in 3rd academic year (60.8%) with mean score 32.41 ± 10.36, and students in 2nd academic year (57.4 %) with mean score 34.04 ± 11.54 and lastly students in 4th academic year which 49.1% of them have positive attitude toward online exam with mean score 34.05 ± 9.14.

Table (3): Explores the correlation between nursing students' anxiety, satisfaction, and attitude toward electronic online exam. There is a negative correlation between students' anxiety and their satisfaction. This means that the students, who have severe level of anxiety, have low level of satisfaction toward online exam. In addition to, there are a positive correlation between students' anxiety and their attitude, this explains the higher anxiety lead to increase negative attitude toward online exam. In contrary to, the table explore a negative correlation between students' satisfaction and their attitude

Table (4): Describes the relation between students' characteristics and their anxiety toward online electronic exam. From this appears that a highly statistically significant relation is present between sex and student' anxiety whereby mean scores of anxiety among female's students is more than male. Also, there is a highly statistically significant relation between students' academic years and their anxiety as students who are in the second academic year have mean score of anxiety more than students who enrolled in other academic year followed by students among third and fourth academic years and lastly students in first academic year, have lower mean score of anxiety.

Table (5): Shows the relation between students' satisfaction and their characteristics toward

electronic online exam. There is a statistically significant difference between numbers of students' experience of previous electronic online exams and their satisfaction; the mean score of satisfaction among students who examined more than ten times are more than other students who examined less numbers of online exams. This means that the more students' experiences about electronic online exams the more feeling of satisfaction occurred about it. Contrary, the mean score of the students' satisfaction in the first academic year are more than students in others academic years, there are highly statistically significant relation between academic years and students' satisfaction toward online exam. **Table (6):** Explores the relation between students' characteristics and their attitude. There is a highly statistically significant relation between sex and students' attitudes whereby females have mean score of negative attitude more than males. In addition, there are a highly statistically significant relation between number of previous online exams and students' attitude, the students' who experienced few number of exams have high mean score of negative attitudes than other students who performed 6 to 10 exam, and who examined more than ten times. Moreover, the academic year affects statistically on students' attitudes. The students who in first academic year have low mean score of negative attitude than other students, and the students who enrolled in second and fourth academic year have the same higher mean score of negative attitude than other students. Also, there is a highly statistically significant relation between academic years and students' attitude toward electronic online exam

Discussion

Electronic online exams are widely used in educational institutions in the last few years. As a central aspect of the teaching process assessment and as one of the most efficient assessment methods, electronic online exams are method of nursing students' assessment aids in understanding whether the learning outcome has been received or not. Also, it ensures the achievement of academic goals and an understanding of the effectiveness of teaching practices by **Rautela et al., (2022)**, the decision to conduct electronic online exams considered as one trigger of anxiety for the nursing students. Electronic online exams were the most prominent source of anxiety found in students across higher education. Therefore, students' anxiety, self-satisfaction and attitudes towards these exams should be continuously monitored by educators.

The present study is among the first studies that identifying anxiety, satisfaction and attitude associated with electronic online exam among nursing students in Egypt. The present study results showed that more than half of the studied students were females. According to the researcher's view,

this is due to male nursing students still facing lots of challenges and barriers, such as the belief that male is inappropriate as caregivers, nursing continues to be a largely female job and nurses through caring, were only doing what they came naturally to do as women by **Abdelrahman et al., (2016)**.

Regarding the level of nursing students' anxiety before electronic online exams, the present study revealed that more than half of the studied students have a healthy level of test anxiety and minority have unhealthy level or higher level of anxiety. These findings agreed with the study of **Elshazly et al., (2023)** who investigated the relationship between exam anxiety, computer experience, and obstacles for nursing students who had undertaken electronic exams and confirmed that more than one quarter of nursing's students reported normal average anxiety levels and only few had extremely high level of anxiety. In the same line, **Mastour et al., (2022)** found that 36.9% and 35.2% of studied students had moderate and severe level of anxiety respectively, toward remote online tests. Moreover, **Porrás & Ortega, (2021)** in a study investigated procrastination, test anxiety and academic performance on university students, explored that 45.3% of faculty students reflected a medium level of anxiety, 28.9% reflect high level and 25.9% showed low level. In contrary to **(Kolagari et al., 2018)** who reported that nearly half of student in the computer based test group had high level of test anxiety than control group. From the researcher's view, the students in the present study have a healthy level of anxiety toward the online exam, may be because of adolescents and youth students have more experiences with smart phone application and internet uses, these experiences made them familiar with online exam.

The current results found a highly statistically significant difference between males and females regarding mean scores of anxiety, where female nursing students had higher mean scores of anxiety toward electronic online exams compared to males. This finding may be due to the female students were more interested and occupied with achievement and success in theoretical studies than male, where male students more interested with practices and skills in clinical setting and laboratory tests. This finding was consistent with **Shaheen et al., (2022)** who confirmed that a significant difference between levels of test anxiety and gender was present as female students had a significantly higher level of test anxiety just pre and post the online test. This is also agreed with the results of a study done by **Ewell et al., (2022)** who revealed that trait and state test anxiety was higher overall in women than men. Furthermore, this finding was consistent with the result concluded that female students had higher test anxiety than male in a study done by **Matara & Pantu (2021)** who assess the level of

test anxiety in students in terms of gender in Indonesia. Accordingly, it may be caused by the academic motivation of female was stronger than in male, especially in the aspects of personal goals, attitudes and female usually had pressure to prove themselves in communities as identified by **Kuśnierz et al., (2020)**. In contrast, the study conducted by **Alkawatli et al., (2022)** who mentioned that test anxiety is higher in male than female.

There is a highly statistically significant relation between nursing students' anxiety and the academic year. As the present study showed that anxiety mean scores in nursing students of second academic year was higher than other students. From the researchers' point of view, the second year's students may have a more vigorous specialty nursing subjects with increased level of difficulty which can lead to increase anxiety level. For third and fourth academic year students, they became more mature and respond to exams with better coping as they progressively more equipped with skills that help them adapt better to stressful exam situations.

On another hand the students in first academic year experienced a lower mean score of anxiety toward electronic online exams compared with other students. It is important to mention that the first-year students came from secondary educational level which were more different from faculty study, they came to faculty life and had more motivation, confidants as became a faculty student and welcome with new experiences.

This finding in the present study was agreed with **Macauley et al., (2018)** who stated the anxiety scores were significantly higher in second year students of physical therapy compared to first-year. Furthermore, **Dawood et al., (2016)** reported a statistically significant negative relationship between test anxiety scores and students' academic level as test anxiety scores decreased with increased academic level of nursing students.

Regarding to self- satisfaction of nursing students, the present study showed that, the most of the studied nursing students had moderate to high level of self- satisfaction toward electronic online exams while few percent of the studied students had lower level. This finding agreed with the **Sutrisno et al., (2020)** who concluded that most nursing students were satisfied with the assessment using the online nursing OSCE on the time to retrieve score and the score accuracy. Similarly, **Tran et al., (2021)**, provide additional support to the present study results as concluded that the majority of students prefer the online assessment. In contrast to current study, **Noor et al., (2022)** concluded that the majority of studied students were dissatisfied with online teaching as well as online assessment method. The current findings revealed a highly statistically significant relation between nursing students'

satisfaction and their academic year, as nursing students at first year had high mean scores of satisfactions compared to students of other academic years. It could be explained by the first academic year had in a new program bylaws by credit hours that have 2 online quizzes and online midterm exam per semester before final exam while second year, third year and fourth year are learning in old bylaws without credit hours teaching and does not expose to online quizzes or online assessment before final exam assessment.

These findings align very closely with **Qalawa et al., 2021** who found that first- and second-year students had higher mean scores of satisfactions regarding electronic exams than the other academic levels.

Moreover, nursing students who exposed to more than 10 electronic online exams had high mean scores of satisfactions than students who did not. These results may explain the relation between student's satisfaction and number of students' experiences about electronic online exams. Students usually spend a long time on their smart phones, or laptops every day, so they are familiar with using the computer during exams. Also, the major benefits of increase number of exposure to the electronic online exams that may lead to increase students' experiences and help to avoid ambiguity of the exams.

Regarding to attitude of nursing students toward electronic online exam. Results indicated that more than half of nursing student's had positive attitude toward electronic online exam. This result was in agreement with a previous study conducted by **Sabet et al., (2020)** who reported that mean score of student's attitudes in electronic test group was more than traditional test group. Also, there were highly statistically significant relation between nursing student's attitude and sex whereby female have mean score of negative attitudes more than male. Additionally, these findings in the same line with **Mondal (2021)** who found significant difference between the attitude of male and female students towards online examination. However, it was found that attitude of male students was significantly better than female students towards online examination.

The present finding revealed that there was a highly statistically significant relation between nursing student's attitude and students' academic years. As students who are in the first academic year have low mean scores of negative attitude than fourth academic years' students. This may be due to fourth year students have better familiarity of the traditional paper and pencil exam than online exams. This may be due to fourth year students have better familiarity of the traditional paper and pencil exam.

The present study results showed a positive correlation between students' anxiety and attitudes,

which means that students who have moderate anxiety level led to positive attitudes and vice versa. From the researcher's point of view, healthy level or acceptable test anxiety in student's prior electronic online exams motivates them to work hard and provides them with its positive consequences. This was in the line with **Zafra et al., (2020)** who mentioned that moderate levels of stress or anxiety enhance students' motivation, leading to greater persistence when studying and achieving future goals. Moreover, the result was consistent with **Basuony et al., (2020)** who mentioned that motivation has an important and positive effect on the students' satisfaction which means that if the motivation of the students increased, it will lead to an increase in satisfaction and consequently, the students had better attitude toward electronic online exams.

The current study results revealed a negative correlation between students' satisfaction and attitudes i.e. More negative attitudes toward electronic online exams led to low level of satisfaction. This was disagreed with a study aim to evaluate students' attitudes and satisfaction regarding e-exams during COVID-19 which conducted by **Zahedi et al., (2022)** who concluded that there were positive and significant correlation between students' attitudes and students' satisfaction. Moreover, the result of the present study reported a negative correlation between students' anxiety and satisfaction. This result was agreeing with **Tahoon (2021)** who found a negative correlation between test anxiety and student's life satisfaction.

Assessment is an essential part of the learning process. Through this process, the learning outcomes can be measured and assessed. Carrying out the assessment process enables instructors to identify whether students have met the sought academic goals or not. Therefore, much attention must be provided to the assessment process. Unfortunately, a positive attitude is often the most difficult thing to maintain when students have low level of self-satisfaction. So, this study will participate in expanding the awareness of nursing faculty staff and students about the consequences of unhealthy test anxiety and benefits of using the online exams for assessment **Amer, (2020)**.

Conclusion:

Most of undergraduate nursing students felt healthy anxiety toward electronic online exam, and small percentage complained from unhealthy anxiety. Also more than half of nursing students had moderate levels of satisfaction and positive attitude toward online exams. A statistical significant relations was present between sex, academic years and students anxiety. Females students had a higher anxiety than male toward online exam. Also, a highly statistically significant

relation was present between academic year and student' attitudes as first year students had a high score of positive attitude toward online exam than other students. Moreover, student's anxiety correlates positively with the poor attitude and negatively with student's satisfaction. Also, that satisfaction correlates negatively with student's poor attitudes.

Recommendation:

The current study recommended the following:

- The nursing students on the third and four academic year should be prepared well with frequent on electronic online quizzes or exams in different courses to facilitate the learning process and may increase student's positive attitudes toward online exams.
- There was a need to raise awareness and among nursing students on testing the values of electronic online exams for improving course assessment and help to facilitate testing logistics.
- Get rid of all the obstacles that may hinders the using of electronic online exams.
- Replication of the study on large probability sampling.

References:

- **Abdelrahman, S., & Abdelkader, M. (2016):** Attitudes of Both Male and Female Nurses toward Men in Nursing in Minia University Hospital. *IOSR Journal of Research & Method in Education*, 6(6): 46-55.
- **Abdelwahed, W., & Hassan, S. (2017):** Prevalence and associated factors of stress, anxiety and depression among medical Fayoum University students. *Alexandria Journal of Medicine*, 53 (1): 77-84.
- **Adanir, G., İsmailova, R., Omuraliev, A., & Muhametjanova, G. (2020):** Learners' perceptions of online exams: A Comparative study in Turkey and Kyrgyzstan. *International Review of Research in Open and Distributed Learning*, 21 (3): 1-17.
- **Albazar, H. (2020):** A New automated forms generation algorithm for online assessment. *Journal of Information & Knowledge Management*, 19(1): 2040008.
- **Alkawatli, H., Bhyat, Y., Abdullah, M., & Alsuwaidi, M. (2022):** Test anxiety amongst university students: A Cross-sectional study. *Medical Reports & Case Studies*, 7 (11): 1-12.
- **Amer, M. (2020):** Effectiveness of using electronic exams in assessment in Saudi Universities: Empirical study, *International Journal of Educational Technology and Learning*, 8 (2): 61-69.
- **Basuony, M., Emad Eldeen, R., & Farghaly, M. (2020):** The factors affecting student satisfaction with online education during the

- COVID-19 pandemic: an empirical study of an emerging Muslim country. *Journal of Islamic Marketing*, 12(3) 631-48.
- **Chen, B., Yang, T., Wang, Y., Xiao, L., Xu, C., Qin, Q., Wang, Y., & Sun, Z. (2021):** Nursing students' attitudes toward mobile learning: An integrative review. *International Journal of Nursing Science*, 8(4):477- 85.
 - **Chin, C., Donn, S., & Conry, R. (1991):** Effects of Computer-Based Tests on the Achievement, Anxiety, and Attitudes of Grade 10 Science Students. [Educational and Psychological Measurement](#), 51(3):735-45.
 - **Dawood, E., Al Ghadeer, H., Almutary, N., & Alenezi, B. (2016):** Relationship between test anxiety and academic achievement among undergraduate nursing students. *Journal of Education and Practice*, 7 (2):57-65.
 - **Dikmen, M. (2020):** The mediating role of medical students' attitudes towards distance education in the relationship between e-learning styles and academic achievements. *Journal of Educational*, 6(2): 351-73.
 - **Elsalem, L., Al-Azzam, N., Jum'ah, A., Obeidat, N., Sindiani, A., & Kheirallah, K. (2020):** Stress and behavioral changes with remote E-exams during the Covid-19 pandemic: A cross-sectional study among undergraduates of medical sciences. *Annals of Medicine and Surgery*, 2020; (60): 271–79.
 - **Elshazly, E., Abdelnasser, N., & Ragab, O. (2023):** Relationship between exam anxiety, computer experience, and obstacles for nursing students who had undertaken electronic exams. *International Egyptian Journal of Nursing Sciences and Research*, 3 (2):327-41.
 - **Ewell, S.N., Josefson, C.C., & Ballen, C.J. (2022):** Why did students report lower test anxiety during the covid-19 pandemic? *Journal of Microbiology and Biology Education*, 23(1): 1-11.
 - **Hanfesa, S., Tilahun, T., Dessie, N., Shumet, S., & Salelew, E. (2020):** Test Anxiety and associated factors among first-year health science students of university of Gondar, Northwest Ethiopia: A Cross-sectional study. *Advances in Medical Education and Practice*, 1(1): 817–24.
 - **Kanwar, A., & Sanjeeva, M. (2022):** Student satisfaction survey: a key for quality improvement in the higher education institution. *Journal of Innovation and Entrepreneurship*, 11(27): 1-10.
 - **Khaira, M., Gopal, R., Saini, S., & Isa, Z. (2023):** Interventional strategies to reduce test anxiety among nursing students: A Systematic review. *International Journal of Environmental Research and Public Health*, 20(1): 1233.1-15.
 - **Khan, S., & Khan, R. (2019):** Online assessments: Exploring perspectives of university students. *Journal of Education and Information Technologies*, 24:661–677.
 - **Kolagari, S., Modanloo, M., Rahmati, R., Sabzi, Z., & Atae, A.J. (2018):** The effect of computer-based tests on nursing students' test anxiety: A quasi-experimental study. *Journal of Acta Informatica Medica*, 26 (2):115-18.
 - **Ku'snierz, C., Rogowska, A., & Pavlova, I. (2020):** Examining gender differences, personality traits, academic performance, and motivation in Ukrainian and polish students of physical education: A Cross-cultural study. *International Journal of Environmental Research and Public Health*, 17 (1): 5729.
 - **Macauley, K., Plummer, L., Bemis, C., Brock, G., Larson, CH., & Spangler, J. (2018):** Prevalence and predictors of anxiety in healthcare professions. *Health Professions Education*, 4 (3): 176–185.
 - **Malakar, P. (2016):** Test anxiety, academic achievement and relationship between general intelligence and emotional intelligence in adolescence. 6th international conference on research in behavioral and social science. London.
 - **Mastour, H., Ghalibaf, A., & Niroumand, SH. (2022):** Remote Online Test Anxiety during the Coronavirus Disease 2019 Crisis: A Cross-Sectional Study among Medical Students. *Iran Red Crescent Medical Journal*, 24(3):1-5.
 - **Matara, K., & Pantu, E. (2021):** Test anxiety is reviewed by gender. *Proceedings of the 1st International Conference on Law, Social Science, Economics, and Education*, ICLSSEE. Salatiga, Indonesia.
 - **Mondal, R. (2021):** Attitude towards online examination of college and university students. 2021; *International Journal of Creative Research Thoughts*, 9(2):326-31.
 - **Nist, P., & Diehl, M.(1990):** PHCC test anxiety questionnaire. Retrieved Aug, 20, 2010 from <http://phcc.edu/ods/questionnaire.htm> l.
 - **Noor, N., Qaisar, A., Ayesha, Lone, S., & Asmat, M. (2022):** Student Satisfaction with Online Teaching and Assessment during Covid 19. *Pakistan Journal of Medical & Health Sciences*, 16 (12): 221-24.
 - **Porras, M., & Ortega, F. (2021):** Procrastination, test anxiety and academic performance on university students. *Interdisciplinaria*, 38(2): 243-58.
 - **Qalawa, S., Elgazzar, S., Alsalamah, M., Aly, S., & Elhanafy., E. (2021):** An investigation of satisfaction regarding electronic exams among KSA nursing students: A multi university study. *International Journal of Innovation, Creativity and Change*, (2):515-531.
 - **Qureshi, J., & Rizwan, M. (2015):** A proposal of electronic examination system to evaluate descriptive answers. *Science International Journal*, 27 (3): 2143- 2146. ISSN 1013-5316.

- **Rahim, A. (2020):** Guidelines for online assessment in emergency remote teaching during the COVID- 19 pandemic. *Education in Medical Journal*, 12(2): 59–68.
- **Rautela, S., Panackal, N., & Sharma, A. (2022):** Modeling and analysis of barriers to ethics in online assessment by TISM and fuzzy MICMAC analysis. *Asian Journal of Business Ethics*, 11(1): 111-38
- **Sabet, F., Pourghane, P., Besharati, H., & Ebrahimiyan, A. (2020):** Comparing two methods of traditional and electronic tests based on attitude and experiences of medical students: A combined study. *Research in Medical Education Journal*, 12(3): 32-34.
- **Shaheen, A., Azam, F., Rabbani, W., & Kazmi, N. (2022):** Correlation of computer-based test anxiety with medical students' performance before, during and after assessments. *Pakistan Journal of Medical Science*, 38(3):476-80.
- **Sutrisno, R., Primanda, Y., & Fahni Haris, F. (2020):** Student's satisfaction on online nursing OSCE (on-osce) assessment application. *Indonesian Journal of Nursing Practices*, 4920: 70-76.
- **Tahoon, R. (2021):** Effects of test anxiety, distance education on general anxiety and life satisfaction of university students. *Psycho-Educational Research Reviews Journal*, 10
- **Tanta University.** Statistical Records of Students Affair for Faculty of Nursing, 2022-2023.
- **Thompson, S.K. (2012):** Sampling, 3rd edition, New Jersey, USA. John Wiley & Sons, Inc., Hoboken, p: 60.
- **Tran, T., Nguyen, PH., Nguyen, N., & Tran, D. (2021):** An empirical study on students' perception and satisfaction towards online assessment and testing in tertiary. *Advances in Social Science, Education and Humanities Research Journal*, 621(1): 207-16.
- **White, S.E. (2019):** Reading the medical literature: Basic & Clinical Biostatistics. 5th ed., Lange Medical Book/ McGraw – Hill. Medical Publication Division, New York, 220-33.
- **Younas, M., Noor, U., Zhou, X., & Menhas, R. (2022):** COVID-19, students' satisfaction about e-learning and academic achievement: Mediating analysis of online influencing factors. *Journal Frontiers in Psychology*, 13(1): 1-12.
- **Zafra, M., Muñoz, J., Martínez, E., Sánchez, F., & Fernández, M. (2020):** Anxiety, perceived stress and coping strategies in nursing students: A cross sectional, correlational, descriptive study. *BMC Medical Education Journal*, 20(370): 1-9.
- **Zahedi, Z., Salehiniya, H., Zarei, A., Abbaszadeh, H. (2021):** Attitude and satisfaction towards electronic exams in medical sciences faculty members. *Research and Development in Medical Education Journal*, 2021; 10 (29):1-7.
- **Zahedi, Z., Salehiniya, H., Zarei, A., & Abbaszadeh, H. (2022):** Attitudes and satisfaction of medical sciences students with electronic exams at Birjand University of medical sciences. *Educational Research Medical Sciences*, 11(1):1- 6.

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