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**Barriers of Electronic Exams among Critical Care Nursing Students****Asmaa Ibrahim Mohamed<sup>1</sup>, Naglaa Ahmed Ahmed<sup>2</sup>, Naglaa Gamal Eldien Abdelhafez<sup>3</sup>**<sup>1</sup>Demonstrator at Critical Care and Emergency Nursing Department Faculty of Nursing, Sohag University.<sup>2</sup>Assistant Professor of Critical Care and Emergency Nursing Department Faculty of Nursing, Assiut University.<sup>3</sup>Assistant professor of Critical Care and Emergency Nursing Department Faculty of nursing, Sohag University  
Asmaa Ibrahim Mohamed<sup>1</sup>**Corresponding Author Email:** [ibrahimasmaa791@gmail.com](mailto:ibrahimasmaa791@gmail.com)**Phone number:** [002-01121069112](tel:002-01121069112)**Abstract**

**Background:** Electronic exams presented through computer by teachers on several software with a high degree of accuracy. It saves a lot of effort and time and gives more stable and objective results to determining the educational levels. **Study aim to:** assess barriers of electronic exams among critical care nursing students. **Design:** Descriptive research design. **Setting:** This study was carried out in Critical care & Emergency Nursing department Faculty of Nursing –Assiut University. **Sample:** - Convenience sample of all critical nursing students (660). **Tools:** - **Tool I:** Critical Care Nursing Student Barriers of Electronic Exam Questionnaire **Results:** results of current study revealed that more three quarters (70.9%) of studied student were female, had less 25 years. Illustrated that, more than half of the studied students (56.7%) had moderate level regarding barriers of electronic exam. **Conclusion:** Electronic examinations are a modern and effective means of evaluating students electronically, as it enables a faculty member to prepare exams objectively and is relatively easy to apply to students and make corrections electronically. **Recommendations:** -Develop training program regarding electronic exams among university students .

**Key words:** Barriers, Critical care nursing students, Electronic exams.**Introduction**

Higher education institutions (HEIs) are increasingly using online tests to supplement or even replace paper-based exams because of the increased usage of information technology and the expansion of online assessment platform possibilities. The phrase "a system that involves the conduct of examinations through the web or the intranet" describes online exams, which were originally referred to as computer-based assessment and are also known as electronic exams (e-exams). (Shraim et al., 2019) .

Exam feedback can be hard for academic staff members to offer in a timely manner because there are more students than ever. For this reason, electronic exams, or E-exams, were created as a helpful evaluation tool.. (Elsalem et al.,2020).

Any test or exam that is given using a computer is referred to as a "computer-based exam". The computer may or may not be online. Stated differently, there is no guarantee that the computer is connected to an intranet or Internet server. A computer-based exam's (CBE) or test's (CBT) results can be locally saved on the hard disk of the computer or posted online to a web server. Most commonly, CBT is used to refer to standalone testing. ( Khan et al.,2021).

There are various disadvantages to using computerized tests. One major disadvantage of electronic examinations is the amount of time needed to prepare for them, as they demand expertise and training for both administration and preparation. Assessing higher skills with computerized testing can be difficult because it

often relies on how well the objective exams are written and hardware malfunctions can occur at any point throughout the test. To pass electronic tests, the professor and the student must also possess strong information technology skills and knowledge, which necessitates adequate training. Examinees' fatigue from using technological tools, technical problems, and the requirement for outside help were all factors. ( Bashitialshaer et al.,2021).

Exams administered online have the following disadvantages: Some locations have power outages; others lack computers; still others have a slow, unreliable internet connection; test fraud and cheating may be possible; still others are ignorant of new technologies. ( Safabakhsh, L., & Arbabisarjou, A. 2020)

**Significance of the study**

In the past year, a lot of universities have switched from traditional paper exams administered by pen and paper to electronic exams, sometimes known as e-exams or digital exams. Based on the researcher's observations, academic staff and students face numerous challenges. Our goal is to assist in this digital transformation by identifying the challenges and suggesting solutions. Critical care nursing students who performed electrical exams on the online platform in 2021-2022 were roughly 1200 students. As a result, the researcher will carry out this study to evaluate the viewpoint, level of satisfaction, and challenges faced by critical care nursing students when taking electronic exams.

**Aim of the study**

Assess barriers of electronic exams among critical care nursing students.

**Research question**

What the Barriers of electronic exams among critical care nursing students?

**Subject & Methods****Research design**

Descriptive research design was used to conduct this study.

**Setting**

Critical care & Emergency Nursing Faculty of Nursing – Assiut University

**Sample**

A convenient sample of critical care nursing students in critical department were included in the study. They were approximately 660 students.

**Tools**

**Tool one:** Critical Care Nursing Student Barriers of Electronic Exam Questionnaire

This tool adapted from (Omran et al., 2022) . to assess the students' perception of barriers to electronic exams.

**Part(1):- Students socio demographic data sheet** it includes (gender and age).

**Part(2):- Barriers to electronic exams** It was 19 item divided into 4 domains, namely:

**1-Personal barriers (eight questions)** about academic achievement under critical conditions & parents worrying about e-exam.

**2- Pedagogical barriers (eight questions)** about teacher's experience to prepare and apply exams & quality of exams.

**3-Technical barriers (three items)** about internet unavailability, and lack of physical space.

**4-Regulatory obstacles (three items)** such as lack of resources and facilitating procedures and lack of administrative support.

**Scoring system**

The statements' responses were measured using three points Likert scale ranging from 1= disagree, 2= uncertain, and 3= agree. The score of items was summed up, and the total was divided by the number of the items, giving the mean score. The total level of student and staff response regarding barriers was classified as low if the score was <50%, moderate if the score was 50-<75%, and high if the score was ≥75% of the total score.

**Preparatory phase**

This phase involved developing the data collection tools by the researchers and preparing the data collection instruments after extensive literature review.

- 1- The official permission to conduct the study was obtained from the dean of faculty of nursing Assiut university after explanation of the aim and nature of the study.
- 2- Development of the tools after reviewing the related literature.
- 3- The tools was reviewed by a jury of 5 expert in field (4 critical care nursing staff & one expert in statistics to assess the clarity, feasibility, applicability, and the content validity of the tools and all the necessary modifications was done
- 4- A pilot study will be conducted in 10% of sample to evaluate the applicability and clarity of the developed tools .

**Pilot study**

Was conducted prior to data collection on 10% of the sample's to assess the applicability, clarity of the tools and recognize any problems. According to this pilot study, the necessary modifications were made. Additionally, it featured a time estimate for when the tools would need to be completed. And they included in the study sample.

**Reliability**

Reliability of the questionnaire was tested using Cronbach's Alpha test and turned out to be for students knowledge was 0.85 and for the second tools' Cronbach's coefficient alpha test (0.82) that indicate high reliability of the used tool.

**Content Validity**

A jury of five experts in the connected domains, including three critical care nursing professionals, one special expert in statistics, evaluated the produced tools' content validity.

**Ethical considerations**

- It was approved from Ethical Committee in the Faculty of Nursing Assiut University to follow the common ethical principles in clinical research.
- No study risk for subject during the research.
- The data of this research will not be reused without second permission.
- Confidentiality and anonymity was assured.
- Study subject have the right to refuse to participate and/ or withdraw from the study without any rational at any time.

**Field work**

WhatsApp groups were recruited to participate in the study using a Google Form [https://docs.google.com/forms/d/e/1FAIpQL\\_SdRw7YP3epUxehZQFnPphZzOPJ5Mpruci-CKdNVQToSEbfzg/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQL_SdRw7YP3epUxehZQFnPphZzOPJ5Mpruci-CKdNVQToSEbfzg/viewform?usp=sf_link) for student. The questioner was written in Arabic. All of the replies of the student "who accepted to respond to questionnaire" were compiled into an

online spreadsheet assesses barriers of electronic exams. Collected data were recorded in a special chart, coded, analyzed and tabulated. Data entry and analysis were conducted using SPSS 26.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables. Person's test was used for correlation

**Statistical design**

The collected data were organized, coded, computerized, tabulated, and analyzed by using Statistical Package for Social Science (SPSS) program (version 25). Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data: the mean and standard deviation (SD) for quantitative data. While the qualitative variables were compared using Chi Square test (  $X^2$  ) which used for relation tests and person correlation coefficient (r) was used for correlation analysis. The degree of significance was identified at:

- Significant result when P-value < 0.05.
- Highly significant result when .P-value < 0.001.
- Non-significant result when P-value > 0.05.

**Results**

**Figure (1):** Shows that more fifty percent (69.1%) of the studied student were ranged from 20- 25

years old and two third (70.9%) of them were female.

**Table (1):** Shows that (68.2%) of studied students agreed with "difficulty studying and its weakness in the case of severe stress". & (42.4%) were uncertain about "Students lack experience in technology ". While less than half of them (44.2%) disagreed with "not attending full theoretical lectures

**Table (2):** Indicates (37%) of students agreed with "The answers are very similar among the students due to the standardization of the test system and that it does not contain a narration". Also, more than half of them (50.6%) were uncertain about "the difficulty of the questions". While half of them (50%) disagreed with "a faculty member is not present during the test to respond to any explanation".

**Table (3):** Displays that (47%) of students agreed with "The duration of the test is short and not commensurate with the length of the test". While nearly two thirds of them (64.2%) disagreed with "Lack of support for teachers and students" and more than half of them (54.5%) disagreed with "Increased cases of fraud due to insufficient observers"

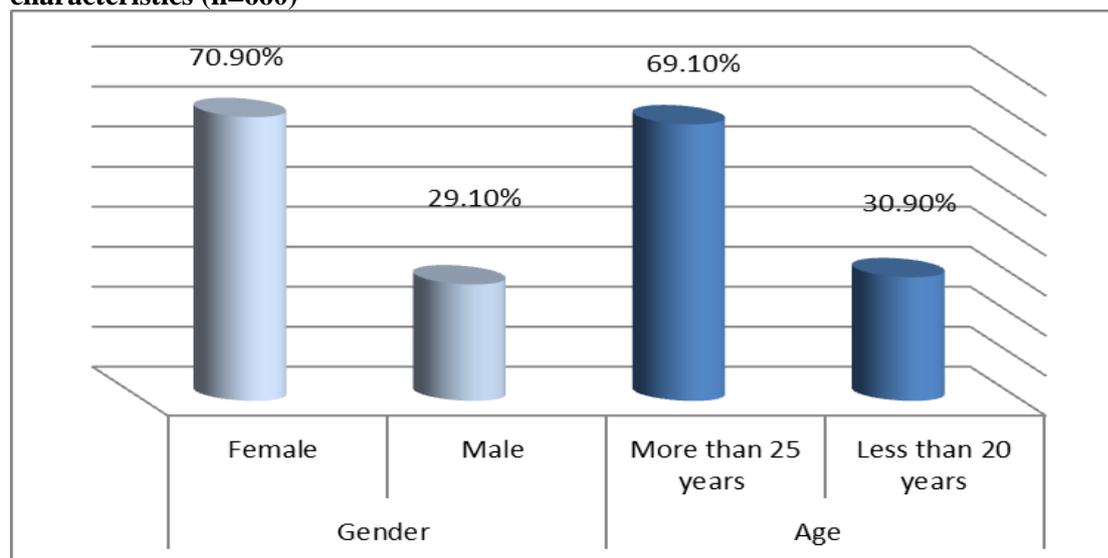
**Figure (2):** Illustrates that (56.7%) of the students had moderate level barriers of electronic exam, less than one quarters of them (24.2% & 19.1%) had high level and low level regarding barriers of electronic exam respectively.

**Results**

The result obtained from the study was presented in the following parts:

**Part I: Socio demographic characteristics of the studied sample**

**Figure (1): Percentage distribution of the studied students regarding to socio demographic characteristics (n=660)**



**Part II: Critical Care Nursing Student Barriers of Electronic Exam****Table (1): Frequency distribution of the studied students regarding to personal barriers of electronic exam (n=660)**

Items	Agree		Uncertain		Disagree	
	No	%	No	%	No	%
<b>A- Personal barriers</b>						
1-Difficulty studying and its weakness in the case of severe stress.	450	68.2	152	23.0	58	8.8
2-Students lack experience in technology	258	39.1	280	42.4	122	18.5
3- Electronic tests make the student feel nervous	272	41.2	250	37.9	138	20.9
4- Belief in the preference of the traditional exam over the electronic exam	160	24.2	212	32.1	288	43.6
5- Not attending full theoretical lectures	132	20.0	236	35.8	292	44.2
6-Feeling that the electronic tests did not show the exact level of students	210	31.8	242	36.7	208	31.5
7-Inability to organize time during the exam	232	35.2	234	35.5	194	29.4
8- Inability to focus while reading on the screen	212	32.1	236	35.8	212	32.1

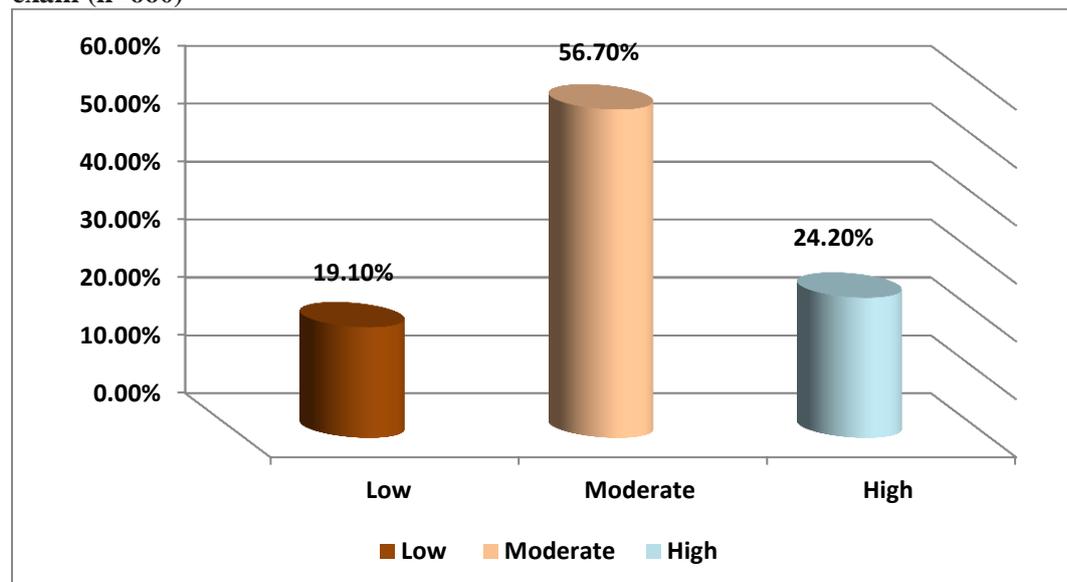
**Table (2): Frequency distribution of the studied students regarding to educational barriers of electronic exam (n=660)**

Items	Agree		Uncertain		Disagree	
	No	%	No	%	No	%
<b>B - Educational obstacles</b>						
1- The answers are very similar among the students due to the standardization of the test system and that it does not contain a narration	244	37.0	246	37.3	170	25.8
2- Some faculty members do not have sufficient experience to prepare for electronic exams	172	26.1	224	33.9	264	40.0
3- The electronic tests are not characterized by high quality in design and preparation.	124	18.8	238	36.1	298	45.2
4- The difficulty of the questions	232	35.2	334	50.6	94	14.2
5- Teaching methods do not cover the curricula sufficiently.	166	25.2	234	35.5	260	39.4
6- A faculty member is not present during the test to respond to any explanation.	130	19.7	200	30.3	330	50.0
7- The faculty members did not prepare the students effectively for the test.	172	26.1	234	35.5	254	38.5
8- Students' dissatisfaction with the final test result	206	31.2	284	43.0	170	25.8

**Table (3): Frequency distribution of the studied students regarding to technical and regulatory barriers of electronic exam (n=660)**

Items	Agree		Uncertain		Disagree	
	No	%	No	%	No	%
<b>C- Technical barriers</b>						
1- Power outage	142	21.5	192	29.1	326	49.4
2- The lack of internet and poor internet quality.	120	18.2	224	33.9	316	47.9
3-The area of the electronic examination hall is not suitable for the number of students	152	23.0	198	30.0	310	47.0
<b>d- Regulatory obstacles.</b>						
1-Lack of support for teachers and students	0	0.0	236	35.8	424	64.2
2-Increased cases of fraud due to insufficient observers	124	18.8	176	26.7	360	54.5
3- The duration of the test is short and not commensurate with the length of the test.	310	47.0	226	34.2	124	18.8

Figure (2): Percentage distribution of the studied students regarding barriers level of electronic exam (n=660)



### Discussion

An essential part of the nursing education/training program is the electronic evaluation, which gauges and reports on the knowledge, clinical skills, attitudes, professional attributes, and competence of the graduates for safe and competent practice. (Khalaf, K., and El-Kishawi, M.2020)

An exam that is taken electronically, or "e-exam," is one in which the pupil uses a computer to complete the examination. It is a practical, impartial, and interesting method of assessing students' academic development. One of the main reasons why educational institutions can employ electronic technology to use their resources more effectively and raise student performance is because of electronic evaluations. (Al Momani et al.,2019).

Electronic tests have become more and more popular as a learning tool in recent years. In order to replace paper-based exams, suitable universities designed electronic exams for every subject across all faculties. The purpose of this study was to evaluate the obstacles that critical care nursing students faced when taking electronic assessments.

#### In term of Critical Care Nursing Student Barriers of Electronic Exam:

**Regarding to student Personal barriers,** the current study shows that more than one third of studied student agreed on "Students lack experience in technology" this agreed with (Bello& Abdullah, 2021) who reported that students have lack of familiarity with assessment technology and lack of information on e-assessment Methods. And also agreed with (Majola& Mudau., 2022) who showed that students have lack of or inadequate technology knowledge or skills.

**Other barriers** mentioned by critical care nursing students in this study include Difficulty studying and its weakness in the case of severe stress, Electronic tests make them feel nervous, Inability to organize time during the exam and Inability to focus while reading on the screen.

**Regarding to student educational obstacles,** shows that little students disagree about "The electronic tests are not characterized by high quality in design and preparation" the current result is not similar to the study done by (Omran et al.,2022) who studied (Facilitators and barriers of employing electronic exams as perceived by nursing students and the relation to their satisfaction) and found that less than one third agreed that teachers do not have sufficient experience to prepare and apply for the exams.

**Regarding to student Technical and regulatory barriers,** nearly half of the studied students disagree on "Power outage", "The lack of internet and poor internet quality" and this disagreed with (Ocak & Karakus, 2021) who study (Undergraduate students' views of and difficulties in online exams during the COVID-19 pandemic) and found that students mostly had technical problems such as internet connection and sudden log out. Also the findings were not similar to (Majola& Mudau., 2022) who reported that shortage of electricity and connectivity are challenges for the online exam.

**In addition,** the current study was not supported by (Coman et al.,2020) who study "Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective) and reported that Technical issues are still the issues most difficult to solve.

**While** nearly two thirds of them disagreed with "Lack of support for teachers and students" and this

against (Ocak & Karakus, 2021) who reported that students encountered different problems such as difficulty in being motivated to electronic exams.

One of the barriers faced by critical care nursing students was "The duration of the test is short and not commensurate with the length of the test" and it agree with (Ocak & Karakus, 2021) who mentioned that students have many problems with electronic exams such as short of time to answer the exam or insufficient feedback.

Regarding to studied students regarding barriers level of electronic exam, the current study Illustrates that more than half of the studied students had moderate level regarding barriers of electronic exam, the result was supported by (Omran et al., 2022) and found that nearly two-thirds of nursing students had a moderate perception level about barriers to electronic exams.

One of the major Technical barrier faced by studied students is "Power outage" and this agreed with (Ocak & Karakus, 2021) who study (Undergraduate students' views of and difficulties in online exams during the COVID-19 pandemic) and found that students mostly had technical problems such as internet connection and sudden log out. Also the findings were similar to (Majola & Mudau, 2022) who reported that shortage of electricity and connectivity are challenges for the online exam.

In addition, the current study supported by (Coman et al., 2020) who study "Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective) and reported that Technical issues are still the issues most difficult to solve.

### Conclusion

Electronic examinations are a modern and effective means of evaluating students electronically, as it enables a faculty member to prepare exams objectively and is relatively easy to apply to students and make corrections electronically.

### Recommendations

- ✓ Training program regarding electronic exams among university students .
- ✓ Generation of question banks and evaluations are very important in electronic exams
- ✓ Duplicate this research on a massive sample size selected from different faculties setting.

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