

# Assessment of Test Anxiety, Student Preferences and Performance on Different Examination Models in Umm Al-Qura University, Saudi Arabia

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## Abstract

**Background:** Test anxiety is a special kind of anxiety-worry mixed with fear which arises in situations where an individual is being evaluated in an academic context. This anxiety may prevent effective use and communication of the information learned by students for examinations, resulting in poor academic performance. Factors such as examination types and socio-cultural context influence test anxiety in university students. Limited evidence is currently available on the roles played by these factors among nursing students in Saudi Arabia, where strong socio-cultural factors shape university education.

**Objectives:** The study was designed to assess university students' preferences for various examination types: quizzes, formal exam, Objective Structured Clinical Examination (OSCE), paper based written exam, oral exam, open book exam. The study also determined the association of test anxiety of the students and the results obtained from different examination types.

**Methods:** This descriptive, cross-sectional study was conducted among 135 baccalaureate nursing students at the Umm Al-Qura University, Saudi Arabia. A pre-tested, semi-structured questionnaire was self-administered to the students, covering level of exam fairness, easiness, and the number of study hours required to attend the examinations. The test anxiety level of the students was evaluated using a Westside Test Anxiety Scale. Multivariate analysis of variance was performed to explore the association between test anxiety and socio-demographic characteristics of the students.

**Results:** A total of 135 female nursing students were enrolled into the study. Their ages ranged from 20 to 22 years with mean age of  $20.8 \pm 0.63$ . Only 24 (17.8%) of them were married at the time of the study. Fifty-nine participants (43.7%) missed less than three theory lectures while 64 (47.4%) were absent for less than three times in the practical sessions. The most preferred examination type was monthly written examination 43 (31.9%) while 78 (57.8%) students had problematic test anxiety. The most frequent coping mechanisms adopted to manage test anxiety by study participants were psychological support and preparation for the examination ( $p=0.001$  and  $p=0.031$ , respectively). No statistically significant association existed between test anxiety and academic performance ( $p=0.41$ ). However, coping mechanisms such as preparing for the exam and psychological support had a statistically significant relationship with academic performance ( $p<0.0001$  and  $0.026$ , respectively).

**Conclusion:** This study showed that test anxiety and preferences for particular test formats affect the students ability to demonstrate content knowledge. The results suggest the need for school support system to make testing outcomes more equitable for nursing students.

**Keywords:** University students • Exam types • Test anxiety • English as a second language • Saudi Arabia

## Introduction

Globally, learning in higher education is driven by important factors such as assessment of student performance during academic examinations [1]. In nursing education, traditional examination methods including paper-based written exam, oral exam and case study scenario have been widely used to evaluate students' academic performance [2]. Current testing practices in many higher education institutions have been reported to fail to "capture" what nursing students really know in terms of content knowledge. This gap

between students' actual knowledge and their test performance is often ignored or unrecognized by university faculty [3]. It has, however, been argued that university faculty must "know what to make of" and "how to act on" valid evidence of student learning. Consequently, assessment practices are a growing concern in higher education because of mounting pressure to create a "culture of evidence" that accounts for student learning [4].

In line with global trends in higher education, Objective Structured Clinical Examination (OSCE) and simulation-based exams have been recently adopted to evaluate learning among nursing students in many universities in Saudi Arabia. These efforts were intended to improve testing procedures and provide a more objective measure of students' performance. Empirical evidence showed that important consideration for improving assessment of student learning should include examination preferences by students [5]. This reflects the national education policy tagged 'Vision 2030 of the Kingdom of Saudi Arabia', which places high premium on students' needs and examination preferences as a part of satisfying national standards for Quality Assurance and Accreditation. However, in most clinical education including nursing, majority of teaching hours are spent on imparting practical and hands-on skills on students in hospital clinics, laboratories or community health centers. This

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didactic learning does not provide adequate opportunity to accommodate students' preferences for examinations because very limited examination options are available to objectively assess students' learning of these practical concepts and skills.

Closely related to assessment of student learning is test anxiety which poses huge challenges when it interferes with the student's capacity to express their knowledge during practical based clinical examinations or demonstrate satisfactory knowledge when other examination types are used. Test anxiety is defined as the physiological and behavioral responses related to taking oral, written, or practical tests that is experienced before and during test taking about possible negative consequences or failure on an examination [6,7]. Early research showed that test anxiety can be both facilitating or debilitating [8] but worry in form of negative thinking and self-doubts regarding testing outcomes has been identified as strongly associated with poor test performance, mainly because worry diverts attention from the test-taking task [9]. Furthermore, studies have demonstrated that students provide evidence that language proficiency, test anxiety, and preferences for particular test formats, such as multiple-choice over essay questions, affect their ability to demonstrate content knowledge [10-12]. Clearly, language proficiency remains a strong factor that influences academic success [5,13], especially in higher education settings such as Saudi Arabia where English is the language of teaching, in variance with Arabic which is the native language of all students. We conducted this study to foster a better understanding of student preferences of different examination types as well as the level of test anxiety amongst nursing students in a Saudi Arabia university where English as a second language is the medium of learning.

## Research Methodology

### Study design

This was an institution-based, descriptive, cross-sectional research design conducted among third year baccalaureate students (enrolled in Pediatric Nursing Course) at the Faculty of Nursing, Umm Al-Qura University (UQU), located in Makkah province, at the Western Region of Kingdom of Saudi Arabia. The primary medium of instruction in the institution is English language, which is a challenge for the students whose first language is Arabic.

The nursing program at UQU is a 4-years course, followed by a one-year internship stage including rotations in different clinical departments, during which the students are exposed to an integrated module based on problem-based learning (PBL) during their training. The modes of student assessment adopted in the Faculty of Nursing, UQU were written tests, structured essays, short answer questions, and multiple choice questions (MCQs). Others included OSCE, clinical mini-exams with viva, student presentations/symposiums, projects, assignments, and log-books.

### Sample size determination

A formal sample size calculation was not done because of the need to identify the appropriate category of students to assess the preferences to different examination types. Thus, this study targeted all 135 undergraduate baccalaureate nursing students at third year of the nursing program when they were enrolled in pediatric nursing course. The students undertaking paediatric nursing were targeted because various examination types were used to assess student performance to determine their progression to the final year of the program.

### Study instruments and data collection

Data were collected using a pre-tested semi-structured questionnaire with the first sections covering socio-demographic characteristics such as age, educational level, year of enrollment, specialty, social status, presence/absence rates in theory and practice, language proficiency in English. The second section examined students' preferences to the types of exams. This preference was represented in terms of the preferred sequence for each student among the following types: Paper-Based Written Exam, OSCE, Periodical

Quiz, Formal Practical Exam, Open Book Exam, Case Study. The third section of the questionnaire contained a 10-item Westside Test Anxiety Scale (WTAS) to identify students with anxiety impairments in educational settings [7]. WTAS was originally developed by Driscoll [14] as a concise instrument which could be completed by respondents in approximately 5-8 minutes. The scale items cover two domains: self-assessed anxiety impairment and cognitions, which can impair performance. Psychometric properties of WTA have been extensively studied and the construct validity investigated using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) indicated that the two domains of WTA met all the pre-established fit criteria [15]. This confirms that WTA is a reliable and valid measure of test-anxiety impairment. All question items on WTA were rated on a 5-point scale as follows: 1= not at all true, never true; 2 = slightly true; seldom true; 3 = moderately true, sometimes true; 4 = highly true, usually true; 5=extremely true, always true. This scale measures both the levels of emotionality (with questions such as "I have an upset, uneasy feeling") and worry (with questions such as "I feel I may not do as well on this test as I could") prior to an examination. Upon completion of the questionnaire, the students were instructed not to modify the rating on the questionnaire. The last section on the questionnaire focused on measures adopted by the students to overcome anxiety, the detail of which is described below. This part contained three sections: (a) How to get ready for exam. (b) What sort of psychological support students obtain from others. (c) How to avoid exam anxiety. Immediately prior to taking each exam, all students were asked to report how many hours they had spent studying for the test and were also asked which type of exam they prefer to take, which type of exam they would study most for and which type of exam they thought they think they would perform best.

## Statistical analysis

Each questionnaire item was analyzed to determine the frequency of student selection for each anxiety level (i.e., 1.0-1.9= Comfortably low test anxiety; 2.0-2.5=Normal or average test anxiety; 2.5-2.9 = High normal test anxiety; 3.0-3.4 = Moderately high; 3.5-3.9 =High test anxiety; 4.0-5.0= Extremely high anxiety). Responses for each item were added and the sum was divided by 10. Data analysis was done with Statistical Package for the Social Sciences (SPSS) version 21.0 (ed. Chicago: SPSS Incorporation 2016). Descriptive and inferential statistics were conducted, with  $p < 0.05$  (two-tailed) considered significant.

## Results

A total of 135 nursing students in third year nursing programme at UQU were approached for the study. All of them fulfilled the inclusion criteria and were subsequently enrolled into the study. The study participants' ages ranged from 20 to 22 years with mean age of  $20.8 \pm 0.63$ . They were all females as the study was undertaken in the female section of the college.. Only 24 (17.8%) of them were married at the time of the study. Fifty-nine participants (43.7%) missed less than three theory lectures while 64 (47.4%) were absent for less than three times in the practical sessions (Table 1).

Table 2 showed the distribution of the study participants across preferences for examination types. Almost the same proportion of the students reported that final written and monthly written examinations were related to their final academic grade (29.6% and 28.9% respectively). Majority of the students, 55 (40.7%), spent the longest time in preparing towards final written examination while 6 (4.4%) spent the least amount of time preparing for open book examination. The most preferred examination type was monthly written examination reported by 43 students (31.9%), followed by practical examination, 35 (25.9%).

A total of 78 (57.8%) students had varying degree of test anxiety. Forty-four (32.6%) had a high normal anxiety score; 27 (20%) had a high anxiety score and 7 (5.2%) had an extremely high anxiety score. The most frequent

coping mechanisms adopted to manage test anxiety by the study participants were psychological support and preparation for the examination which yielded moderate performance in 77 (57%) and 99 students (73.3%), respectively (Table 3).

Across the various levels of test anxiety, psychological support and avoiding test anxiety were the two coping mechanisms which provided moderate performance and reached statistical significance,  $p=0.001$  and  $p=0.031$  respectively (Table 4). Anxiety level reported by the study participants did not have a statistically significant association with the academic grade ( $p=0.41$ ) (Table 5). Conversely, coping mechanisms such as preparing for the exam and psychological support had a statistically significant relationship with academic grade,  $p<0.0001$  and  $0.026$ , respectively (Table 6). Table 7 illustrated

that there was no statistically significant relationship between anxiety levels and time spent by students for preparing for the exams ( $p=0.303$ ).

Univariate analysis showed that a statistically significant difference existed among measures adopted by students to overcome anxiety ( $p<0.0001$ ), but not with the students' anxiety feeling before examination ( $p=0.343$ ) (Table 8). Multivariate analysis showed that the measures used by the students to overcome anxiety increased with the lowering of the students' scores. The measures used by students with lower scores (pass & good) were statistically significantly higher than those with high scores ( $p<0.0001$ ). No significant statistical differences existed between those with (very good and excellent) in the average utilization of measures overcoming anxiety ( $p=0.658$ ) (Table 9).

**Table 1.** Socio-demographic characteristics of study participants, Makkah, 2016-2017.

Variables	Number (N=135)	Percent
<b>Age</b>		
20	44	32.5
21	75	55.6
22	16	11.9
<b>Grade</b>		
Excellent	10	7.4
Very good	43	31.9
Good	65	48.1
Acceptable	17	12.6
<b>Marital status</b>		
Married	24	17.8
Single	111	82.2
<b>Rate of absence from theory lectures</b>		
Less than 3 times in a semester	59	43.7
3 times a semester	34	25.2
More than 3 times in a semester	42	31.1
<b>Rate of absence from practical session</b>		
Less than 3 times in a semester	64	47.4
3 times in a semester	44	32.6
More than 3 times in a semester	27	20.0

Table 1 showed that majority of the students were aged 21 years (55%), 82.2% were not married, 43.7% and 47.4% missed less than three theory and practical lectures, respectively.

**Table 2.** Distribution of the study participants across preferences for examination types, Makkah, 2016-2017.

Variables	Number (N=135)	Percent
<b>Most related to your grade</b>		
Final written	40	29.6
OSCE	18	13.3
Monthly written	39	28.9
Practical Exam	27	20.0
Open book	7	5.2
Case study	4	3.0
<b>Where student spent most time</b>		
Final written	55	40.7
OSCE	29	21.5
Monthly written	31	23.0
Practical Exam	14	10.4
Open book	6	4.4
<b>Most preferred</b>		
Final written	24	17.8
OSCE	15	11.1
Monthly written	43	31.9
Practical Exam	35	25.9
Open book	15	11.1
Case study	3	2.2

Table 2 showed that majority of the students (31.9%) preferred monthly written examination but 40.7% spent most time preparing for final written examination which only 29.6% reported it was the most related to their final grade.

**Table 3.** Distribution of study participants by anxiety levels and coping mechanisms, Makkah, 2016-17.

Variables	Number (N=135)	Percent
<b>I. Anxiety level</b>		
Comfortably low test anxiety	20	14.8
Normal or average test anxiety	37	27.4
High normal test anxiety	44	32.6
High test anxiety	27	20.0
Extremely high anxiety	7	5.2
<b>II. Procedures used to eliminate the anxiety of the test</b>		
<b>a. preparation for the test</b>		
Poor performance	33	24.4
Moderate performance	99	73.3
Satisfactory performance	3	2.2
<b>b. Provision of psychological support</b>		
Poor performance	17	12.6
Moderate performance	77	57.0
Satisfactory performance	41	30.4
<b>c. Avoiding test anxiety</b>		
Poor performance	11	8.1
Moderate performance	79	58.5
Satisfactory performance	45	33.3
<b>Total procedures used to eliminate the anxiety of the test</b>		
Poor performance	8	5.9
Moderate performance	104	77.0
Satisfactory performance	23	17.0

Table 3 showed that 78 (57.8%) students had varying degree of test anxiety. Forty-four (32.6%) had a high normal anxiety score; 27 (20%) had a high anxiety score and 7 (5.2%) had an extremely high anxiety score.

**Table 4.** Association between anxiety level and different procedures used to eliminate the anxiety of the test by study participants, Makkah, 2016-17.

Variables		Anxiety level					X <sup>2</sup> p	
		Comfortably low test anxiety	Normal or average test anxiety	High normal test anxiety	High test anxiety	Extremely high anxiety		
Prepare for the test	Poor performance	No.	7	7	10	6	3	10.604 0.201
		%	35.0%	18.9%	22.7%	22.2%	42.9%	
	Moderate performance	No.	13	27	34	21	4	
		%	65.0%	73.0%	77.3%	77.8%	57.1%	
	Satisfactory performance	No.	0	3	0	0	0	
		%	0.0%	8.1%	0.0%	0.0%	0.0%	
Provide psychological support	Poor performance	No.	7	3	0	5	2	27.290 0.001*
		%	35.0%	8.1%	0.0%	18.5%	28.6%	
	Moderate performance	No.	9	27	27	12	2	
		%	45.0%	73.0%	61.4%	44.4%	28.6%	
	Satisfactory performance	No.	4	7	17	10	3	
		%	20.0%	18.9%	38.6%	37.0%	42.9%	
Avoid test anxiety	Poor performance	No.	4	4	1	2	0	17.000 0.031*
		%	20.0%	10.8%	2.3%	7.4%	0.0%	
	Moderate performance	No.	11	24	20	20	4	
		%	55.0%	64.9%	45.5%	74.1%	57.1%	
	Satisfactory performance	No.	5	9	23	5	3	
		%	25.0%	24.3%	52.3%	18.5%	42.9%	
Total procedures used to eliminate the anxiety of the test	Poor performance	No.	2	2	0	4	0	15.587 0.116
		%	10.0%	5.4%	0.0%	14.8%	0.0%	
	Moderate performance	No.	16	30	32	19	7	
		%	80.0%	81.1%	72.7%	70.4%	100.0%	
	Satisfactory performance	No.	2	5	12	4	0	
		%	10.0%	13.5%	27.3%	14.8%	0.0%	

Table 4 showed that psychological support and avoiding test anxiety were the two coping mechanisms which had statistically significant association with moderate academic performance by student ( $p=0.001$  and  $p=0.031$  respectively).

**Table 5.** Association between academic grade and anxiety level of study participants, Makkah, 2016-2017.

Variables	Accumulated grade				X <sup>2</sup> P value		
	Excellent	Very good	Good	Accepted			
Anxiety	Comfortably low test anxiety	No.	1	8	11	0	15.775 0.401
		%	10.0%	18.6%	16.9%	0.0%	
	Normal or average test anxiety	No.	2	9	22	4	
		%	20.0%	20.9%	33.8%	23.5%	
	High normal test anxiety	No.	5	12	18	9	
		%	50.0%	27.9%	27.7%	52.9%	
	High test anxiety	No.	2	10	11	4	
		%	20.0%	23.3%	16.9%	23.5%	
	Extremely high anxiety	No.	0	4	3	0	
		%					

Table 5 showed that anxiety level reported by the study participants did not have a statistically significant association with the academic grade ( $p=0.41$ ).

**Table 6.** Preparing for the exam and psychological support had a statistically significant relationship with academic grade.

Variables	Different coping mechanisms				X <sup>2</sup> ; P		
	Excellent	Very good	Good	Accepted			
Prepare for the test	Poor performance	No.	8	14	11	0	30.676 0.000
		%	80.0%	32.6%	16.9%	0.0%	
	Moderate performance	No.	2	29	51	17	
		%	20.0%	67.4%	78.5%	100.0%	
	Satisfactory performance	No.	0	0	3	0	
		%	0.0%	0.0%	4.6%	0.0%	
Provide psychological support	Poor performance	No.	3	7	7	0	16.088 0.026
		%	30.0%	16.3%	10.8%	0.0%	
	Moderate performance	No.	4	29	31	13	
		%	40.0%	67.4%	47.7%	76.5%	
	Satisfactory performance	No.	3	7	27	4	
		%	30.0%	16.3%	41.5%	23.5%	
Avoid test anxiety	Poor performance	No.	2	4	5	0	7.601 0.409
		%	20.0%	9.3%	7.7%	0.0%	
	Moderate performance	No.	7	22	39	11	
		%	70.0%	51.2%	60.0%	64.7%	
	Satisfactory performance	No.	1	17	21	6	
		%	10.0%	39.5%	32.3%	35.3%	
Procedures used to eliminate the anxiety of the test	Poor performance	No.	2	4	2	0	7.808 0.243
		%	20.0%	9.3%	3.1%	0.0%	
	Moderate performance	No.	7	34	50	13	
		%	70.0%	79.1%	76.9%	76.5%	
	Satisfactory performance	No.	1	5	13	4	
		%	10.0%	11.6%	20.0%	23.5%	

Table 6 showed that coping mechanisms such as preparing for the exam and psychological support had a statistically significant relationship with academic grade,  $p<0.0001$  and  $0.026$ , respectively.

**Table 7.** Association between time consumption in study and anxiety level of study participants, Makkah, 2016-17.

Variables	Time consuming in study					X <sup>2</sup> P		
	Final written	OSCE	Monthly written	Practical exam	Open book			
Anxiety Level	Comfortably low test anxiety	No.	7	5	5	2	1	22.851 0.303
		%	12.7%	17.2%	16.1%	14.3%	16.7%	
	Normal or average test anxiety	No.	14	8	8	3	4	
		%	25.5%	27.6%	25.8%	21.4%	66.7%	
	High normal test anxiety	No.	16	8	14	6	0	
		%	29.1%	27.6%	45.2%	42.9%	0.0%	
	High test anxiety	No.	14	8	2	3	0	
		%	25.5%	27.6%	6.5%	21.4%	0.0%	
	Extremely high anxiety	No.	4	0	2	0	1	
		%	7.3%	0.0%	6.5%	0.0%	16.7%	

Table 7 showed no statistically significant association between anxiety levels and time taken by students to prepare for different exam types ( $p=0.303$ ).

**Table 8:** Univariate analysis of association between test anxiety and measures adopted by students to overcome test anxiety, Makkah, 2016-17.

Variables	F	Mean square	P-value
Anxiety feeling before exams	1.122	35.029	0.343
Measures to overcome anxiety feeling	7.061	681.336	<0.0001

Table 8 showed that a statistically significant difference existed among measures adopted by students to overcome anxiety ( $p < 0.0001$ ), but not with the students' anxiety feeling before exam ( $p = 0.343$ ).

**Table 9:** Multivariate analysis showing pairwise comparison of students' academic grade with anxiety feeling and measures adopted by students to overcome test anxiety, Makkah, 2016-17.

95%CI		p-value	Mean Difference	Grade point average	Grade point average	Dependent Variables
Lower Bound	Upper Bound					
3.131	-4.629	0.703	-0.749	Good	Pass	Anxiety feeling
4.585	-2.923	0.662	0.831	V good		
2.946	-5.863	0.513	-1.459	excellent		
4.629	-3.131	0.703	0.749	Pass	Good	
3.752	-0.593	0.153	1.580	V good		
2.456	-3.876	0.658	-0.710	excellent		
2.923	-4.585	0.662	-0.831	pass	V good	
.593	-3.752	0.153	-1.580	good		
.721	-5.300	0.135	-2.290	excellent		
5.863	-2.946	0.513	1.459	pass	Excellent	
3.876	-2.456	0.658	0.710	good		
5.300	-0.721	.135	2.290	V good		
-2.336	-15.981	0.009	-9.158	good	Pass	Measures used to overcome it
-7.045	-20.247	0.000	-13.646	V good		
-7.091	-22.580	0.000	-14.835	excellent		
15.981	2.336	0.009	9.158	pass	Good	
-0.668	-8.308	0.022	-4.488	V good		
-0.110	-11.245	0.046	-5.677	Excellent		
20.247	7.045	0.000	13.646	pass	V good	
8.308	0.668	0.022	4.488	good		
4.105	-6.483	0.658	-1.189	Excellent		
22.580	7.091	0.000	14.835	pass	Excellent	
11.245	0.110	0.046	5.677	good		
6.483	-4.105	0.658	1.189	V good		

Table 9 showed that the measures used by the students to overcome anxiety increased with the lowering of the students' scores. The measures used by students with lower scores (pass & good) are statistically significantly higher than those with high scores ( $p = 0.0001$ ). No significant statistical differences existed between those with (very good and excellent) in the average utilization of measures overcoming anxiety ( $p = 0.658$ ).

## Discussion

The socio-demographic characteristics of nursing students in this study reflected same sex, relative young age group of 20-22 years and majority of single status are consistent with previous findings from a similar study conducted in Saudi Arabia [16]. This similarity underscores the contribution of social context in test anxiety in any educational setting. About 60% of the students had varying degree of test anxiety in this study. This is slightly higher than the prevalence reported from similar studies conducted in another Saudi Arabia University where 53% of medical students reported problematic anxiety [17]. Similarly, findings of a US study [18] showed 55% of the students having problematic test anxiety while studies from Ethiopia, Iran, Turkey, Malaysia and India reported lower prevalence [1,19-22]. Plausible reasons for the difference in the magnitude of test anxiety in the present study might be due to the sampling size difference, the methodological differences including the instrument used to measure test anxiety and differences in the study in the characteristics of the population in each country. Conversely, findings of this study is lower than those obtained in other settings where the magnitude of test anxiety of 65% [17] 68.1% [23] were reported, respectively. Differences in course contents/structure, educational environments, examination conditions and language proficiency were identified as likely to be responsible for this discordance.

Expectedly, the most preferred examination type was monthly written examination reported by about a third of the students. This was closely followed by practical examination where about a quarter of the students reported high preference. Owing to the nature of the monthly written examination which students were required to select a maximum of three to four out of 10 questions, providing ample opportunity to demonstrate understanding of the concepts and principles underpinning the questions. Unlike in other studies where multiple choice questions were most preferred by the students, this exam type was not an option for the students in the present study. Also, the school policy of negative markings has been reported to lower students' preference for multiple choice questions. Another study has also reported lack of objectivity in oral examination as the main reason for students' low preference for this type of examination. With the advent of OSCE which has introduced some degree of objectivity, it would be interesting to explore whether student preference for written examination would switch to OSCE in future.

The most frequent coping mechanisms adopted to manage test anxiety by study participants psychological support and preparation for the examination. Similarly, psychological support and avoiding test anxiety (approaches) were the two coping mechanisms which provided moderate performance and reached statistical significance. This finding is in agreement with previous studies where students adopted various coping mechanisms to minimize test anxiety by employing techniques of desensitization, self-motivation,

progressive muscular relaxation and cognitive therapy [24,25]. Although, test anxiety level was not statistically significant with the academic grade, suggesting that test anxiety may not play a significant role in academic performance. This finding is at variance with findings reported in a systematic review [26]. On the other hand, coping mechanisms such as preparing well for the exam and receiving emotional/psychological support had a statistically significant relationship with academic grade. These findings corroborated the earlier documented impact of psychological support in alleviating test anxiety which ultimately may contribute to better academic performance [27,28]. Our study showed that low grade scores were associated with increasing utilization of measures to overcome test anxiety by the nursing students. This finding disagrees with similar studies conducted in Sudan, Sri Lanka and Nigeria [29-31] where higher-grade scores were associated with greater risks of test anxiety which invariably resulted in using more measures to overcome test anxiety by the students. This could be due to differences between universities educational environment, teaching and evaluation methods, and systems of rewards and punishments resulting from test results.

This study has some limitations. Risk factors such as biological factors for test anxiety were not studied mainly because the study took place among female students. Also, very few proportion of the study participants were married, making it statistically challenging to determine the effect of marital status on test anxiety and academic performance. The learning styles employed by the students were also not investigated as this could have provided insights on how this factor influence the time spent on preparing for each examination type and the contribution of this towards test anxiety and academic performance.

## Conclusion

This study showed that the burden of test anxiety was high among female nursing students in a Saudi University. The most preferred examination type was monthly written examination while psychological support and avoiding test anxiety were the two coping mechanisms which provided moderate academic performance. Screening for test anxiety among the students and provision of psychological support are recommended to be integrated into the student support system.

## Authorship

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript. Furthermore, each author certifies that this material or similar material has not been and will not be submitted to or published in any other publication before its appearance in the International Journal of Nursing Studies.

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## Declarations

### Ethical consideration & student's consent

The study was approved by the Ethical Committee of Faculty of Nursing, Umm Al-Qura University, Saudi Arabia. Written informed consent was obtained from all the participants. To avoid coercion and intimidation as a result of power difference between the nursing students and the investigators who were their tutors; voluntary participation and respect for autonomy of individual students were ensured by:

- Providing research participants with sufficient information to make

an informed decision as to whether or not to take part in research (informed consent);

- Ensuring that participants were not subjected to coercion to take part or penalty for not taking part;
- Ensuring that participants are, and were aware that they were, free to withdraw from the research at any time without giving a reason and without a prejudice;
- Protecting and respecting personal data provided by the participants through rigorous and appropriate procedures for confidentiality and anonymization.

## Consent for publication

This is not applicable because all the study participants were above the legal age of consent (18 years) in the country of study (Saudi Arabia). Also, confidentiality was thoroughly maintained as the participants' data were anonymised to ensure that their identities were not divulged in this publication

## Availability of data and materials

The authors confirm that the data supporting the findings of this study are available within the article.

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