Test Anxiety, Self-Esteem, Gender Difference, and Academic Achievement: The Case of the Students of Medical Sciences at Sudanese Universities: (A Mixed Methods Approach)

Abdunasir Sideeg

sidiga@rcyci.edu.sa

Abstract

Test anxiety is one of the most controversial assessment-related psychological concepts. In the words of Zeidner (1998), it is one of the most "salient constructs in modern-day psychology and by far the most widely studied form of anxiety in the literature" (p. ix). This research article attempts to study the levels of test anxiety in relation to particular psychological, social, and academic correlates among the students of medical sciences at Sudanese universities. Specifically, the study investigates the relationship between test anxiety, self-esteem, gender, type or field of study, and the effect of test anxiety on academic achievement. The present article employs a fixed methods design, a set of specific procedures for collecting, analyzing, and 'mixing' both quantitative and qualitative findings and interpretations in a single study to understand a multi-dimensional and intricate research problem. Study findings indicate that test anxiety among the study participants is significantly higher than the critical value set by Westside Test Anxiety Scale. Findings also confirm the hypothesis that test anxiety significantly correlates with students' academic achievement. Moreover, the negative correlation between the level of test anxiety and self-esteem endorses the strong association between these two psychological constructs. Further, findings indicate the statistically significant effect of gender difference and type of study on the levels of text anxiety.

Key words: Test anxiety, self-esteem, academic achievement, gender difference, Westside Test Anxiety Scale

1. Introduction

1.1 Test Anxiety: the Basics

Educational tests are the major tools for measuring academic achievement. Although varying methods of evaluation are used in educational settings, tests will remain the most commonly used method of assessment (Keogh and French, 2001). More than fifty years ago, Sarason (1959) rightly observes that "we live in a test-conscious, test-giving culture in which the lives of people are in part determined by test performance" (Cizek and Burg, 2006, p.8), for "few devices are as powerful, or are capable of dictating as many decisions as tests" (Shohamy, 1993, p.4). Nonetheless, a number of external psychological and social factors may have substantial effects on performance on these powerful assessment tools. Several terms have been coined to account for these significant effects on test performance. One of these terms is **'test anxiety'**, a condition that involves excessive worry in testing situations. The concept of test anxiety was first identified as a psychological phenomenon in the 1930s by Luria, Brown, and Neumann (Burn, 2004), and later developed and operationalized by Mandler and Sarason (1952). Since then, the construct has been "closely studied and has grown as an area of educational research" (Fiore, 2003, p. 5). "Research on test anxiety", maintain Stöber and Pekrun (2004), "has a long and fruitful history" (p. 205) and **test anxiety** is becoming a key "studied construct" in both educational psychology and educational assessment (Roy, 2013, p. 211). Zeidner (1998) observes that the

> *Topic of test anxiety has prospered, in part, due to the increasing personal importance of test situations for people in modern society, making tests and their long-term significant educational, social, and clinical problems for many. Since test results in most academic and occupational settings have important practical implications for a person's goals and future career, test anxiety is frequently reported to be a meaningful factor impacting upon test scores (p. ix).*

In fact, there are several factors which often affect students' performance on a particular test. A student might not do well on a test due to some sort of fatigue, illness, or because their mind is distracted as a result of the death of a relative or a friend, for instance. Nevertheless, whereas these causes are usually temporary and do not extend to all testing situations, test anxiety, along with some other psychological factors, is relatively permanent, affecting the individual in almost all testing situations.

Anxiety as general could be defined as "the response to some as yet unrecognized factor, either in the environment or in the self" (Emanuel, 2000, p. 6). Test anxiety is a factor that is different from all the temporary sensations that may affect performance on a test. The term generally "refers to the set of phenomenological, physiological, and behavioral responses that accompany concern about possible negative consequences or failure on exam or similar evaluative situation" (Zeidner, 1998, p.17). In this sense, test anxiety has typically the relatively permanent features of anxiety with cognitive, behavioral, and physiological signs and symptoms which can be classified as shown in the table below:

Table (1,1): Primary characteristics of anxiety

Cognitive	Behavioral	Physiological
Concentration problems	Motor restlessness	Tics
Memory problems	Fidgets	Recurrent, localized pain
Attention problems	Task avoidance	Rapid heart rate
Oversensitivity	Rapid speech	Flushing of the skin
Difficulty solving problems	Erratic behavior	Perspiration
Worry	Irritability	Headaches
Cognitive dysfunctions —Distortions —Deficiencies	Withdrawal	Muscle tension
	Perfectionism	Sleeping problems
Attributional style problems	Lack of participation	Nausea
	Failure to complete tasks	Vomiting
	Seeking easy tasks	Enuresis

(Huberty, 2009, p. 14)

These symptoms and signs can result in interference with the basic thinking processes and lead to poor performance in tests. As one form of anxiety, test anxiety may lead to short-term or long-term impairment of learning and low test performance, for as Field (2004) observes, "general anxiety is one of several affective factors which can influence **attention** and hence lead to a deterioration in … performance" (p. 15). According to Spielberger and Vagg (1995) "aptitude and achievement test scores, as well as academic performance, are increasingly used in evaluating applicants for jobs and admission into educational programs. Consequently, examination stress and test anxiety have become pervasive problems in modern society" (p. xiii).

1.2 Test Anxiety and the Level of Arousal

Horwitz, Horwitz, and Cope (1986) define anxiety as "the subjective feeling of tension, apprehension, nervousness, and worry associated with an arousal of the autonomic nervous system" (p. 125). However, some sort of 'benign' arousal is crucial for better performance in any human activity. Nonetheless, when this arousal becomes so excessive and interferes with performance in the test, it becomes an indisposition that lowers achievement (Coon and Mittere, 2010, p. 328). The Yerkes-Dodson Law (1908) claims that human performance at any task varies with arousal in a predictable parabolic curve. At low arousal, individuals are inactive and perform poorly. As arousal rises, performance rises, too. Yet, there is a point after which increasing arousal actually decreases performance. Below is a graphical illustration of this law:
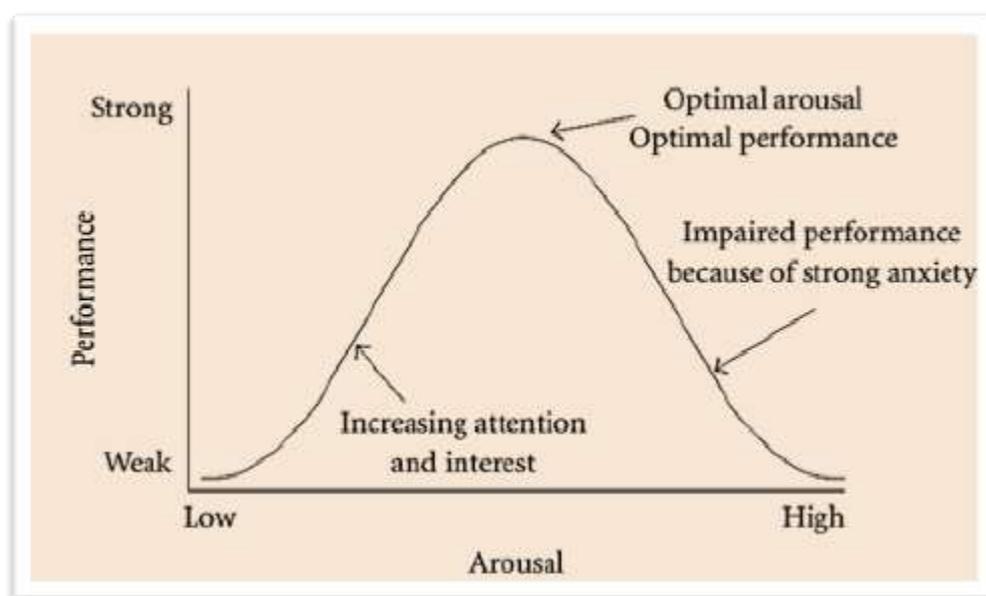
Figure (1.1) The Hebbian Version of the Yerkes-Dodson Law
(Diamond, Campbell, Park, Halonen, and Zoladz, 2007, p. 3)

Test anxiety occurs when the level of arousal rises to the point that impairs performance. This helps to explain the fine distinction between natural fear and anxiety which is often ignored or confused in the relevant literature. Though some researchers regard fear and anxiety as two similar and related concepts on a continuum in which anxiety represents a stronger form of fear, the fact is that the two are entirely distinct constructs with entirely different origins, causes, and consequences although they share some mutual signs or symptoms. Worry is one of these symptoms common to both fear and anxiety. Bruhn (1990) maintains that anxiety occurs when worry leads to extended periods of "introspection and social withdrawal" and hinders rather than "stimulates" learning. Anxiety occurs when "worry becomes so self-satisfying that it promotes a pattern of helplessness" (p. 561). With regard to test anxiety, Goonan (2003) argues that this construct entails more than "normal worry about a test" as "it is a specific anxiety disorder that involves excessive amounts of concern, worry and fear of negative evaluation during or in anticipation of performance or evaluative situations" (Goonan 2003, p.4).

1.3   Test Anxiety and Self-Esteem

Sapp (2014) discusses the different perspectives on the 'construct' of tests anxiety, from the early formulations of Mandler and Sarson (1952) which conceive test anxiety as a "single latent or underlying trait" to Spielberger and Vagg's (1995) comprehensive theory of test anxiety which "specifies the interpersonal perceptions and cognitions, informational processing, retrieval mechanisms and mediate the effects of worry and emotionality on performance" (p. 92). Thus, rather than being a unitary concept, test anxiety is a "multidimensional" construct: the "different dimensions" of test anxiety show different relationships with several psychological constructs such as interference, emotionality, fear of failure, lack of confidence, and self-esteem (Stoeber, Feast, and Hayward, 2009). Self-esteem is about how one perceives their value to the world and how valuable one thinks they are to others. Rubio (2007) maintains that the key contributors to the development of the theory of self-esteem such as James (1890), White (1959), Coopersmith (1959) and (1967), Rosenberg (1965) and (1979), Branden (1969) and (1994), and Mruk (1999), (2006) isolate six key "components or dimensions" of self-esteem:

- Competence and worthiness.

- Cognition and affect.

- Stability and openness (p. 4).

In the relevant literature, the correlation between test anxiety and self-esteem has widely been studied in academic settings as the two constructs have strong affinities. Several studies reveal that levels of depression and other conditions that co-occur such as stress and anxiety, are strongly correlated with self-esteem for self-esteem affects depression and depression works negatively to decrease self-esteem (Sowislo and Orth, 2012). However, Amorim and Lam's (2013) study suggests that the level of self-esteem is not "a good indicator to analyze the level of anxiety among international students, especially when cultural factors may play a role" (p. 13). This is why the present article investigates this bi-directional influence to discover its overall effect on academic achievement. In theory, self-esteem, as many argue, is a decisive psychological construct that underlies and correlates with almost all psychological constructs and variables relevant to academic performance, aptitude, and achievement. In his phenomenal work 'The Six Pillar of Self-Esteem', Branden (1995) aptly states that one cannot think of "a single psychological problem—from anxiety and depression, to underachievement at school or at work, to fear of intimacy, happiness, or success, …- that is not traceable, at least in part, to the problem of deficient self-esteem" (p. xv).

1.4   Some Relevant Previous Studies

Test anxiety has extensively and intensively been investigated regarding its relationship to academic achievement, other psychological and social constructs, and test performance. A plethora of studies on the assumed significant relationship between test anxiety and academic achievement (and in several instances studying other psychological correlates associated with test anxiety) have been carried out in different countries and at different times.

A significant relevant study is Fiore's (2003) thesis on 'Gender Differences in Test Anxiety' which basically aims to determine if there is a significant difference in general test anxiety according to gender. Using the modified Suinn Test Anxiety Behavior Scale, the key rationale for Fiore's study is to resolve the conflict on the role of gender in test anxiety, for there are contradictory perspectives or dichotomies in the body of the relevant literature with equally large body of evidence supporting and refuting the significant role of gender difference with regard to test anxiety theory (p. 1). Fiore's findings indicate that there is no overall significant difference in the level of general test anxiety according to gender difference. Nevertheless, "when a multivariate regression was conducted to account for variability contributed by age and class, there was a statistically significant difference" (Fiore, 2003, p. ii). This is an indicator that it is not gender alone that causes significant differences in general test anxiety; therefore, research must be conducted to isolate the variables accounting for significant differences.

A second relevant study is Ahmed's (2009) thesis which investigates the relationship between academic achievement, gender, social anxiety, and self-esteem among Pakistani secondary students. A stratified random of 551 boys and 449 girls of 9th class from the high schools of city district Lahore (Pakistan) makes the sample of this study. Academic achievement is measured by a valid achievement test developed for this purpose. An adapted Urdu version of Interaction Anxiousness Scale is used as the instrument for assessing the intensity of social anxiety. Additionally, an adapted Urdu version of Rosenberg self-esteem scale is used to assess the self-esteem of the study participants. Tools of data analysis include the t-tests, Pearson product moment correlation, regression analysis, and one way ANOVA.

The study results show that academic achievement has positive relationship with self-esteem and negative relationship with social anxiety. Self-esteem has negative relationship with social anxiety. Furthermore, findings reveal that male students have higher level of self-esteem and lower level of social anxiety as compared to the female students.

Another relevant study is Rezazadeh and Tavakoli's (2009) research article which investigates the relationship among test anxiety, gender, academic achievement and years of study among the Iranian EFL university students. Suinn's Test Anxiety Questionnaire is used as the instrument of data collection in this study. Tools of data analysis are correlation coefficient and Chi square test. The study findings show that female students have a higher level of test anxiety. As expected, there is a statistically significant negative correlation between test anxiety and academic achievement. However, there is no meaningful relationship between test anxiety and the number of years of study.

A fourth relevant study on the relationship among test anxiety, self-efficacy, and academic achievement is Barrows, Dunn, and Lloyd's (2013) study on the empirical evidence that supports the relationship between self-efficacy, test anxiety, and overall academic success. The study basic assumption is that students' level of self-efficacy (which is significantly related to self-esteem) and test anxiety directly impacts their academic success. Results of the study show a strong relationship between each of test anxiety, self-efficacy and exam grades. Additionally, multiple linear regression analyses show that exam grade could be predicted by test anxiety and self-efficacy level, and that self-efficacy moderate the effects of anxiety. Further, the study results indicate that self-efficacy does not moderate test anxiety or the test grade, which has interesting implications for future research.

1.5 Objectives of the Study

This research article attempts to study the levels of test anxiety in relation to particular psychological, social, and academic correlates and its effect on academic achievement among students of medical sciences at Sudanese universities. Specifically, the study investigates the relationship between tests anxiety and self-esteem, gender, type or field of study, and the effect of test anxiety on academic achievement.

1.6 Rationale for the Study

The raisons d'être of this study could be seen in two ways. First, the present article adds to the body of the literature on the subject by testing some of the relevant controversial hypotheses. Though there are hundreds of studies done on test anxiety and academic performance, still heated debates and controversies are there, causing considerable tension and uncertainty which call for worthwhile solution. As "concern" about test anxiety increases in current research, so does "confusion" about its nature, triggers, potential victims, and treatment (Cizek and Burg, 2006, p. 8). In the foreword to Spielberger and Vagg (1995), McKeachie maintains that

Since the earliest research studies, anxiety has been identified as a major variable affecting performance. However, the relation between anxiety and performance is not a simple one. Anxiety usually has negative effects; but the nature of the task, the way individuals handle their anxiety, and the interactions of anxiety with other personality characteristics and with situational variables- all of these factors make research on anxiety endlessly fascinating (p. xi).

Second, the poverty of the online literature and data on the subject of test anxiety among Sudanese learners makes it mandatory to initiate and publish online research that attempts to integrate the Sudanese context into the global sway of research on test anxiety. This will make it possible to compare results and identify potential and relevant points of significant research.

Questions of the Study

(Questions with an asterisk (*) are amenable to both quantitative and qualitative analyses).

(1) Is the level of test anxiety significantly higher than the critical value set by Westside Test Anxiety Scale?

(2) *How would the study participants perceive the nature of test anxiety and its consequences on their test performance?

(3) Is the level of test anxiety significantly high among the study participants according to gender difference?

(4) Is there any significant correlation between levels of test anxiety and type or field of study?

(5) Is there any significant correlation between levels of test anxiety and self-esteem among the study participants?

(6) Is there any significant correlation between levels of test anxiety and academic achievement?

2   Method

2.1   Study Design

This study employs a fixed methods design, a set of specific procedures for collecting, analyzing, and 'mixing' both quantitative and qualitative findings and interpretations in a single study to understand a multi-dimensional and intricate research problem.

Specifically, this study employs a fixed mixed methods design, "where the use of quantitative and qualitative methods is predetermined and planned at the start of the research process, and the procedures are implemented as planned" (Creswell and Clark, 2011, p. 54).

Within the framework of the fixed mixed methods design, this research article employs the embedded design in which a "supplemental strand" qualitative data is collected and analyzed within a quantitative design to "enhance the overall design in some way" (Creswell and Clark, pp. 71-72) as shown in the diagram below, adapted from Creswell and Clark (2011):
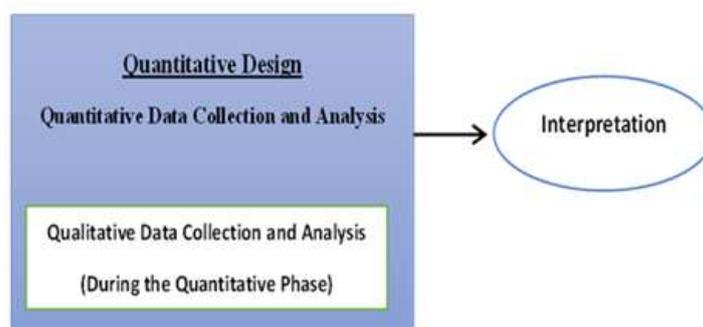

Figure 3.1: Embedded Design

2.2   Participants

A convenience sample of 705 students (389 females, 316 males, ages between 17 and 25) is taken from the target population which is the students of medical sciences in the four major universities in the Sudan: University of Khartoum, Sudan University for Science and Technology, Al-Neelein University, and Omdurman Islamic University.

Table (2.1) Distribution of the Study Participants

Type of Study	Number Females	Males	Total
Pharmacy	116	108	224
Nursing	100	72	172
Medicine	88	60	148
Medical labs	80	56	136
Total	384	296	680

* 25 of the participants did not return the relevant questionnaires

Data were collected in the period from January, 2012 to November 2014. For qualitative data, only seventy-two students (equally distributed according to gender) were selected from the study participants to give free accounts on some basic constructs relevant to the study.

2.3 Variables of the Study

This study contains several variables which could be explained in the table below:

Table (2.2) Study Variables and Description

Variable	Type	Description
Test anxiety	Independent Variable (1) Dependent variable (1)	The study dependent variable which is assumed to be affected by some variables in this study.
Self-esteem	Independent Variable (2)	
Gender	Independent variable (3)	These are the primary independent variable believed to have effect on the dependent variable in this study.
Field of study	Moderator variable	A moderator is a special variable that represents a process or a factor that alters the effect of a primary independent variable X on a dependent variable Y.
Academic achievement	Dependent variable (2)	

2.4 Instruments of Data Collection

Westside Test Anxiety Scale is used to measure the participants' level of test anxiety. A description of this scale is provided below:

2.4.1 Scale's Components

The scale is constructed to measure anxiety impairments, with most items asking directly about performance impairment or about worrying, which interferes with concentration. Simple indications of physiological stress are found to be relatively weak indicators of performance impairments.

1. Incapacity (memory loss and poor cognitive processing) — 6 Items #1, 4, 5, 6, 8 & 10
2. Worry — 4 Items #2, 3, 7, 9
3. Physiological symptoms — no items.

Interpreting the scores obtained from the Westside Test Anxiety Scale:

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 (some items rated 4=high)

3.5—3.9 High test anxiety (half or more of the items rated 4=high)

4.0—5.0 Extremely high anxiety (items rated 4=high anxiety (items rated 4=high and 5=extreme

(Driscoll, 2004)

2.4.2 The Validation of the Scale

On the validity of this scale, Driscoll (2007) maintains that

Westside scale combines six items assessing impairment, four items on worry and dread, and no items on physiological over-arousal. The cognitive items are similar to those in the Cassady-Johnson (2001) Cognitive Test Anxiety Scale and in other familiar anxiety scales, and the impairment items are similar to those on the Alpert-Haber (1960) Debilitative Anxiety Scale (p. 2).

Plus, Driscoll (2007) adds that the "Westside scale thus has high face validity, in that it includes the highly relevant cognitive and impairment factors but omits the marginally relevant over-arousal factor" (p. 2).

Nonetheless, it should be noted here that the absence of items on the physiological symptoms in Westside Test Anxiety Scale is one of the strong reasons of 'triangulation', use of qualitative data in the interpretation phase of what is basically a quantitative design in this study.

2.4.3 Rosenberg Scale of Self-esteem

Rosenberg ten-item scale is used to measure levels of self-esteem among the study participants. Scoring of the scale is as follows:

Items 2, 5, 6, 8, 9 are reverse scored. We give "Strongly Disagree" 1 point, "Disagree" 2 points, "Agree" 3 points, and "Strongly Agree" 4 points. After that we sum the scores for all ten items and keep them on a continuous scale. Higher scores indicate higher self-esteem. The scale ranges from 0-30. Scores between 15 and 25 are within normal range; scores below 15 suggest low self-esteem.

2.5 Tools of Data Analysis

In this study, quantitative data is analyzed using SPSS (Version 22). One sample t-test, independent samples t-test, one way ANOVA, and Pearson correlation coefficient (r) are used to analyze the study hypotheses embedded in the study questions. Because Sudanese universities use different types of grading, grades/marks obtained from the study population are transformed to standardized scores: z-scores and then t-scores to ensure uniformity.

3 Results

Descriptive and inferential statistics are separately presented in this section, to be followed by discussion in section [4].

Table (3.1): One-Sample t-test for the level of test anxiety among the study participants

N	Mean	SD	Critical Value	t	Sig. (2-tailed)
620	3.645	1.0728	3.50	3.362	.001

Level of test anxiety among the study participants is significantly higher than the critical value set by Westside Test Anxiety Scale, which is (3.50).

Table (3.2): Descriptive statistics for the items of the questionnaire

Item	N	Maximum	Minimum	Mean	Standard Deviation
The closer I am to a major exam, the harder it is for me to concentrate on the material.	680	5	1	4.48*	0.32
When I study for my exams, I worry that I will not remember the material on the exam.	680	5	1	4.30*	0.93
During important exams, I think that I am doing awful or that I may fail.	680	5	1	3.72*	1.04
I lose focus on important exams, and I cannot remember material that I knew before the exam.	680	5	1	3.78*	1.22
I finally remember the answer to exam questions after the exam is already over.	680	5	1	3.32	1.04
I worry so much before a major exam that I am too worn out to do my best on the exam.	680	5	1	3.68*	0.96
I feel out of sorts or not really myself when I take important exams.	680	5	1	2.98	1.97
I find that my mind sometimes wanders when I am taking important exams.	680	5	1	3.16	1.02
After an exam, I worry about whether I did well enough.	680	5	1	4.35*	0.88
I struggle with written assignments, or avoid doing them, because I feel that whatever I do will not be good enough. I want it to be perfect.	680	5	1	2.68	1.85

 * **Item mean is significantly higher than the critical value set by Westside Test Anxiety Scale**

Table (3.3): Independent samples t-test for female and males participants

	Gender	N	Mean	Std. Deviation	Sig. (2-tailed)
Level of Test Anxiety	Female	324	3.9802	.90993	.05055
	Male	296	3.2777	1.11789	.06498

There is a significant difference between levels of test anxiety according to gender difference: female students have significantly higher level of test anxiety.

Table (3.4): ANOVA: Levels of Test Anxiety- Types of Study (Specialization)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	117.023	3	39.008	40.357	.000
Within Groups	595.411	616	.967		
Total	712.433	619			

One way ANOVA shows that there is a significant difference in the level of test anxiety among participants according to the type of study (specialization). The table below shows in detail the nature of differences among the four groups: pharmacy, nursing, medicine, and medical labs.

Table (3.5): ANOVA: Multiple Comparisons (Types of Study- Specialization)

(I) Type of Study [Specialization]	(J) Type of Study [Specialization]	Mean Difference (I-J)	Sig.
Pharmacy	Nursing	.54412*	.000
	Medicine	-.66856*	.000
	Medical labs	-.01123	.931
Nursing	Pharmacy	-.54412*	.000
	Medicine	-1.21268*	.000
	Medical labs	-.55535*	.000
Medicine	Pharmacy	.66856*	.000
	Nursing	1.21268*	.000
	Medical labs	.65733*	.000
Medical labs	Pharmacy	.01123	.931
	Nursing	.55535*	.000
	Medicine	-.65733*	.000

The multiple comparisons above show that whereas there is no significant difference between level of test anxiety among pharmacy students and medical lab students, level of test anxiety is significantly higher among pharmacy students than that among nursing students and significantly lower than that among medicine students. In fact, the comparisons show that level of test anxiety among students of medicine is significantly higher than any of the three groups, whereas level of test anxiety among students of nursing is significantly lower than any of the three groups.

Table (3.6): Correlation between test anxiety and self-esteem

Variables	Pearson Correlation Coefficient (r) [Sig. 2-tailed]
Level of Test Anxiety	-.391**
Level of Self-esteem	

**. Correlation is significant at the 0.01 level (2-tailed)

The table above shows a significant negative correlation between levels of test anxiety and level of self-esteem. This indicates that the higher the level of self-esteem the lower the level of test anxiety.

Table (3.7): Correlation between test anxiety and academic achievement

Variables	Pearson Correlation Coefficient (r) [Sig. 2-tailed]
Level of Test Anxiety	
Academic Performance [GPA, Final Grades, etc.]	-.476**

**. Correlation is significant at the 0.01 level (2-tailed)

The table above shows a significant negative correlation between levels of test anxiety and level academic achievement. This result confirms the strong affinity between the two constructs which is attested in several studies.

4   Discussion

This research article aims to answer questions that pertain to specific issues about test anxiety and four psychological, social, and academic correlates in the context in question. Below is the discussion of each of these questions based on the study results.

(1) **Is the level of test anxiety significantly higher than the critical value set by Westside scale?**

The degree of test anxiety experienced by the study participants is significantly higher than the critical value set by Westside Test Anxiety Scale (WTAS) for measuring test anxiety: the critical value set in WTAS is 3.5, whereas the mean of the level of test anxiety among the participants is 3.645 (significant at the p-value .001). This result shows that students of medical sciences at Sudanese universities experience severe anxiety in testing situations. Personal accounts written by some of the study participants enhance this finding as well.

(2) ***How would the study participants perceive the nature of test anxiety and its consequences on their test performance?**

Quantitative results show that test anxiety is a real dilemma among the study participants. Six items of Westside Test Anxiety Scale have a mean of responses significantly higher than the critical value set in the scale. This indicates that the vast majority of the participants experience the basic symptoms and signs of test anxiety. In a nutshell, the accounts given by the participants show the severe cognitive, behavioral, and physiological signs and symptoms which the study participants suffer as a result of test anxiety. Below is a taxonomy of the basic symptoms and signs experienced by the study participants:

Table (4.1): A Summary of Qualitative Data (Symptoms and Signs of Test Anxiety among the Study Participants)

Cognitive Symptoms/Signs	Behavioral Symptoms/Signs	Physiological Symptoms/Signs
Feeling of insignificance Focus and retrieval problems Worry about instructors' attitudes Worry about parents' attitudes Suicidal tendencies	Smoking and excessive smoking Taking too much painkillers Avoiding tests and exams (medical excuses) Withdrawal Over-study Failure to complete tests and exams Changing field of study	Headaches Cyclic disorders (*females*) Sleeping disorders Pains over the whole body Eating disorders Lack of appetite Nocturia (Frequent urination) Nausea Dizziness

The data in the table above is consistent with Huberty's (2009) taxonomy of the symptoms/signs of test anxiety with few new but minor details which could still be treated within Hubtery's classification.

(3) **Is the level of test anxiety significantly high among the study participants according to gender difference?**

Results of the independent samples t-test show that there is a significant difference between levels of test anxiety according to gender difference. Female students have significantly higher level of test anxiety. This finding is consistent with the findings of some relevant previous studies, such as Chapell, Blanding, Silverstein, Takahashi, Newman, Gubi, and MaCann (2005) whose study findings support the controversial hypothesis that female students experience more severe test anxiety than male counterparts, and Farooqi, Ghani, and Spielberger (2012) who demonstrate that gender is a significant factor in test anxiety level among medical students, with female students having a higher level than males. Ahmed's (2009) and Zaheri, Shahoei, and Zaheri's (2012) findings on Pakistani and Iranian students respectively indicate that females report significantly higher levels of test anxiety. These

findings are in line with Huberty's (2009) statement who succinctly observes that "although everyone worries occasionally, excessive and frequent worry can impair social, personal, and academic functioning. It can contribute to feelings of loss of control and perhaps depression, especially in girls" (p. 13). (My emphasis).

Yet, qualitative data in this study do not confirm the finding that female students have higher level of test anxiety than male students. Statements obtained from both genders expose almost the same types of symptoms and signs with the same level of severity and with almost the same frequency. The three charts below clearly show that there are almost no variations in the frequency of the symptoms and signs of test anxiety among male and female students of medical sciences.

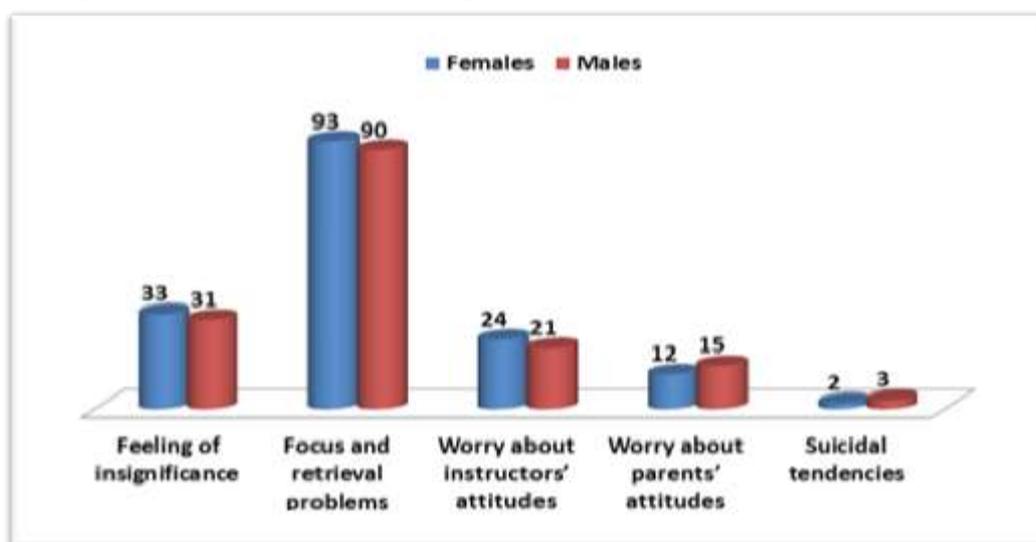**Chart 4.1: Frequency of Words/Expressions Indicating Relevant Cognitive Symptoms/Signs among the Study Participants**

Chart 4.2: Frequency of Words/Expressions Indicating Relevant Behavioral Symptoms/Signs among the Study Participants
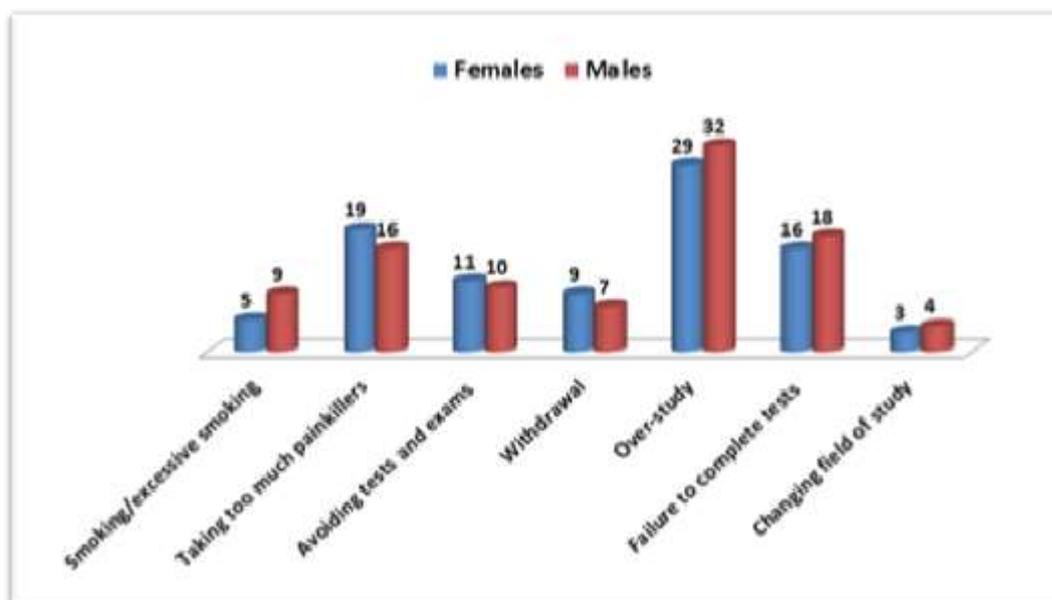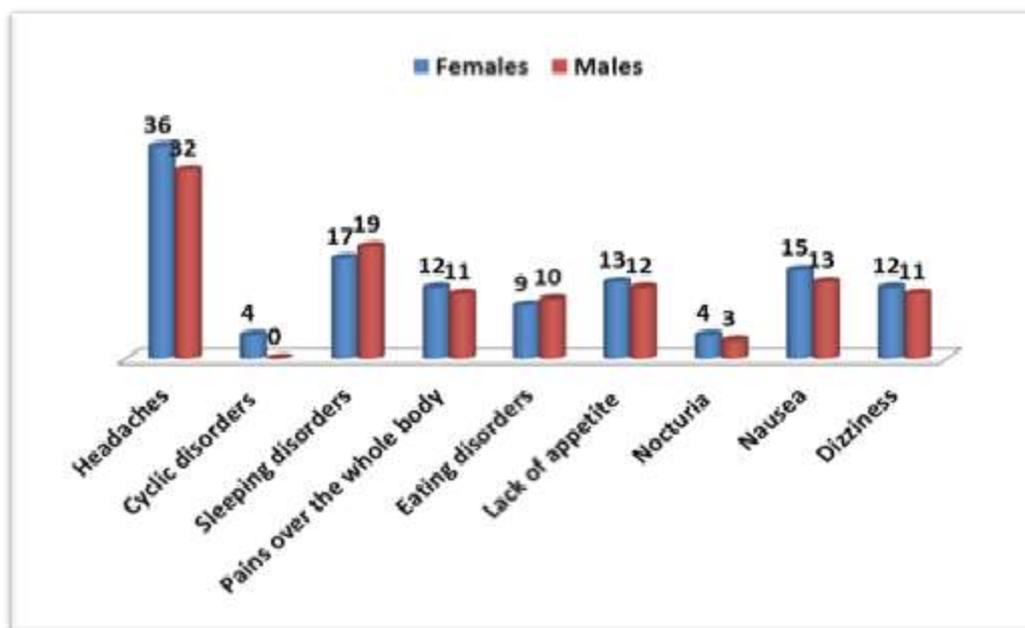
Chart 4.3: Frequency of Words/Expressions Indicating Relevant Physiological Symptoms/Signs among the Study Participants

(4) Is there any significant correlation between levels of test anxiety and type or field of study?

Results show that there is a significant difference in the level of test anxiety among participants according to the type of study (specialization). Multiple comparisons indicate that students of medicine rank first with regard to level of test anxiety, whereas nursing students experience the lowest level of test anxiety. Pharmacy and medical lab students have almost the same mean of level of test anxiety, significantly lower than that among medicine students, yet significantly higher than that among nursing students. These findings point out to the fact the type of study [specialization] is a significant factor in test anxiety. Most probably, students of medicine experience the highest levels of test anxiety because of the demanding nature of their study, the high-stakes tests they take during study, and the significant consequences of the performance on these test in academic study and future career.

(5) Is there any significant correlation between levels of test anxiety and self-esteem among the study participants?

Results show a significant negative correlation between levels of test anxiety and level of self-esteem. This means that the higher level of self-esteem the lower the level of test anxiety is. This indicates the strong affinity between these two psychological constructs. This finding is in line with Bhatta's (2013) and Alam's (2014) study results show significant negative correlation between test anxiety and self-esteem among Nepalese and Pakistani students respectively.

(6) Is there any significant correlation between levels of test anxiety and academic achievement?

As expected and confirmed by a plethora of studies, results show that there is a significantly strong correlation between test anxiety and academic achievement. This finding is in harmony with almost all relevant previous studies such as Chapell, Blanding, Silverstein, Takahashi, Newman, Gubi, and MaCann (2005), Akanbi (2010), which confirm the

hypothesis that students with the high level of test anxiety have poor academic performance. However, this significant correlation between test anxiety and academic achievement does not mean that there is a direct cause-effect between these two variables. As Goonan (2003) aptly put it, "test anxiety does not have a direct impact on academic achievement, but it may manifest differently based on many factors, including familial background, level of achievement, motivation, and intellectual giftedness" (p. 7).

5   A Summary of Findings and Implications

1) Test anxiety is a serious psychological problem. It has extremely adverse effects on a significant portion of the study participants.
2) Qualitative data indicate that students of medical sciences at Sudanese universities are conscious of the effect of anxiety on test performance. Unfortunately, this awareness, rather than leading to the right strategies to overcome this unfavorable hurdle, is a source of frustration in most cases.
3) Tests, particularly high-stakes tests, evoke varying degrees of anxiety in the students depending on the type of the study (specialization) and the importance of the test in terms of its effect on the students' lives and careers.
4) Gender role in test anxiety has to be further studied in relation to all confounding variables. The findings of this research paper are not unequivocal as there is some sort of discrepancy between quantitative and qualitative data on the effect of gender difference on prevalence and severity of test anxiety.

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Appendices

[1]
Westside Test Anxiety Scale

Rate how true each of the following is of you, from <u>extremely or always</u> true, to <u>not</u> at all or never true. Use the following 5 point scale. Circle your answers:

5	4	3	2	1
extremely always true	highly usually true	moderately sometimes true	slightly seldom true	not at all never true

__ 1) The closer I am to a major exam, the harder it is for me to concentrate on the material.
        5   4   3   2   1

__ 2) When I study for my exams, I worry that I will not remember the material on the exam.
        5   4   3   2   1

__ 3) During important exams, I think that I am doing awful or that I may fail.
        5   4   3   2   1

__ 4) I lose focus on important exams, and I cannot remember material that I knew before the exam.
        5   4   3   2   1

__ 5) I finally remember the answer to exam questions after the exam is already over.
        5   4   3   2   1

__ 6) I worry so much before a major exam that I am too worn out to do my best on the exam.
        5   4   3   2   1

__ 7) I feel out of sorts or not really myself when I take important exams.
        5   4   3   2   1

__ 8) I find that my mind sometimes wanders when I am taking important exams.
        5   4   3   2   1

__ 9) After an exam, I worry about whether I did well enough.
        5   4   3   2   1

__ 10) I struggle with written assignments, or avoid doing them, because I feel that whatever I do will not be good enough. I want it to be perfect.
        5   4   3   2   1

[2]

Rosenberg Scale of Self-esteem

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree

1. On the whole, I am satisfied with myself.

1	2	3	4

2. At times I think I am no good at all.

1	2	3	4

3. I feel that I have a number of good qualities.

1	2	3	4

4. I am able to do things as well as most other people.

1	2	3	4

5. I feel I do not have much to be proud of.

1	2	3	4

6. I certainly feel useless at times.

1	2	3	4

7. I feel that I'm a person of worth, at least on an equal plane with others.

1	2	3	4

8. I wish I could have more respect for myself.

1	2	3	4

9. All in all, I am inclined to feel that I am a failure.

1	2	3	4

10. I take a positive attitude toward myself.

1	2	3	4

[3]

Qualitative Data

The Open-Ended Questionnaire

1. **Could you please (in detail) reflect bon what you usually feel before, after, and during major exams and tests?**

2. **In case you experience any sort of worry, stress, or pain before, after, and during major exams and tests, how can you overcome these negative feelings in the future?**

3. **Do you think that these negative feelings do affect your academic performance and achievement?**

A Sample of the Participants' Responses

(**1**) *"From the first day I came to this faculty of medicine I feel I'm studying day and night as not to fail in these many, many test we do every week and every month. When I failed in a test I feel like I'm broken and I'll not do well in any all next tests. My teachers and all the doctors in the college will be of so very negative idea of anyone failing tests. And the oral exams will be very hard for everybody will be failing in the final test or having vey low marks. Many of my senior friends telling me that if I fail in the intermediate year of next year which is third year, I guess I will never ever maybe have good grades or marks in the final year and that is very bad for all the time after leaving the college and I'm really afraid all the time and in my dreams bad things come to me about all these testing I hate too much really. I think sometimes I wanted to go to a doctor or psychologist to analyze my situation and sometimes I started even to smoke cigarettes"* **[Female student-medicine]**

(**2**) *"I study hard for the test. In all big exams I suffer migraine before and after the exams. In the exams I'm working on the test but always have fear of difficult questions and when I find something I'm not sure about, I feel very bad. I feel very bad in my stomach I get very cold and sometimes feel the world is not ok and moving, and feel the world dark around me. I don't do well in the things I know in*

the test. I just want to get it over with and get out of the room of the exam. I'm very sick of exams and tests and I don't know what I can do for them." **[Male student-medicine]**

(3) "Usually before final test I feel very bad and I don't sleep most of the nights. Sometimes I feel very bad pains in my muscles and I don't feel hungry and can't eat all the day sometimes. My period comes always earlier in exams time and sometimes continues for more days. I don't do well in tests, still I memorized all facts and information for the exams. My life becomes very bad every test I take. I wish I am not live and died. In the lessons and lectures I'm very smart and the teachers like my assignment. I don't understand what is wrong. I'm hopeless. Sometimes in mind I think of stop pharmacy and leave this college." **[Female student- pharmacy]**

(4) "I always feel painful and I think about what is going to be if I don't do very well in the final test and then things become very bad. I lose my focus in the test. Even in case I know the answer, I start to be out of memory and lose my knowledge of everything and struggle to find the thing to write and the correct words to explain my knowledge. When the test finished and I leave the exam room, I remember everything and every right answer to the questions." **[Female student- medical lab]**

(5) *When times of exams come I feel not good at all and I worry how the family will think of my results. My mother in Saudia Arabia working and always will ask on whatsapp about my exams in every day. I'm in a lot of stress always in the exams. Before the times of the exams I feel I can't read and when I read I feel I can't remember anything. In time of exams I find myself very bad and take many medical excuses to not do the exam but do them later. Also I feel in before the exams I need go to bathrooms many times and even during the exam I go many times. My stomach is very bad and moving. After exam I could not sleep and I smoke many cigarettes sometimes twenty in the day. I think I have not to study pharmacy and go to an easy college in there no many tests and exams always as here in the pharmacy faculty.***[Male student-pharmacy]**

(6) *"I feel very bad about when I'll have exams and always I'm afraid I do not write the meaning I want to write because of the language which is not Arabic but English and I'm very weak in English. I feel I can't know what the questions mean and I know the meaning is very clear but I'm always in the feeling that this is not the correct meaning. I find that I write answers and suddenly feel they are not ok and I erase them. When the exams come I feel like an ill. I become usually very very sick until I feel I could not go to the exam but really I'm not ill. Just I hope one day there are no exams in the world and just assignments are ok without these many exams and I sometimes think death is good and it makes me rest"* **[Male student-nursing]**

Bio:

Abdunasir I. A. Sideeg offers eighteen years of teaching linguistics and related disciplines in Sudan and Kingdom of Saudi Arabia. He obtained a PhD in critical applied linguistics. He has been teaching educational psychology for five years at Yanbu University College, KSA. His major interests include linguistic interfaces, English syntax, learning theories, educational assessment, and history of English.