

The Effects of Academic Related Stress on the Performance Scores of Students of Ordinary Level Chemistry in Bamenda III

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ABSTRACT

Poor performance in sciences especially in chemistry has continued to be a major concern for educational stakeholders in Cameroon. These poor performance scores have led to low mean grades for most students thus jeopardizing their chances for upward educational mobility. Academic performance may be impeded by academic related stress and its attendant indicators such as anxiety, depression, financial stress and loneliness which could in turn lead to inadequate coverage of subject syllabus, non-familiarity with examination format, lack of strong reading habit by students preparing for examinations amongst other challenges faced by chemistry students. Thus, the purpose of this study is to investigate the influence of academic-related stress on the performance scores of students in Ordinary Level Chemistry in Secondary Schools in Bamenda III. More specifically, the study sought to ascertain the extent to which anxiety and depression affect the performance scores of students in Ordinary Level Chemistry. The study employed the survey research design with a mix of both quantitative and qualitative techniques. Quantitative data were collected through a questionnaire while a semi-structured interview guide were used to collect qualitative data from a sample of 120 respondents. Questionnaires were completed by 100 Chemistry students while 20 Chemistry teachers were interviewed. The purposive and simple random sampling techniques were used to select the sample of the study. Data were analyzed with the aid of the Statistical Package for Social Sciences (SPSS) version 23.0 for Windows. Descriptive statistics such as simple percentages, mean scores and standard deviation, and inferential statistics notably the Pearson Correlation test was used to analyze quantitative data while qualitative data were analyzed using content analysis with the support of ATLAS.ti software version 8.0. The findings revealed that anxiety ($r=0.863$, $p<0.05$) and depression ($r=0.811$, $p<0.05$) have a positive correlation with workers' performance. These findings are in consonance with the postulates of scholars such as Mayya (2004), Sideridis (2005), Trombitas (2012), Morahan-Martin and Schumacher (2003) who have theorized anxiety and depression as having the ability to determine students' performance scores. The findings were discussed within the framework of the Lazarus & Folkman's Cognitive relational theory (1984), Albert Bandura's theory on self-efficacy (1997) and Urie Bonfenbrenner's Ecological systems theory (1979). Based on the findings, recommendations were made to students, teachers, school authorities and to integrate stress coping strategies in their teaching methods and follow up at home so as to assuage the devastating effects of academic related stress on the performances scores of their students (children) in Ordinary Level Chemistry. Suggestions for further studies were made.

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KEYWORDS: *academic-related stress, anxiety, depression, academic performance*

INTRODUCTION

Stress has been noted as a main source of problems being faced by students during their academic career when they are struggling to get the academic achievements for their future life. Academic pressure is one of the factors that cause failure among students. Stress is the response of mental action through hormonal signaling. The perception of danger sets off an automatic response system, known as the fight or flight response.

The psychological perception of pressure, on the one hand, and the body's response to it, on the other involves multiple systems, from breakdown to muscles to memory. Stress is a lot of expectation from self. Stress is the feeling of strain and pressure. Stress is a threatening feeling (Cohen, Kessler, & Gordon, 1997). Psychological stress occurs when an individual perceives that environmental demands or duties exceed his or her adaptive capacity. Stress generate psychological disorders that may arise as downstream (Jex, 1998). Many different things can cause physical stress, such as fear of something dangerous or emotional, such as concerns about your family or work and a poor outcome in ones studies. This is a reaction to things around you that cause stress (Manuel, 2003).

However, it is important to note that stress can have both negative and positive impacts on students' academic performance. Most psychologists believe that moderate stress motivates individuals to achieve and fuels creativity, although stress may hinder individuals from performance on the difficult tasks (Nelson & Simmons, 2003). Stress impact on the emotional and physical behavior of persons. It is believed to be the reason associated with academic failure or even awareness of the possibility of such why individuals feel tension, pressure, or negative emotions (Bernstein, Penner & Roy, 2008). According to Gupta & Khan, (1987) academic stress is a mental distress with respect to some foreseen frustration associated with such failure.

Anxiety is a subjective feeling of tension, apprehension, nervousness, and worry associated with arousal of the nervous system (Spielberger, 1983). The high level of anxiety causes a person's normal life being difficult such as interfered activities and social life. Anxiety is one of the wide varieties of emotional and behaviour disorders (Rachel and Chidsey, 2005). Students with anxiety disorder exhibit a passive attitude in their studies such as lack of interest in learning, poor performance in exams, and do poorly on assignments. The anxiety's psychological symptoms among students of chemistry and other subjects include feeling nervous before a

tutorial class, panicking, going blank during a test, feeling helpless while doing assignments, or lack interest in a difficult subject whereas the physiological symptoms include sweaty palms, cold, nervousness, panic, fast pace of breathing, racing heartbeat, or an upset stomach (Ruffins, 2007).

Anxiety while studying is a major predictor of academic performance (McCraty, 2007 and McCraty, et al., 2000) in various subjects including chemistry and various studies have demonstrated that it has a detrimental effect. Little is known that there exist a possible association between high level of anxiety and low academic performance among students. Researchers revealed that high levels of anxiety influence on the decrease of working memory, distraction, and reasoning in students (Aronen et al., 2005). Tobias in Ibrahim (1996) has been recognised that anxiety plays significant role in student's learning and academic performance, moreover anxiety has been known to have both facilitating and debilitating effects on academic achievement. Researchers have been looking at the correlation of anxiety and the effect of academic performance among school students, they found that among high school students with higher level of anxiety have lower academic performance (McCraty, 2007) and greater anxiety would be associated with poorer academic achievement (Luigi & Poala, 2007).

Depression is a common disorder that impacts an individual's ability to perform life activities, including those required by students in school. Bayram and Bilgel (2008) indicate that depression among students is an area of increasing worldwide concern as this population has been shown to be particularly prone to depression due to factors that include academic pressures, obstacles to their goal achievement, environmental changes, and life challenges such as transition from secondary school to university and the change in role from student to knowledgeable adult. Science students and chemistry students in particular have been found to experience higher levels of depression and anxiety compared to the general population and to their same age peers (Bayram & Bilgel, 2008). Differences between levels of depression and anxiety have also been noted between students attending public and private schools.

Depression has a significant impact on an individual's ability to perform life activities. According to Sherina, Rampal and Kaneson (2004) while the ability to participate in the lives of friends and family has been widely explored in the context of quality of life, much less research has been done that investigates the impact of depression on the ability to

perform the life activities related to work performance, and none have yet been published on the impact of depression on the ability of students to perform the work required for academic achievement. The prevalence of depression among students in public secondary schools has been estimated to be 10.4% in Greece, 15.2% in USA, 21.7% in Malaysia, 24% in UK, 29.1% in India, and 43.8% in Pakistan. The prevalence of depression among private school students, however, has been estimated to be 19% in USA, 49.1% in India, and 60% in Pakistan (Sherina, Rampal & Kaneson, 2004).

Academic performance is the educational aim that is achieved by a student, a teacher or an institution over a specific period of time. The academic performance of students heavily depends upon parental involvement in their academic activities to attain the higher level of quality in academic success. Students are quite emotional especially female students as majority of them become stress up at everything in school. Some of the factors that influence their studies include parental pressure, teacher's attitude towards their study, home strictness, future and job tensions (Hussain, 2012).

Previous research shows that academic related stress can reduce academic achievement, reduce motivation and can cause school dropout. The long term impact includes reduced likelihood of sustainable employment and can cost government so much money each year (Nelson & Simmons, 2003). This work is actually aimed at finding out how academic related stress affects students' performance in Ordinary level chemistry in some secondary schools in Mezam Division as case study.

STATEMENT OF THE PROBLEM

Poor performance in sciences especially in chemistry has continued to be a major concern for educational stakeholders in Cameroon. These poor performance scores have led to low mean grades for most students thus jeopardizing their chances for upward educational mobility. At the national level, poor performance has led to low uptake of careers in science and technology.

Academic performance may be impeded by academic related stress and its attendant indicators such as anxiety and depression which could in turn lead to inadequate coverage of subject syllabus, non-familiarity with examination format, lack of strong

reading habit by students preparing for examinations amongst other challenges faced by chemistry students. Students with anxiety are prone to internalized disorders and agonizing academic challenges that confront them. Students who suffer from depression are psychopathologic, due to their proneness to internal negative emotion. Students with financial difficulties may look for jobs or do other activities to meet up with their financial demands thus leaving less time for studies. However, it is not clear which of these factors are responsible for the poor performance of Chemistry in Bamenda III. This study therefore seeks to investigate the effect of academic related stress on the performance scores of students in Ordinary Level Chemistry in Secondary Schools in Bamenda III, Cameroon.

Specific objectives:

- To investigate how anxiety influences the performance scores of students in Ordinary Level Chemistry in Bamenda III.
- To investigate how depression influences the performance scores of students in Ordinary Level Chemistry in Bamenda III.

METHODOLOGY

The study employed descriptive cross-sectional survey design. The design was used since it enabled the researcher collect data across the sampled population using the same instruments at the same time. This study was carried out in Bamenda III Sub-division, found in Mezam Division in the North West Region of Cameroon. The target population comprised 200 form five chemistry students from Three (3) General education secondary schools in Bamenda III Sub-Division which were GBHS Bayelle, Saint Paul secondary school and Saint Michael secondary school. The study targeted one public secondary school, one confessional secondary school and one lay private secondary school. There were 200 Form five Chemistry students in the said schools, 15 Chemistry teachers, 3 Heads of Departments and 2 Regional pedagogic inspectors (RPIs) for Chemistry for the North West Region. The sample was made up of 100 form five chemistry students in three General secondary schools in Bamenda III Sub-division who were within the reach of this research. The purposive sampling technique was used by the researcher to select the class to answer the questionnaires. The researcher then used the simple random sampling procedure to choose the students who answered the questionnaires.

Table 1: Summary of sample (Students)

S/N	School	Nature of School	Females	Males	Total
1	Saint Michael	Lay private	12	8	20
2	Saint Paul College	Confessional	18	12	30
3	GBHS Bayelle	Public	30	20	50
Total			60	40	100

Table 2: Summary of sample (teachers)

S/N	School	Nature of School	Teachers
1	Saint Michael	Lay private	4
2	Saint Paul College	Confessional	6
3	GBHS Bayelle	Public	10
Total			20

The researcher used questionnaires to gather information students, meanwhile, interview guides were used to collect qualitative data from the teachers and pedagogic inspectors of Chemistry. Content and construct validity were used to validate the instruments. A pilot study was used to check reliability of the instruments.

Data was analyzed quantitatively using the Statistical Package for Social Sciences (SPSS) software version 23.0. Descriptive statistics such as frequencies tables containing the various weighted responses, percentages, measures of central tendencies (mean), and dispersion (standard deviation) were generally used to provide answers to the research questions. The independent *t* test, one-way analysis of variance (ANOVA's F-test) and the Pearson correlation test was also used to compare means within the variables under investigation, thereby supplying the inferential statistics for this study. The Pearson product moment correlation was used to determine the magnitude and direction of the relationship between anxiety and depression with respect to academic person. Qualitative data obtained from the interviews and observations were analyzed using the technique of content analysis and the ATLAS.ti software version 8.0 (Frieze, 2011).

RESULTS

Research question one: What is the influence of anxiety on the performance scores of students in Ordinary Level Chemistry?

Table 3: Anxiety and performance scores in O/L chemistry

Items	Alternatives %				N	Mean	St. d	Rank
	SD	D	A	SA				
During tests/exams, I cannot tell what is going to happen and this makes me feel very anxious and it affects my performance	2.7	8.1	57.1	32.1	100	4.18	.71	6
Student's mathematical competence affects their performance in Chemistry	2.7	5.4	60.9	31.0	100	4.19	.70	5
I worry about my health, weight and appearance as I study chemistry and this affects my performance	1.1	4.3	47.3	47.3	100	4.41	.62	2
I have fear of failure in chemistry or get a sudden feeling of panic and this affects my performance	1.6	6.0	51.1	41.3	100	4.32	.66	4
Resource persons especially Chemistry specialists are periodically invited to come and speak to us	2.2	6.0	38.0	53.8	100	4.43	.70	1
I continuously get distracted and cannot pay attention during tests/exams and this affects my performance	1.6	5.4	52.7	40.2	100	4.32	.65	4
The tension during chemistry tests & practicals makes me clumsy and things fall out of my hands and this affects my performance	1.6	3.8	48.9	45.7	100	4.39	.64	3
Our Chemistry teacher always uses charts, models and other teaching aids during Chemistry lesson.	2.2	6.0	38.0	53.8	100	4.43	.70	1
There is Chemistry laboratory for effective teaching and learning Chemistry in my college	1.6	5.4	52.7	40.2	100	4.32	.65	4
Regular experiments is the way to maintain the level of students understanding in Chemistry	1.6	3.8	48.9	45.7	100	4.39	.64	3
Total	1.51	4.09	56.1	38.3	100	4.19	.65	

SD-strongly Disagree; D-Disagree; A-Agree; SA-Strongly Agree

Source: Researcher's field survey

Table 3 shows the distribution of the responses according to anxiety and performance scores in Ordinary level Chemistry. A higher percentage of the respondents (94.4%) agreed that anxiety influenced their performance scores as opposed to those that disagreed (5.6%). This therefore revealed that anxiety affected the performance scores of students in Ordinary Level Chemistry in Bamenda III. The result was in this series: Agreed >Disagreed.

Interview responses

An overwhelming majority of the cases expressed dominant positive views on the relationship between anxiety and students' performance scores as can be seen on Table 18 above. Case 5 was selected for thematic illustration because she was a female Chemistry teacher who expressed a particularly strong positive view on the topic by quoting:

"...Students preparing for Ordinary Level Chemistry, like other exams organized by the CGCE Board at this level, are usually overwhelmed with anxiety especially when they get to Form Five which is an examination class. The anxiety usually heightens when the GCE is fast approaching and this paralyses some students leading to poor academic performance in some subjects especially Chemistry in the science field. At this point, we usually caution the students to remain calm and prepare hard do as to emerge successful at the GCE exams..."

Case 5's explanatory excerpt illuminates the fact that anxiety is an important issue in the that impinges on the performance scores of students in Ordinary Level Chemistry and Chemistry teachers need to put all hands on deck to help the students perform well at this level.. Against this backdrop, anxiety is seen as an essential issue that affects Students performance scores in Ordinary Level Chemistry in Bamenda III.

Verification of hypothesis one

HO2: This hypothesis was designed to verify whether there is a significant relationship between anxiety and performance scores in O/L Chemistry. The results obtained after testing the null hypothesis is presented on Table 4.

Table 4: Correlation between anxiety and performance scores in Chemistry

variable		Anxiety	Performance scores
Anxiety	Pearson Correlation	1	.863**
	Sig. (2-tailed)		.000
	N	100	100
Performance scores	Pearson Correlation	-.863**	1
	Sig. (2-tailed)	.000	
	N	100	100
<i>NB: Correlation is significant at the 0.05 level (2-tailed).</i>			

There is a significant relationship between depression and performance scores in O/L Chemistry ($r=-.863$, $df=98$, $p<0.05$). Based on the fact that the significance level of the hypothesis is below 0, the null hypothesis was rejected while the alternative hypothesis was retained. This provided supportive inferential evidence to conclude that there is a significant negative correlation between depression and performance scores in Ordinary Level Chemistry in Bamenda III. This means that a unit increment in depression leads to a corresponding unit decrease in performance scores.

Research Question two: How does depression influence the performance scores of students in Ordinary Level Chemistry?

Table 5: Depression and performance scores in O/L chemistry

Items	Alternatives %				N	Mean	St. d	Rank
	SD	D	A	SA				
I usually have negative thoughts that I am going to fail in chemistry and this affects my performance	1.1	7.1	46.2	45.7	85	4.36	.66	2
I feel discouraged about my future in chemistry and this affects my performance	1.6	7.6	58.2	32.6	85	4.21	.69	5
I feel like a failure in chemistry and this affects my performance	0.5	6.5	46.2	46.7	85	4.39	.63	1

Lack of qualify Chemistry teachers is encouraging stress on learning Chemistry in your college	2.2	10.3	38.0	48.4	85	4.19	.70	6
An immediate withdrawal should be given to any student found cheating in the examination hall during Chemistry exams	0.5	11.4	50.0	27.2	85	4.33	.69	3
I feel disappointed with myself and chemistry as a subject and this affects my performance score	0.5	9.2	39.7	33.2	85	4.24	.63	4
I feel irritable and cry a lot about my shortcomings in chemistry and this affects my performance score	1.6	12.0	42.4	27.2	85	4.33	.74	3
I lose interest in life including the subject chemistry and this affects my performance	1.1	7.1	46.2	45.7	85	4.36	.66	2
I have insomnia or sleep disturbance/deprivation when studying chemistry and this affects my performance	1.6	7.6	58.2	32.6	85	4.21	.69	5
I suffer from fatigue from studying chemistry and this affects my performance	0.5	6.5	46.2	46.7	85	4.39	.63	1
Total	8.44	13.76	44.2	33.6	85	4.20	.73	

SD-strongly Disagree; D-Disagree; A-Agree; SA-Strongly Agree

Source: Researcher's field survey

Table 5 shows the distribution of the responses according to depression and performance scores. A higher percentage of the respondents (77.8%) agreed that depression influenced their performance scores as opposed to those that disagreed (22.2%). This therefore revealed that depression affected the performance scores of students in Ordinary Level Chemistry in Bamenda III. The result was in this series: Agreed > Disagreed.

Interview responses

An overwhelming majority of the cases expressed dominant positive views on the relationship between depression and students' performance scores as can be seen on Table 21 above. Case 12 was selected for thematic illustration because he was a male Chemistry teacher who expressed a particularly strong positive view on the topic by quoting:

"...Often times, depression sets in when students are preparing for Ordinary Level examinations especially in Chemistry. This is usually caused by an overwhelming feeling of fear of failure which is usually not a good feeling. When this negative feeling sets in, students tend to perform poorly in chemistry at this level which is not what we as teachers want for them. We therefore usually caution them to focus more on their book work and strive to excel in the subject at the end of course exams..."

Case 12's explanatory excerpt illuminates the fact that depression is an important issue in the that impinges on the performance scores of students in Ordinary Level Chemistry and Chemistry teachers need to put all hands on deck to help the students perform well at this level. Against this backdrop, depression is seen as an essential issue that affects Students performance scores in Ordinary Level Chemistry in Bamenda III.

Verification of hypothesis two

HO2: This hypothesis was designed to verify whether there is a significant relationship between depression and performance scores in O/L Chemistry. The results obtained after testing the null hypothesis is presented on Table 6.

Table 6: Correlation between depression and performance scores in Chemistry

variable	Depression	Performance scores
Depression	Pearson Correlation	1
	Sig. (2-tailed)	.811**
	N	100
Performance scores	Pearson Correlation	-.811**
	Sig. (2-tailed)	.000
	N	100
<i>NB: Correlation is significant at the 0.05 level (2-tailed).</i>		

There is a significant relationship between anxiety and performance scores in O/L Chemistry ($r = -.811$, $df = 98$, $p < 0.05$). Based on the fact that the significance level of the hypothesis is below 0, the null hypothesis was rejected while the alternative hypothesis was retained. This provided supportive inferential evidence to conclude

that there is a significant negative correlation between anxiety and performance scores in Ordinary Level Chemistry in Bamenda III. This means that a unit increment in anxiety leads to a corresponding unit decrease in performance scores.

DISCUSSION

Anxiety and performance scores in Ordinary Level Chemistry

Hypothesis 1 intended to examine whether there is a significant relationship between anxiety and performance scores in Ordinary Level Chemistry in Bamenda III. The findings indicated that there is a significant correlation between anxiety and performance scores.

The finding is in line with Spielberg (2013) who found that the negatively affected academic performance which is seen through poor personal efforts, time management, peer interaction, environment, campus facilities, completion of assignments, class attendance, tutorial services, study groups, and teaching style. According to him, students' anxiety causes a feeling of discomfort, which means that feeling anxious in the classroom does not improve learning. Besides, he also observed that students who felt satisfied and had low levels of anxiety achieved a higher academic performance. Therefore, anxiety has been regarded as the most significant factors in determining students' achievement in academic performance.

The finding is however at variance with Ibrahim (1996) whose study found no significant differences between their levels of stress during the beginning of term, middle of the term and prior to end term examinations. This implied that stress is not influenced by the anticipation of an examination. This was attributed to inclusion of continuous assessment test marks (40%) in the final examination, being prepared for the examination among other factors. This finding is contrary to the finding of the present study which has shown that examinations increase anxiety. According to previous studies, students' levels of anxiety will rise during the examination period as compared to other times of the school term.

The finding is in agreement with Mayya (2004) who found that university students have a responsibility to maintain their optimal academic performance. Anxiety among students are created by insensible teaching or an over demanding syllabus. This then pushes students towards the surface approach as a coping strategy, stress and anxiety due to personal or family related problems also leads to a feeling of anxiety. It is common for students to perform poorly when they experience pressure with their tasks and when they experience high level of anxiety during their studies. There are many sources of created anxiety during study, and anxiety sources can be

interpreted on difference of age level, social class, high activity, greater familiarity, gender, and culture ecosystem. This relationship also could possibly lead to reaction of anxiety that interferes with students' performance through blocks of memory, concentration, attention resources, or cognitive interference from the worries and fears induced by anxiety during their study.

Depression and performance scores in Ordinary Level Chemistry

Hypothesis 2 intended to ascertain whether there is a significant relationship between depression and performance scores in Ordinary Level Chemistry in Bamenda III. The findings indicated that there is a significant correlation between depression and performance scores.

The finding is in agreement with Hysenbegasi (2005) who investigated the relationship between depression and its treatments and the academic performance of undergraduate students. He diagnosed that depression was associated with a 0.49 point, or half a letter grade, decrease in student GPA, while treatment was associated with a protective effect of approximately 0.44 points. The self-reported data regarding the impact of depression on the performance of academic tasks was consistent with these findings. Depressed students reported a pattern of increasing interference of depression symptoms with academic performance peaking in the month of diagnosis and decreasing thereafter with the lowest levels reported in months 4 through 6 post-diagnosis, each of which is significantly less than the month of diagnosis.

The finding equally conforms to that of Ma (2018) who investigated the effects of high parental expectations on both academic performance and depression of adolescents. In addition, the study also explored whether these relationships could be mediated through adolescents' value of academic success, self-efficacy, and supports from parents and school. The results revealed that high parental expectations were positively associated with adolescents' academic performance and also positively associated with their depression. The mediating roles of adolescents' value of academic success and school support frequency were also confirmed. This study provides some implications for parenting practice by clarifying the complex roles of parental expectations and the need for social support for adolescents.

The finding is also in consonance with Sideridis (2005) who posited that a performance orientation may create a vulnerability to depression in the case of repeated failure. Thus, higher value of academic performance among adolescents may be associated with higher levels of depression. Regarding the mediating role of self-efficacy, many previous studies have confirmed that self-efficacy is negatively associated with adolescents' negative emotions such as anxiety and depression. With reference to the mediating roles of support from parents and schools, it has been widely demonstrated that types of social support, including parent and teacher supports, are negatively associated with adolescents' depression. Therefore, it is reasonable to propose that the four mechanisms of adolescents' value of academic performance, self-efficacy, parent support, and school support could also serve as mediators between high parental expectations and adolescents' depression.

CONCLUSION

Academic-related stress, specifically anxiety and depression, have been proven in this study to negatively impinge on the academic performance of Ordinary level Chemistry Students in Cameroon. It was recommended that with regards to anxiety and students' performance scores in Chemistry, the students themselves should place a high premium on hard work as the key to success. They should avoid distractions and remain calm throughout the academic year especially when preparing for Ordinary Level exams in Chemistry and other subjects. This would abate their anxiety especially before, during and after the exams. It was also recommended that in relation to depression and students' performance scores in Ordinary Level Chemistry, teachers of students at the Ordinary Level especially those teaching Chemistry at this level should integrate stress coping strategies and mechanisms into their teaching. This would eliminate the onset of depression in students and improve on their overall mental health. As a result, the academic related stress of the students would be uplifted and their performance scores would improve. Since the current study was carried out with a small sample size of just 120 participants, another study should be carried out with a larger sample size of say 500 in order to compare the findings against this one. Based on the limitations of this study, further studies should be also carried out that involve the use of probability sampling techniques such as simple random sampling in order to further explore with more statistical precision the effects of academic related stress on students' performance scores in Ordinary Level Chemistry.

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