

Relationship Between Socio-Demographics, Study Skills and Distress Among Pakistani School Students: A Cross-Sectional Study in Riyadh, Saudi Arabia

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Purpose: The increasing prevalence of distress among students is of global concern. Several factors such as school and family environment and ineffective study skills could influence mental health. The study explored the rate of distress symptoms among school students' and its relationship with their study skills, stressors and demographic factors.

Methods: In this cross-sectional analytical study, a sample of 215 students from a community school participated in the study. Three questionnaires, demographic questionnaire, Study Skills Inventory and the Kessler Psychological Distress Scale, were used for data collection. Data were analyzed using Student's *t*-test, ANOVA, Pearson's correlation coefficient and stepwise linear regression.

Results: Response rate was 70% (*n* = 150). A high proportion of respondents (75%) was distressed (mean 27.28 ± 8.77). Correlation analysis showed that distress (K10 score) was negatively related to study skills (SSI total score) ($r = -0.247$, $p = 0.002$). The rate of distress symptoms was higher among female students (79%) compared to their male counterparts (72%). The factors associated with distress included negative association of teachers' level of help to develop competencies ($p = 0.000$, $\beta = -0.278$, $R^2 = 0.249$), unfavorable school environment ($p = 0.000$, $\beta = 0.285$, $R^2 = 0.123$), inability to cope with studies ($p = 0.005$, $\beta = 0.205$, $R^2 = 0.038$), family problems ($p = 0.014$, $\beta = 0.184$, $R^2 = 0.173$) and lower study skills ($p = 0.031$, $\beta = -0.164$, $R^2 = 0.270$). The overall regression analysis explained 33.6% of the variance (corrected $R^2 = 0.336$).

Conclusion: Higher than expected levels of distress (75%) was found in immigrant school students. Poor study skills have a significant relationship with distress. Learning environment and related stress factors were associated with distress among students. Based on the findings, it is recommended that stakeholders in education address the hidden curriculum, as it is usually unacknowledged and might affect students' wellbeing, and move from student centered to an interpersonal relation-centered education.

Keywords: school students, distress, study skills, stressors

Introduction

Students face a challenging transition in the form of greater academic load, higher level of difficulties inherent in the syllabus and greater academic expectations. These factors may contribute to psychological distresses.¹⁻⁴ Psychological distress is a state of emotional suffering associated with stressors and demands that are difficult to cope with in daily life.⁵ It is a proxy indicator of mental health.⁶

The level of distress increases during the early years of education and continues to later years of studies⁷ and increases the risk for long-term mental health disorders.^{6,8} Stress and anxiety were found to be the top factors that negatively affected the students' academic performance in an American-National College Health Assessment research survey.⁹ In addition, previous studies have shown that internal or individual as well as stimulus factors in the external

environment contribute to psychological distress.^{6,10–16} The influence of emotions affects students' cognitive processes and performance and is associated with students' psychological and physical wellbeing as well.¹⁷

Students of Asian descent are reported to suffer more from stress and anxiety as compared to others due to high parental expectations and pressure.¹⁸ Many students struggle in their learning and achievement despite their hard work and effort which may influence their mental health. Students in difficulty often utilize less effective study techniques, like cramming and highlighting the text they read which adversely influence their academic performance.^{19,20} Unhealthy coping strategies like avoidance might conversely increase the distress.⁸ As “binge and purge” is no longer a viable strategy in education, they need to learn effective study strategies, often referred to as study skills. “Study skills” is a broad concept that includes a range of elements and utilizes conscious intentional approaches to learning that help the processing of new information acquisition with the aim of learning effectively^{21,22} and can be applied in the learning process.

Although acquisition of study skills and strategies contributes to success in both academic and non-academic settings, students are seldom assessed or taught about them.²³ Therefore, it is important to understand what benefits or hinders it.

Statement of the Problem

Observations and interactions with students indicated that many are distressed and concerned about their studies. Psychological problems among college students tend to be overlooked as they do not present early and thus are not addressed. Hence, the prevalence of psychological problems may be higher than is reported.²⁷ The majority of studies focused on undergraduate students, and only a handful of studies addressed school students^{7,26} with an adequate theoretical understanding of the interrelationship between characteristics of the learner, the learning environment and the distress experienced by students. This prompted us to take up a study on assessing distress, study skills and associated factors, as this information would be useful for prediction, detection and prevention of distress among school students. In particular, understanding the factors linked with distress can serve as the basis for prevention and early diagnosis. Preventive strategies could include developing future directions on teaching and instruction, improving learning environments and helping students in managing their studies and improving their study skills to foster their well-being.

The study aims to address the following questions: what is the level of distress among senior college students; what association, if any, exists between distress and study skills; and is there a relationship of study skills and other stress factors (individual; external: learning environment and others) with distress among college students? Thus, this research integrates individual and institutional variables that can impact students' well-being.

Conceptual Framework

The study is anchored on the Walberg's theory of educational productivity²⁸ and Stress Strain Outcome model (SSO)²⁹ to understand the factors that predispose students to strain and consequently distress. This theoretical framework was appropriate for this study because stressors are not only isolated events but are often interconnected and dependent on many factors. Stressors are environmental stimuli that an individual perceives as troublesome. Strain and outcome are the psychological and behavioral reactions of individuals to stressors, respectively. Walberg's theory of academic achievement postulates that psychological characteristics of students and their environments influence educational outcomes. We analyzed the different factors associated with psychological distress by combining the two theories and formulated a new framework (Figure 1). In this framework, the distress experienced during the study period is expected to be the result of combined effects of the individual characteristics (gender and year of study) and the external environment (academic stressors, learning and home environment, peer group pressure, etc.). This will contribute to a more comprehensive understanding of the causes of distress from multiple perspectives.

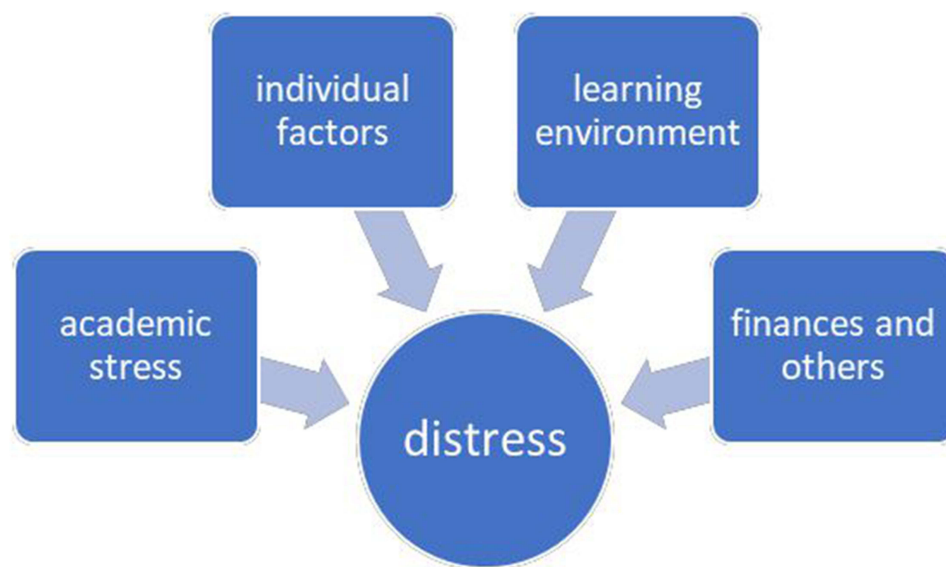


Figure 1 Analytical framework of students' distress.

Materials and Methods

Study Design

This was a cross-sectional analytical study, conducted in an international school, Riyadh, Kingdom of Saudi Arabia, during February 2020.

Study Setting

The study was carried out at a community-owned non-profit international English medium school designed primarily to serve the needs of the children from ages 3–18 years. The school accepts students from Pakistani Community, from diverse ethnic and socioeconomic backgrounds with the mission to provide a safe and intellectually challenging environment and equip the learners to thrive in the twenty-first century. The school follows a teacher-centered curriculum using didactic instructional methods as the main teaching strategy with summative assessment and a pass–fail grading system.

Target Population/Sampling

The target population was students of both sexes from Grade 11 and 12, attending the school. With an effect size of 0.1, level of significance of 0.05 and power of 0.95, the sample size was calculated to be at least 110. All students from higher grades (11 and 12; total 215) were invited to participate. Students who were absent or not willing to participate during the data collection were excluded.

Data Collection

The principal investigator contacted the school head and explained the purpose to be allowed to administer questionnaire in their school. Data were collected by two investigators (FI, SH) using a structured self-administered questionnaire which has three parts. The survey was administered at the beginning of the second semester to avoid exam stress. It was administered one hour after the morning assembly with the help of class teachers. This time was selected to ensure that the students were fresh. The survey questionnaires (hard copy) were distributed manually to all students from grades 11 and 12 and explained what they were expected to do.

During the data collection process; students were encouraged to ask to approach the researcher/facilitator, if they needed any help or clarification with the filling out of the questionnaire. Students were seated apart; anonymity and confidentiality were emphasized. The three instruments that were distributed to the students included a demographic

questionnaire, Study Skills Inventory (SSI) and Kessler Psychological Distress Scale (K10) in printed format. They were given enough time to be able to complete and provide answers to the items in the questionnaire.

Item Development and Data Quality Control

Based on the literature review, authors FI and SH generated a pool of items aimed at measuring school stressors for students. These were reviewed and edited for content and appropriateness by another member of the research team (SI). Pre-testing of the questionnaire was done a week before the actual data collection time for clarity of the questionnaire. Items that required explanation or were interpreted differently were either modified or omitted after research group discussion. The collected data were reviewed and checked for completeness.

Study Variables

Independent Variables

Demographics, sources of stress, study skills inventory (SSI) mean score.

Dependent Variable

Kessler psychological distress (K10) mean score.

Instruments

Section 1: A self-administered survey questionnaire consisted of the demographic characteristics, namely, gender (male, female), age and study year.

Section 2 consisted of sources of stress and it was divided into three parts: Academic (seven questions), Learning environment covering teaching and school environment (six questions) and finances/others (five questions). These were close-ended questions that used Yes/No responses.

Section 3 had the Study Skills Inventory (SSI) and Kessler Psychological Distress Scale (K10) ([Appendix 1](#)).

Study Skills Inventory (SSI) as a Measure of Study Skills

It has five subscales namely reading skills, memory and concentration skills, time management, emotional management skills and other learning practices. It consists of a total of 23 statements: Reading text = 4 questions, concentration and memory = 5 questions, time management = 5 questions, emotional management = 4 questions and other learning practices = 5 questions.

Each statement of the inventory has four options that are scored as follows

3 stands for always (ie all the time – around 100% of the time).

2 stands for usually (ie sometimes – around 75% of the time).

1 stands for rarely (ie few times – around 25% of the time).

0 stands for never (ie almost at no times – around 0% of the time).

The Maximum Total Score of the SSI Equals 69

- Reading texts: 5 items = 15 (maximum score)
- Concentration and memory: 5 items = 15 (maximum score)
- Time management: 5 items = 15 (maximum score)
- Emotional management: 4 items = 12 (maximum score)
- Other learning practices: 4 items = 12 (maximum score)

A previous study among medical students showed that the SSI is both reliable and valid.³⁰ First, the authors verified a priori the suitability of the questionnaire items for high school students by going through the material in the questionnaire. Later, the same was verified with evidence through piloting.

Kessler Psychological Distress Scale (K10) as a Measure of Psychological Distress

The K10 was validated for college students.³¹ Its suitability for this cultural setting was first verified a priori by the researchers and then verified with evidence through piloting. It consists of ten questions on non-specific psychological distress and the level of anxiety and depressive symptoms a person experienced in the most recent four-week period. Each item is answered on a five-point Likert scale; from 1 = “none of the time” to 5 = “all of the time”. Scores of the 10 items are then summed, yielding a minimum score of 10 and a maximum score of 50.³²

Interpretation of Scores

10–19 Likely to be well

20–24 Likely to have a mild disorder

25–29 Likely to have a moderate disorder

30–50 Likely to have a severe disorder

Data Analysis

The SPSS software (version 21.0, IBM Corp, Armonk, NY, USA) was used for data analysis. Descriptive statistics such as frequency, percentages, mean, and standard deviation were calculated.

Comparisons were made using Chi square test and ANOVA to compare the following categorical variables: sex, study year and the psychological distress severity (well, mild, moderate, severe). Additionally, Pearson’s correlation coefficient was used to find the relationship between total psychological distress symptoms (psychological distress scale K10) scores and the study skills inventory (SSI) scores. A linear regression analysis was employed to investigate the relationship between all the independent variables and the distress as dependent variable. To create the most parsimonious model, factors with non-significant correlations were avoided by selecting a stepwise method in regression model. P-values less than 0.05 were considered statistically significant.

Ethics Approval and Consent to Participate

Informed consent was obtained from all students prior to data collection. Parental informed consent was waived as the study was educational with no interventions and not likely to impact student’s opportunity to learn. All respondents were given assurance of confidentiality that the information gathered will be used exclusively for research purposes and their participation will not have any impact on their school work/results. This study was approved by the Institutional Review Board of the College of Medicine, King Saud University (Ref. No. 21/0138/IRB). All procedures comply with the principles of Helsinki Declaration.

Results

Among 215 students who were invited to participate, 150 (70%) agreed to participate. The age range of the respondents was 15 to 19 years. Male students outnumbered their female counterparts (56:44) (Table 1). The top four stressors identified by the students were anxiety about good grades (85.3%, $n = 128$), anxiety about exams (79%, $n = 118$), time constraints (76%, $n = 114$) and academic overload (73.3%, $n = 110$). Cronbach’s alpha reliability coefficients of SSI and K10 were 0.77 and 0.86, respectively.

Perceived Distress Among Students

The overall mean \pm standard deviation of the perceived distress level was 27.28 ± 8.77 . The prevalence of distress symptoms was found to be 75.0%. The proportion of the students who had severe distress was 41%, moderate distress (19%), mild distress (15.3%) and well (25%). The prevalence rate and mean score of distress symptoms was higher among the female students (79%, 27.42 ± 8.27) as compared to their male counterparts (72%, 27.17 ± 9.19) (Table 2) and the senior study year (grade 11: 75%, 26.91 ± 8.5 ; grade 12: 76%, 28.0 ± 9.1), respectively. However, the differences between the sex and year of study were statistically insignificant ($t = 0.178$, $p = 0.85$ and $t = 0.703$, $p = 0.48$, respectively) (Table 2).

Table 1 Students' Socio-Demographic Characteristics and Sources of Stress (N = 150)

	Variable	Number of Students	%
1	Sex		
	Male	84	56.0
	Female	66	44.0
2	Year of study		
	Grade 11	97	64.7
	Grade 12	53	35.3
3	Sources of stress		
	A. Academic stressors	Yes (N)	%
	Anxiety about grades	128	85.3
	Anxiety about exams	118	78.7
	Academic overload	110	73.3
	Inability to cope with studies	106	70
	Pressure from parents for admission in a good university	62	41
	Homework and work outside of school	54	36
	Competition with classmates	39	26
	B. Factors relating to the learning environment.		
	(I) Teacher student relations:		
	Teachers are encouraging	100	67
	Teachers encourage to participate in class	95	63.3
	Teachers help to develop my competencies and confidence	84	56
	Teachers are well focused and teaching time is put to good use	84	56
	(II) Environment		
	Unfavorable school environment and administration	48	32
	Family problems and home environment	26	17.3
	B. Extra-academic help:		
	Time constraints	114	76
	Tuition is a cause of reducing stress	65	43.3
	Tuition is a burden financially	48	32
	Tuition is a cause of stress	44	29.3
	Body image perception	44	29.3

Abbreviations: SSI, Study Skills Inventory; K10, Ke.

Table 2 Association Between Level of Distress Symptoms Among Students by Sex and Study Year

Sex	Kessler Psychological Distress Scale (K10) Score				Distress (Total Morbidity) (%)	(X ² value)	p-value*
	Well N (%)	Mild N (%)	Moderate N (%)	Severe N (%)			
Male	23 (27.3)	13 (15.5)	12 (14.2)	36 (43.0)	72.7	3.314	0.346
Female	14 (21.2)	10 (15.1)	17 (26)	25 (38.0)	79.1		
Total N (%)	37 (24.6)	23 (15.3)	29 (19.3)	61 (40.7)	75.3		
Grade 11	24 (24.7)	17 (17.5)	18 (18.6)	38 (39.2)	75.3	1.097	0.778
Grade 12	13 (24.5)	6 (11.3)	11 (20.8)	23 (43.4)	75.5		
Total N (%)	37 (24.6)	23 (15.3)	29 (19.3)	61 (40.6)	75.2		

Note: *Indicates t-test p value.

Table 3 Comparison of the Respondents' Means of SSI Total Scores with Different Severity Levels of Distress

K10	N	Total SSI Mean (SD)	ANOVA F Ratio (p value)	95% Confidence Interval for Mean		Scheffe Multiple Comparison Test*			
				Lower Bound	Upper Bound	Well	Mild	Moderate	Severe
Well	37	46.30 (8.52)	3.392 (0.041)	43.45	49.14	I			
Mild	23	42.61 (7.06)		39.55	45.66	0.406	I		
Moderate	29	43.24 (7.24)		40.49	46.00	0.514	0.994	I	
Severe	61	41.41 (8.59)		39.21	43.61	0.043	0.957	0.801	I

Note: *Indicates t-test p value.

No statistically significant association was found between students' sex or study year and the presence or severity of distress symptoms (Table 2).

Relationship Between Study Skills and Distress

The mean and standard deviation of the total SSI score were 43.15 (62% of a maximum 69) and 8.26, respectively. There was a statistically significant negative correlation between K10 score and the SSI total score ($r = -0.247$, $p = 0.002$).

A statistically significant association was found between the respondents' mean SSI total scores and the distress severity categories ($p = 0.041$) being significant between "well" and "severe distress" categories (Table 3).

Factors Influencing the Perceived Distress Among Students

In the step-wise regression analysis, teachers' help to develop competencies, unfavorable school environment, inability to cope with studies, family problems and study skills were found to be independent variables that explained 33.6% of the variance in distress (adjusted $R^2 = 0.336$) (Table 4).

Discussion

The current study revealed an overall high rate of distress symptoms. Furthermore, a significant negative association between the study skills score and the distress symptom severity was found.

The teachers' lack of help, unfavorable school environment, inability to cope with studies, family problems, and study skills were the contributory factors associated for distress symptoms. It was notable to find that the contribution of study skills to distress was comparatively little as compared to other factors. This study adds to the growing literature on distress factors and is an initial study that combines the effects of study skills and several demographic and learning environment variables within the same study among a cohort of high school students.

Table 4 Stepwise Multiple Regression Showing the Relationship of K-10 with SSI and Factors Related to the Learning Environment

	Code	Coefficients B	Std. Error	Standardized Coefficients Beta	P value*	95.0% Confidence Interval for B		Goodness of Fit		
						Lower Bound	Upper Bound	Model F	P-value	R ²
K – 10										
(Constant)		24.886	1.458		0.000	22.004	27.769	7.019	0.000	0.336
Teachers: help to develop my competencies and confidence	Yes=1 No=0	–4.925	1.298	–0.278	0.000	–7.49	–2.36			
Unfavorable school environment and administration	Yes=1 No=0	5.286	1.33	0.285	0.000	2.656	7.915			
Inability to cope with studies	Yes=1 No=0	3.906	1.379	0.205	0.005	1.18	6.632			
Family problems and home environment	Yes=1 No=0	4.189	1.679	0.184	0.014	0.87	7.508			
Total SSI	-	–0.174	0.080	–0.164	0.031	–0.332	–0.016			

Note: *Indicates t-test p value.

High school students are growing adults, and many if not all pass through high levels of storm and stress. Furthermore, the problems of these immigrant adolescents are aggravated by the kind of experiences they face. Scholars in the field of cross-cultural psychology have viewed acculturation, an important phenomenon, that can affect the well-being.³³ It is noteworthy that the prevalence of psychological distress reported in this study (75%) is greater than that reported by similar populations locally^{34–37} and internationally.^{38–40} Similarly, a higher rate of severe distress (41.0%) was found in the current study when compared with age matched population in other studies.^{34,39} This translates to two out of five students experiencing severe distress, much higher than that reported by a recent systematic review representing student samples from 16 different countries (one out of five).³⁸ A possible explanation for such high distress could be a higher baseline level of psychological distress in the country of origin, stressors arising from adjustments (culture specific) social instability and transitions. Caution should be taken not to draw firm inferences when comparing the study findings with international studies due to several factors, such as the instruments used, the cut-off points to determine psychological distress and sociocultural contexts. Research indicates that students from the expatriate community perceive study environment and skills as obstacles in the way of their academic achievement and mental well-being.⁴¹ The academic and school-related sources of stress in the current study are in line with the results of prior conducted studies.^{37,39,40}

According to the person-environment fit theory, individuals are not likely to do well in an environment that does not meet their psychological needs. At the most basic level, this suggests the importance of a fit between the needs and opportunities offered. The study finding of the learning environment as one of the factors for distress is important and is in line with other studies.⁴² Various explanations have been offered for students' distress symptoms. They are reported to be notably associated with a significant lack of proper academic skills, maladaptive coping, a hostile educational and home environment with poor connectedness to wellbeing.³⁸ It is very likely that in the renegotiation processes associated with developmental trajectories, there might be asynchrony within the family and the outside, creating a pathway that is not smooth.

The determinants of distress for students in this study were related to their school (teachers' lack of help as interpreted from the item "Teachers help to develop my competencies and confidence", unfavorable environment, inability to cope with studies, perceived low study skills) and to family and home environment issues and concerns.

Both school and home environments play an important role in students' learning and well-being; their effects are influential on their behavior, attitude and skills necessary to achieve success in a global society.^{43,44} Family is the first influence in an individual's life – close parent-child relationships and positive parent role modeling have well-documented positive effects on mental health and study habit development.^{44–47} Family environments like schools usually face the difficulty of providing an atmosphere that is an appropriate fit for their children's need. Students need a comfortable, safe and challenging environment when their desire to control is growing. This is the time when they are in special need of peer and adult relationships, especially outside of the home. The results of the present study indicate that teachers' support and help to develop students' competencies were associated with greater student well-being. This finding echoes the results of prior studies in this field.^{42,43,48} Teachers are part of the school environment, but their role extends beyond the classroom as their support, quality of teaching and academic advice impacts student learning, achievement and health.⁴³ Moreover, previous studies have shown that teachers' support and positive feedback help students develop a good understanding of their strengths and weaknesses and a greater sense of their own ability.¹⁷ Our findings suggest that teachers must be conscious of students' backgrounds and needs. Teachers and parents need to work hand in hand to create the right kind of environment for students, one in which the students are preparing as best as they can but are not exhausting themselves in the process.

A metanalysis has shown that psychosocial factors and study skills are more important than socioeconomic status and high school GPA in predicting college academic performance and retention outcomes.²⁴ Unconducive study environment, student-teacher interaction and other stressors can influence the students' mental health. According to stressor-strain theory, exposure to stressors adversely influence individuals' mental health,²⁵ and ineffective study skills reduce students' academic potential.⁷

Although we cannot confirm a causal relationship between distress and study skills, few factors (school environment, inability to cope) showed a strong relationship. A strong relationship persisted between distress score and poor study skills after regression analysis that controlled for other factors. It can be explained by the findings that stress markedly hampers the updating of memories and impairs memory retrieval interfering with a student's ability to concentrate and remember.⁴⁹ In addition, poor study skills can lower academic achievements, which may cause emotional exhaustion and difficulty in coping with the stressors.²¹ This could explain some of the negative correlation between study skills and distress severity.

The results can serve as a reference for schools and teachers that the current teaching strategies, curricula and learning environment are adversely influencing students' learning and are not conducting to student well-being.

From a public health perspective, this information is of great interest at a preventive level and is an alert to the academic community and society at large. A substantive amount of work is needed to determine how academics can structure the curricula to decrease student distress and at the same time boost better learning. A timely appreciation of this complexity – establishment of educational reforms aiming at an improvement in the environment – by inclusion of stress management education and preparatory study skills management in the curriculum for the students should be a priority rather than an optional extra, as mastery of learning and study skills reduces academic stress.³⁴

The current study finding, in terms of using a theoretical framework for distress symptoms and its sources, is an important finding that needs confirmation.

A culturally sensitive strategy is therefore advised to study this important subject. Additional mixed methods studies are needed to further explore this relationship and confirm sources, repercussions and solutions to this issue rather than simply chronicling the problem. Lastly, this research study should be replicated on a larger scale to determine whether sports and academic commitment affect the psychological distress levels of students. Furthermore, future research should utilize a pre-and-post-test study design to compare psychological distress levels once they enter college and then again after one or two semesters or quarters within college to determine whether a significant change in the distress levels has occurred.

Strengths and Limitations

This study's strength is the use of a theoretical framework for distress symptoms and its sources. It examined both psychological distress and study skills, using well-validated measures and instruments. It surveyed high school students from an expatriate community which has not been touched on before. There are, however, limitations to the study. The study relied on quantitative measures only. Although SSI and K10 are reliable and valid scales, qualitative studies could be used in the future to find the multifactorial reasons for distress in depth.

The self-administered survey provided subjective measures. The cross-sectional design precluded causal interpretations and prevented the ruling out of any other confounding variables underlying the associations found.

Recommendations and Implication Statement

The results of this study provide important information to students, educators and policymakers. Students can use these results to understand the effect of distress on their learning and well-being. Teachers can use these results to increase their awareness of the causes and levels of students' distress and understand the broader dimensions of their mentoring role to offer support to students. School policymakers can take initiatives through a policy development process which focuses on a "culture" of well-being for all (students, teachers, staff). These policies can be applied by inclusion of study skills and stress management sessions for students as a part of core educational preparation rather than as an optional extra. Closer attention by the education providers is needed to assess the deleterious impact of school students' distress on their well-being, as the students might not raise the issue on their own.

Multi-center studies with frequent administration of questionnaires are needed to provide generalizable information on this issue. Future longitudinal research must investigate designed interventions for study skills to determine whether study skills truly affect students' wellbeing.

Conclusion

A high rate of distress (prevalence of 75%) among the student population is a cause for concern. Poor study skills have a significant relationship with this higher distress score. There was some evidence that learning environment (lack of teachers' help to develop competencies, unfavorable school environment, inability to cope with studies), study skills and family problems were associated with distress. Improving the learning environment, teachers' empowerment to be excellent facilitators and students' study skills are an important target for change, leading to better emotional well-being and learning of students.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that they have no competing interests.

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