How Much Do Academic Performance, Lifestyle, and Social Relationships Explain Depressive Symptoms in Filipino University Students? A Regression Model

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Abstract: Further systematic data on the predictors of depressive symptomatology are crucial due to the need to address the worsening mental health problems among young people in the Philippines. A regression model with seven predictors on academic performance, lifestyle, and social relationships was developed and tested. Data were drawn from a survey sample of 3,049 Filipino university students from Metro Manila, the Philippines. The predictors examined for their relationships with depressive symptoms as the dependent variable included cumulative grade-point average, number of hours spent on vigorous physical activity, number of hours spent using Facebook, number of bottles/glasses of alcohol taken, number of religious activities, and level of relational closeness with parents and peers. The predictors were each found to be statistically significantly related to depressive symptoms; relational closeness with parents and with peers were the strongest predictors. The model was statistically and significantly robust, albeit with modest predictive quality (R=0.320) as well as modest predictive strength (R^2=0.103). As the model is formative, there is a need to continually examine, even elevate, its predictive power. In its current state, the model would be useful for triggering discourse, research, and intervention towards the prevention and control of this mental health problem and its pernicious effects on young people.

Keywords: depressive symptoms, academic performance, lifestyle, social relationships, Filipino university students

Depression affects many young people globally (World Federation of Mental Health, 2012). Specifically, depression has dire consequences on young people's social and interpersonal relationships, offending behavior and employment, as well as on their future adult lives (Fraser & Blishen, 2007). Because of its life-changing and long-term adverse impact, depression is considered a compelling mental disorder that needs urgent and effective diagnosis and treatment (Maslow et al., 2015). Treating young people who are suffering from depressive symptoms promptly and effectively is pivotal in helping them to avoid depression later. For this purpose, data on predictors of depressive symptomatology are important. With such data, individuals with depressive symptoms can be systematically identified from among the population

and subsequently advised to undergo diagnosis and treatment. We discuss in this report our regression model on depressive symptoms among Filipino university students. Data are intended to jumpstart action against this mental health challenge in the Philippines.

Study Framework

Depressive symptoms in young people are a multi-factorial phenomenon. In addition to biological predictors, these symptoms are linked to social factors, among which are academic performance, lifestyle, and social relationships. Previous studies had also identified familial, academic, and social factors as important correlates (Billatte et al., 2017).

At their current age, young people devote a substantive part of their lives to academics, where they seek to complete a study program that would later help their job and career plans. The number of classes and non-academic activities that they attend—for several days weekly across three to five years—underscores the salience of academics to young people. Performing well, in particular, earning a good cumulative grade-point average (CGPA), is thus important. CGPA is indicative of hard work, conscientiousness, resilience, and persistence (Lee et al., 2016), and because it is given importance at entry-level employment, young people are motivated to study harder to get good grades. Understandably, not performing well and therefore having poor grades could induce depressive symptoms in them. There is an inverse or a negative association between CGPA and depressive symptoms (Hishinuma, Chang, McArdle, & Hamagami, 2012), which means that decreases in CGPA tend to translate in increases in the level of symptoms.

Like other population sub-groups, young people have a lifestyle that is part of their age-graded and gender-related norms and socialization towards adulthood. This lifestyle also serves as their life-base, offering them wide-ranging activities to temporarily detach themselves from the demands of their academics. Broadly, lifestyle helps young people to have fun and be entertained as well as to de-stress, re-energize, re-strategize, or re-grow. Young people have multiple lifestyle-related activities; among others, these include physical activity, using Facebook, alcohol intake, and religious activities. Having a physical activity (e.g., engaging in sports), using Facebook, drinking alcohol,

and participating in religious activities (e.g., praying) are relatively common in young people. For example, among those in the Philippines, 46% were reported to have a physical exercise at least two times a week (Demographic Research and Development Foundation & University of the Philippines Population Institute, 2014), 99% used Facebook (Lee et al., 2016); 24% were current alcohol drinkers (World Health Organization, 2004); and 80% attended religious services at least once a week (Catholic Educational Association of the Philippines, 2014).

Studies suggest that the relationships of depressive symptoms with physical activity (Rothon et al., 2010) and with religious activities (Le et al., 2007) are both negative, whereas depressive symptoms with use of Facebook (Simonsic, 2012) and with alcohol intake (Wu et al., 2006) are both positive. Physical activity is beneficial to cognitive, emotional, and motor domains that are concomitant with decrements in distress and negative affect (Archer et al., 2014). Religious activities help to reduce vulnerability to depressive symptoms through a variety of substantive psychosocial mechanisms, such as social support (Smith & McCullough, 2003), or the lack thereof (Bonelli et al., 2012). Young people with limited or without physical activity and religious activities are thus likely to develop depressive symptoms. Using Facebook, which is very common, with tens of millions of active users in the Philippines, helps induce depressive symptoms, particularly when users begin comparing their lives to the posted activities and accomplishments of their friends (Steers et al., 2014). Although its effects on affective disorders are less understood, alcohol intake has been known to lower the brain's level of serotonin, the chemical responsible for regulating one's mood, which may then lead to the development of depressive-like symptoms (Getachew et al., 2010).

As integral in their ways of life, survival, and development, young people have and maintain a number of social relationships. The two fundamental, yet most significant ones, are those involving their parents and peers. In general, parents and peers provide young people with immediate care, security, and support, including deep closeness and attachments that these provisions consequently foster. Because parental and peer group relationships are broad-based and encompassing—affecting the entire, if not the broad spectrum of their members' lives—these

collective relationships serve as a life-base for many young people. Lower levels of relational closeness with parents and peers, which could equate to social rejection and exclusion from the most ubiquitous collective structures of the society, are very likely to result in the occurrence of depressive symptoms (Kamkar et al., 2012; Han & Lee, 2011).

In the present study, we carried out a multiple regression analysis of the seven earlier mentioned predictors in our effort to develop a model that can be used to explain depressive symptoms in Filipino university students.

This is not the first time we analyzed a set of predictors on depressive symptoms. Previously, we examined 11 social and demographic predictors of depressive symptoms involving a different sample of 2,430 Filipino university students (see Lee et al., 2013). The assessed predictors included sex, age, course, year level, religion, frequency of smoking, frequency of drinking, living arrangements with parents, satisfaction with one's financial condition, and relationship closeness levels with parents and peers. We found that those with higher levels of depressive symptoms were students who smoked and took alcohol more frequently, did not live with their parents under one household, were dissatisfied with their financial condition, and had a lower level of relational closeness with parents and with peers. Results from the prior analysis had only provided us a listing of statistically significant predictors with their independent rather than their combined influences. A prediction model would be needed for a more strategic and nuanced risk-reduction intervention.

Methods

This report discusses a data set drawn from a complete enumeration survey carried out among 3,049 Filipino students enrolled at a university in Metro Manila, Philippines. Two-thirds of the sample were 16–17 years old and first- and second-year students. Three-fourths were enrolled in degree programs in liberal arts, humanities, and education, whereas the remaining 25% were in engineering, natural sciences, business, and economics programs.

Students were surveyed in the lecture rooms during the first 20–30 minutes of their classes. Each class was duly informed of the aim and objectives of the study. Students were assured of the anonymity and confidentiality of their self-report and that their participation in the survey was voluntary. After that, students were each given a questionnaire to complete and were instructed not to write any identifying mark in the instrument. Once all accomplished questionnaires were collected, they were thanked for their participation. No incentive was provided. The findings presented in this report form part of a broader research that we conducted regarding well-being, social and civic engagements, and relationships in young people. The study was given ethical clearance.

As the dependent variable, depressive symptoms were measured as a continuous variable using the university student depression inventory (USDI) developed by Khawaja and Kelly (Khawaja & Duncanson, 2008). The USDI measures the physical and cognitive-emotive dimensions of depressive symptoms, including academic motivation. The 30-item USDI has three sub-scales: lethargy (nine items on lethargy, concentration difficulties, and task performance); cognition-emotion (14 items on suicide ideation, worthlessness, emotional emptiness, and sadness); and academic motivation (seven items on class attendance and motivation to study). Items have score-bearing responses ranging from (1) - "none at all" to (5) -"all the time." The USDI total score ranges from 30 to 150. The internal consistency of the USDI is high (Cronbach a=0.95).

The seven independent variables were measured as follows. Relational closeness with parents and peers was measured using a series of eight and nine items, respectively. The statements were drawn from published studies on parental and peer relationships. Each series had four score-bearing responses: (1) definitely not true, (2) mostly not true, (3) mostly true, and (4) definitely true. The parental closeness score ranges from 8 to 32, and that of the peer closeness ranges from 9 to 36. The internal consistency of both scales is high (Cronbach a=0.77 for the parental scale, and 0.79 for the peer scale).

The other independent variables were measured by asking students about their cumulative GPA (ranging from 1 to 4, 4 being the highest), the number of hours they spent on vigorous physical activity in the past seven days, the number of hours they spent daily using Facebook, the number of bottles/glasses of alcohol they had taken in the past 30 days, and the number of their religious activities.

Table 1

Descriptive Statistics

Variable	Mean	Standard Deviation	N
Depressive symptoms	68.7	18.6	3049
Cumulative grade-point average	2.77	0.51	3049
Number of hours spent on vigorous physical activity in the past 7 days	1.66	1.46	3049
Number of hours spent daily using Facebook	1.18	0.52	3049
Number of bottles/glasses of alcohol taken in the past 30 days	0.61	1.09	3049
Number of religious activities	9.66	5.1	3049
Level of relational closeness with parents	27.11	0.72	3049
Level of relational closeness with peers	23.71	0.81	3049

We followed several standard procedures in performing multiple linear regression using the Statistical Packages for the Social Sciences (version 20.0). First, we computed the descriptive statistics of the study variables. Second, we calculated the R, R^2, and adjusted R^2 to determine the quality and strength of the independent variables' collective predictive power. Third, we performed an analysis of variance to ascertain the statistical significance of the model's predictors as a set as well as to examine the goodness of fit of the regression model to the observed data. Finally, we computed the beta coefficients and the t-values to determine the predictive power and statistical significance of every independent variable in the model.

Results

The means of the seven variables assessed are shown in Table 1. Of the total depressive symptoms score of 150, students scored 68.7. Their cumulative GPA was 2.77. Students spent 1.66 hours in the past 7 days for their vigorous physical activity and 1.18 hours daily using Facebook. Moreover, students took 0.61 bottles/glasses of alcohol in the past 30 years, and they had 9.66 religious activities. Students scored 27.11 (out of 32) and 23.71 (out of 36), indicating the level of their relational closeness with their parents and peers, respectively.

Table 2 shows the summary of the regression model. The model's level of prediction of depressive symptoms was modest (R=0.320). The value of R^2 suggests that 10.3% of the variance in the depressive symptoms in Filipino university students could be attributed to academic performance, lifestyle, and social relationships. The value of adjusted R^2 (0.100), which is nearly identical to the value of R^2, indicates that the model has specified just a good number of predictors that explain depressive symptoms.

Table 2

Summary of Regression Model

Model	R	R^2	Adjusted R^2	Sig.
1	0.320	0.103	0.100	.000

The ANOVA data in Table 3 suggest that the set of independent variables was found to have statistically significantly predicted depressive symptoms $F(7, 3048) = 49.641$, p=.000). Furthermore, the ANOVA data indicate that the regression model is a good fit to the observed data.

The beta coefficients and t-values for the seven predictors of depressive symptoms are presented in Table 4. The beta values indicate that the independent variables had either a positive (and increasing) or a negative (and decreasing) effects on the dependent variable, where their effects were observed to have ranged from 0.044 to 0.175. The independent variables with the strongest effects on depressive symptoms were the variables on parental ($\beta = -.175$) and peer group ($\beta = .151$) relational closeness. This means that for every one-unit increase in the relational closeness with parents, there was a unit decrease of 0.175 in depressive symptoms. Moreover, for every one-unit increase in the relational closeness with peers, there was a unit increase of 0.151 in depressive symptoms. Although the beta coefficients are modest, these are statistically significantly distinct from zero, based on the t-values and significance levels. Overall, the findings strongly confirm the statistically significant predictive power of each of the seven independent variables.

The equation to predict depressive symptoms in Filipino university students is: Depressive symptoms $=76.693 - (.096 \times CGPA) - (.104 \times$ number of hours spent on vigorous physical activity$) + (.073 \times$ number of hours spent daily using Facebook$) + (.044 \times$ number of bottles/glasses of alcohol taken$) - (.101 \times$ number of religious activities$) - (.175 \times$ relational closeness level with parents$) + (.151 \times$ relational closeness level with peers$)$.

Discussion

Using multiple linear regression, this study examined the power of a model to explain depressive symptoms among a sample of Filipino university students. The assessed predictors included CGPA, number of hours spent on vigorous physical activity, number of hours spent daily using Facebook, number

Table 3

ANOVA Results of the Three Regression Models

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	110620.446	7	15802.921	49.641	.000
	Residual	968085.636	3041	318.345		
	Total	1078706.082	3048			

Table 4

Summary of Regression Model Predictors of Depressive Symptoms

Model	Predictors	B	Beta	t	Sig.	Tolerance	Variance inflation factor
1	(Constant)	76.693		15.511	.000		
	Cumulative GPA	-3.560	-.096	-5.428	.000	.940	1.064
	Number of hours spent on vigorous physical activity in the past 7 days	-1.340	-.104	-5.908	.000	.949	1.054
	Number of hours spent daily using Facebook	2.614	.073	4.236	.000	.993	1.007
	Number of bottles/glasses of alcohol taken in the past 30 days	.770	.044	2.486	.013	.935	1.069
	Number of religious activities	-.376	-.101	-5.497	.000	.873	1.145
	Level of relational closeness with parents	-1.110	-.175	-9.550	.000	.876	1.142
	Level of relational closeness with peers	1.455	.151	8.637	.000	.965	1.036

of bottles/glasses of alcohol taken, number of religious activities, relational closeness with parents, and relational closeness with peers. Evidence on these predictors and the model would benefit the Philippines as it continues to advocate for the prevention and control of mental health problems whose effects are now seriously threatening the lives of many Filipinos (Lally et al., 2019). Because they were derived from a distinct sample of students, the data here may be applicable only to the sample involved or even to other students with comparable characteristics (e.g., from high-income families).

As hypothesized and validated in the regression analysis, the predictors were all statistically significant related to depressive symptoms, which means that their explanatory power was not happenstance. Moreover, all but one of their hypothesized relational directions with the dependent variable—whether positive or negative—were confirmed in the collected data, such as the negative relationship of CGPA or the positive relationship of using Facebook. The lone predictor whose hypothesized negative relational direction ran in contrast from that observed was the level of relational closeness with peers. Theoretically, relational closeness with peers (this was found occurring at a high level in the present sample) should bear a negative predictive effect on depressive symptoms. However, the empirical evidence disclosed the opposite (i.e., positive) outcome, which could possibly be due to some intervening factors. For instance, some behavioral norms and conflicts within peer groups that are inherent in primary groups (these are unexplored in the present study) may cause members to develop depressive symptoms. Furthermore, depressive symptoms may be formed among members because they frequently co-ruminate or discuss their peer-based problems among themselves (Van Zalk et al., 2010).

Notwithstanding the unexpected finding, the relational closeness with peers, along with the relational closeness with parents, were the two predictors with the strongest explanatory power. That these particular predictors had the strongest effects, at least in this analysis, is hardly a surprise. Among young Filipinos, as is the case among the rest of the Filipino population across all ages, families and peers are the most significant primary groups where both the general and specific ways of life of the citizens are formed, spent, and celebrated. During their lifetime with these groups, young people would be experiencing

myriads of processes and outcomes that are complex enough to strongly induce depressive symptoms in them. In stark contrast, CGPA, which was hypothesized as a critical concern among young people, did not produce a respectable amount of explanatory power. On the contrary, CGPA was among the least powerful predictors in the current sample. Another study, albeit a correlation analysis, had also reported a predictive power of CGPA in one instance where the coefficient was comparatively low, at -0.09 (Hishinuma et al., 2012).

With their respective statistically significant independent contributions, the predictors were integrated into an explanatory model of depressive symptoms. Although the model was statistically significantly robust (i.e., not based on chance), its predictive quality was modest (R=0.320), and so was its predictive strength, where its power to explain the variance in depressive symptoms among the current sample of Filipino university students was only 10.3%. As a pioneering attempt, though, aimed at systematically organizing the predictors of depressive symptomatology, the model, especially in the Philippines where none exists, represents a good start-up guide for interventions seeking to identify the most-at-risk. If the model in its current state were to be piloted among Filipino university students, how would program implementers use it? Based on the model and among a similar sample of students, the implementers would have to focus their attention on students' relational closeness with their parents and with their peers as the entry point in which to ascertain the presence of depressive symptoms in the group. This recommendation is consistent with that offered in both research and practice. Additionally, in our view, focusing on the salience of and utilizing the primary group relationships for probing and addressing students' problems are strategic as well as culturally appropriate.

As the model is formative, there is a need in the near future to further validate, even increase, its predictive power. Introducing a set of new variables into the model would be an option, but it would be much wiser to improve the explanatory power of the current set of predictors by probing and testing them even more towards obtaining definitive results on their effects at some point. The latter approach would require the deepening of the measurements of the predictors. For example, the predictor on physical activity would not

just revolve around the number but also the type and quality level of vigorous physical activity. In the same vein, the predictor on Facebook use would not only refer to the number of hours of usage but also to the specific types of activity performed in the said social media. The predictor on alcohol intake would be more nuanced and more predictive if, in addition to the number of bottles/glasses, the types of alcohol taken would also be included as a measure. The challenge, in particular, is to fully exhaust the measurement and probing of the present predictors—by expanding their scope and coverage—until their explanatory power is optimized.

Overall, the model developed in this study is a step towards a more systematic approach to addressing depressive symptoms among Filipino students. More studies should be carried out to further advance the pool of empirical knowledge on the subject. Future research has to bestow greater attention to modeling the explanatory factors of depressive symptoms among Filipino university students involving large samples. Universities, as well as student populations, have to provide their unequivocal engagements in research and interventions that aim to address a mental health illness whose adverse effects are serious and life-long.

Declaration of ownership

This report is our original work.

Conflict of interest

None.

Ethical clearance

This study was approved by the institution.

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