**ORIGINAL ARTICLE**

# FACTOR STRUCTURE OF GENERAL HEALTH QUESTIONNAIRE AND ASSESSMENT: A CROSS-SECTIONAL STUDY AMONG UNIVERSITY STUDENTS IN MALAYSIA

*Prashanth Talwar & Mohd Fadzil b Abd Rahman*

**University Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia.**

## Abstract

*Objective:* **This study aims to assess the factor structure and reliability of the General Health Questionnaire (GHQ-12). Additionally, the study also attempts to evaluate the psychological well-being among university students using the GHQ-12 scale and thereby determine a relationship between select demographic variables and well-being.** *Methods:* **An exploratory cross-sectional survey was conducted among undergraduate students of a public university in Sarawak, Malaysia. A self-administered questionnaire consisting of the demographic aspects and the GHQ-12 scale were utilized to assess the well-being of students, who were selected by convenience sampling technique.** *Results:* **Factorability of the GHQ-12 was examined and a three-factor model explaining 55% total variance was found to be the best fit. Internal consistency of the scale was 0.78, which is within the acceptable range. The results also suggest that considerable proportion (57%) of students had psychological distress. Participants who were susceptible to psychological distress in the present study were identified as students from low-income families, with poor social support, in a relationship with partner as well as the student with Hindu's religion and male students. By multiple regression analysis, variables that significantly predicted psychological distress were gender; income; area of residence; relationship with parents; negative life events; smoking; drinking and event with the overall model fit were 34%.** *Conclusion:* **Based on these findings, it may be foreseen that if prompt intervention is not provided to students in distress, they may be susceptible to depression, anxiety and stress. The findings have implications for teachers and counsellors, who are in a position to influence a wide range of students and provide support to improve the psychological well-being of students.** *ASEAN Journal of Psychiatry, Vol. 16 (2): July – December 2015: XX XX.*

Keywords: GHQ-12, Factor structure, Psychological well-being, University Students, Psychological Distress

## Introduction

Psychological distress among university students is of increasing concern. Assessment of individuals' psychological well-being and mental health is an important aspect of health promotion [1]. It is well documented that the mental-health problems among today's university cohorts in the industrialized countries are more frequent than observed previously [2]. Studying at university is associated with experiencing significant stressors. Students may experience major changes in academic demands from pre-higher education institutions and may be faced with difficulties concerning their finances, finding employment and maintaining their personal relationships [3].

Young adults face as many or even more stresses than any other age groups. As a matter of fact, young adults experience greater sensitivity towards their surroundings as well as anticipation for doing well. They strive relentlessly to live up to self or others' expectations. This pressure to excel, along with other concerns, can drain young people's energy and result in excessive stress [4]. Students can also have a feeling of uncertainty of their future. A relative lack of tolerance for uncertainty may prove to be an important predictor of psychological distress in undergraduates [5].

Academic success depends upon the health and well-being of students. Positive emotional well-being is fundamentally important to general health status and is linked to many favourable health outcomes [6]. Lack of emotional well-being could cause stress. Stress is an external constraint which upsets an individual both mentally and physically [7].

There are six major components that could relate to the involvement of students' psychological well-being status, which are autonomy, personal growth, environmental mastery, purpose in life, positive relations with others and self-acceptance [8]. On the other hand, the higher impact stress level and psychological well-being on students means that there are negative mental conditions that make it relatively unable to be associated with feelings of good health, happiness, high self-esteem and confidence in regular physical activity [8].

Psychological well-being is an important measure with respect to whether the lives of students are satisfying and productive. Psychological well-being has two aspects, the positive and negative aspect. The positive psychology focuses on strengths and optimal functioning of human well-being [9]. According to this view, a lack of negative state is not sufficient for well-being, moreover, building positive states can have favourable consequences apart from the absence of negative states [9]. In the present study, the term well-being was used to portray the feelings of normal individuals and not used to assess any emotional disorder. Feelings of distress among students do not necessarily mean that they are mentally ill. The present study aims to evaluate the factor structure and reliability of the GHQ-12. Additionally, the study also attempts to assess the psychological well-being among university students using the GHQ-12 scale and thereby find a relationship between select demographic variables and well-being.

**Methods**

*Participants*

An exploratory cross-sectional study was conducted among undergraduate students of University Malaysia Sarawak. A convenience sampling technique was adopted for selecting the participants who belonged to the Faculty of Social Sciences. Prior to assessment, students were informed about the purpose of the study and assured about the confidentiality of their responses. Participation was voluntary and verbal consent was obtained from the students. The questionnaire was administered during the last 15 minutes of a 2-hour class lecture and applied only to the students who were present in class, on the day of assessment. The self-administered English language questionnaire consisted of two parts. Socio-demographic aspects of students such as age, gender, religion, year of study, cumulative grade point average (CGPA), relationship with parents, social support, relationship status, life events and habits were included in part 1 and the GHQ-12 items were included in part 2. This self-funded study received approval from the University Research Committee [EPI-FPI (F06)/105/2012(65). University Malaysia Sarawak, dated 20th September 2012].

*Instruments*

The GHQ was used as a screening tool to detect psychological distress. Goldberg's [10] General Health Questionnaire with 12 items (GHQ-12) can be classified as either positively worded or negatively worded. The four responses to each item ranges from 'not at all' to 'much more than usual'. In this study, a bimodal method was used for scoring each item. The total summated score provides a self-assessed measure of symptomatic mental health. Higher scores indicate psychological distress. The cut-off point was set at a

threshold level of 2 and above. Goldberg et al. [10] showed that the best threshold for scores varied from 1/2 to 6/7, with the most common cut-off score being 2/3.

### Statistical analysis

SPSS 21 was used to process the data. Exploratory Factor Analysis (EFA) was conducted using the principle component analysis. Extraction method with principle component analysis was used because the primary purpose was to identify and compute composite coping scores for the factors underlying the short version of the GHQ. Factor loadings below 0.4 were suppressed. Varimax rotation with Kaiser normalization was used to determine number of factors. Cronbach's [11] alpha coefficient was used to calculate the reliability of the scale. Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the "underlying construct." Construct is the hypothetical variable that is being measured [12]. Nunnaly [12] had indicated 0.7 to be an acceptable reliability coefficient. Other statistical tests included the independent t-test and multiple regression analysis.

### Results

#### Demographic data

A total of 280 students completed the questionnaire, among whom 34% were males and 66% were females. Religious profile of the students reflected the demographic characteristics of the institution with 61% Muslims, 26% Christians, 11% Buddhist and 2% Hindus. Students between the ages of 20 to 21 years comprised of 24% males and 44% females. Students between the ages of 22 to 23 years comprised 13% males and 19% females.

### Factor analysis

Data screening was conducted for univariate outliers and all were within range values. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.74, which is above the recommended value of 0.60. Initially, the factorability of 12 item GHQ was examined. Each of the 12 items correlated to at least 0.30 with one other item, suggesting reasonable factorability. Bartlett's test of sphericity was significant, ($\chi^2$ (153) = 829.12, $p < 0.05$). Moreover, the communalities were all above 0.30, further confirming that each item shared some common variance with other items. Based on these overall indicators, factor analysis of GHQ-12 was conducted. On varimax rotation a three factor solution was obtained, which explained 55 % of total variance. The first factor (items 5, 6, 7, 8 and 11) obtained 20 % variance, second factor (items 1, 2, 10 and 12) explained 18% variance and third factor (items 3, 4 and 9) explained 17 % variance.

**Table 1. Factor loading matrix of the GHQ-12**

| Items | Components | | |
|---|---|---|---|
| | **Factor I** | **Factor II** | **Factor III** |
| (7)  Been able to enjoy your normal day-to-day activities. | 0.66 | | |
| (11) Been thinking of yourself as a worthy person. | 0.65 | | |
| (6)  Felt that you could not overcome your difficulties. | 0.65 | | |
| (5)  Felt constantly under strain. | 0.63 | | |
| (8)  Been able to face up your problems. | 0.58 | | |
| (1)  Been able to concentrate on whatever you are doing. | | 0.73 | |
| (12) Been feeling reasonably happy, all things considered. | | 0.71 | |
| (2)  Lost much sleep over worry. | | 0.71 | |
| (10) Been losing confidence in yourself. | | 0.59 | |
| (4)  Felt capable of making decisions about things. | | | 0.84 |
| (3)  Felt that you were playing a useful part in things. | | | 0.70 |
| (9)  Been feeling unhappy and depressed. | | | 0.45 |
| Percentage of Variance | 20 | 18 | 17 |

All items had primary loadings above 0 .40. Item number 11 had a strong primary loading of 0.65 on Factor I, however it also had a cross loading of 0.43 on Factor II. Item number 10 had a strong primary loading of 0.59 on Factor II, however it also had a cross loading of 0.40 on Factor III. Item number 9 had a strong primary loading of 0.45 on Factor III, however it also had a cross loading of 0.40 on Factor I. The factor loading matrix for the final solution is presented in Table 1.

*Reliability Analysis*

The Cronbach's alpha for the whole sample was found to be 0.78, indicating satisfactory results. As shown in Table 2, the reliability analysis demonstrate adequate values of Cronbach's coefficients for each factor with 0.70 for Factor I, 0.67 for Factor II and 0.62 for Factor III. Not much difference was observed if items were deleted.

**Table 2. Descriptive statistics and internal consistency for the three factor GHQ-12**

|             | Number of Items | Mean | Standard Deviation | Alpha |
|-------------|-----------------|------|--------------------|-------|
| Factor I    | 5               | 0.26 | 0.44               | 0.70  |
| Factor II   | 4               | 0.91 | 0.40               | 0.67  |
| Factor III  | 3               | 0.27 | 0.44               | 0.62  |

*GHQ-12 score analysis*

In the current study, an approximately normal distribution was evident for the composite score data, thereby ensuring suitability for parametric statistical analysis. Using the GHQ score of 2 and above as cut off point, it was found that 43% were psychologically healthy (Mean=0.45, SD=0.49) and majority (57%) had psychological distress (Mean=4.88, SD=2.18). Independent sample t-test revealed statistically significant differences in the mean scores; t (278) =21.76, p<0.05. The scores of male (Mean=3.34, SD=2.89) and female students (Mean=2.79, SD= 2.69) did not reveal any significant differences; t (278) =1.58, p>0.05. Students in the age group 20 to 21 years indicated good psychological health (Mean=2.95, SD=2.70) while students in the age group 22 to 24 years showed psychological distress (Mean=3.04, SD=2.95).However, it was not significant statistically; t (278) =0.30, p>0.05

Students living in the urban area had higher GHQ-12 score (Mean=3.69, SD= 2.97) compared to those from rural area (Mean=2.71, SD= 2.64) and mean scores were found to be statistically significant; t (278) =2.66, p<0.05. Hindus had highest GHQ score compared to all other religions; (F=4.88, df=3,276, p<0.05), suggesting psychological distress. Students whose family income was less than RM 3000 were considered to be low income group and above RM 3001 as high income group. There was a significant difference in the low income group (Mean=3.12, SD=2.73) and high income group (Mean=1.36, SD= 2.73); t (278) =2.89, p<0.05. Significant differences were also noted among students who received adequate social support from their parents (Mean=2.46, SD=2.45) and those who received inadequate social support (Mean=3.98, SD= 3.06); t (278) =4.45, p<0.05. Majority (62%) of the students were single and 38% reported they were in a relationship. It was found that students in a relationship (Mean=3.35, SD=2.97) had more psychological distress compared to those who were single (Mean=2.75, SD=2.61). Independent t-test showed statistically significant differences in the mean scores; t (278) =1.79, p<0.05. Majority (72%) said that their CGPA score was average, whereas 25 % reported high CGPA and 3% reported poor CGPA. There was no significant difference in those who had high CGPA (Mean=2.87, SD=2.84) and those who had poor CGPA score (Mean=3.02, SD=2.74); t (278) =0.37, p>0.05. Negative life events were reported by 41% of the students. Comparison between scores of students who had encountered negative life events (Mean=3.38, SD=2.85) and those who had not (Mean=2.70, SD=2.68) revealed significant differences in

psychological well-being; t (278) = 2.03, p<0.05.             .

## Multiple Regression Analysis

A multiple regression was conducted to see if socio-demographic variables predicted psychological distress. An analysis of standard residuals was carried out on the data to identify any outliers. It was found that the data contained no outliers (Std.Residual Min= -2.48, Std.Residual Max=2.23). Collinearity was not a concern as all VIF values were less than 10 and tolerance was not less than 0.1. The histogram of standardized residuals indicated that the data contained approximately normally distribution errors, as did the normal P-P plot of standardized residuals, which showed points that were not completely on the line, but close. The scatterplot of standardized predicted value showed that the data met the assumption of linearity and homogeneity of variance. The data also met the assumption of non-zero variances. Model summary denotes that the data met the assumption of independent error Durbin-Watson value of 2.27. Using the enter method it was found that socio-demographic variables explained a significant amount of variance in psychological distress; (F (17,262) =7.782, p<0.005, R=0.58. $R^2$=34%).

Variables that significantly predicted psychological distress were gender (t=2.54, p<0.05), income (t=2.25, p<0.05), area of residence (t=3.60, p<0.05), relationship with father (t=2.08, p<0.05), relationship with mother (t=4.70, p<0.05), negative life events (t=3.99, p<0.05 ) smoking (t=2.21, p<0.05), drinking (t=5.60, p<0.05) and social support (t=2.59, p<0.05). The overall model fit was 34%.

## Discussion

The mental health of university students is an area of increasing concern worldwide [13]. Mental disorders are as prevalent among college students as same-aged non-students, and these disorders appear to be increasing in number and severity [14]. Not only do university students face challenges related with independent living, but they also face academic challenges. This predisposes them to depression, anxiety and stress, which are fairly common [15]. Stress is a state of an individual that results from the interaction of the individual with the environment which is perceived as threatening or threat to the well-being. It is an external constraint which directly upsets the individual both mentally and physically [15]. Mental health issues can negatively impact on the health and academic performance of college students [16].

In view of rising cases of psychological disorders all over the world, it is essential to have a scale to measure psychological well-being, particularly among students. The GHQ-12 is a well validated concise instrument for measuring psychological morbidity among individuals. It has been used in different settings and languages across various populations. Although the GHQ-12 was designed as a single dimension model, two and three-factor solutions have been frequently reported. Graetz[17] in 1991, examined the factor structure of the 12-item GHQ and proposed that the model with the best fit was the three-factor model. Similarly, a study conducted in Finland utilized the Confirmatory Factor Analysis (CFA) for the GHQ-12 and reported that the simplest and best fit was provided by the three-factor solution [18]. Padrón et al. [19], reported that the CFA in their study showed a three dimensional model as the best fit, whereby the three-factors social dysfunction, anxiety and self-esteem, together explained 53.7% of the variance. Several studies have found that Graetz's three factor model of the GHQ-12 is more plausible than other models [20]. However, some studies also indicated a two-factor solution for the GHQ-12. An analysis by Salama-Younes et al. [21] demonstrated a good fit not only to the three factor model but also to the two factor model (positive vs. negative items).

In the present study, a three-factor model was identified with a total variance of 55%. Factor I consisted of 5 items and explained 20 % variance. Factor II consisted of 4 items and explained 18% variance. Factor III consisted of 3 items that explained 17% variance. It was also found that the loadings were ranged from 0.45 to 0.84 and majority of them are showing value above 0.60. These results are similar to a study conducted by Sánchez-López [22] who

reported a three factor model with 54.19 % explained variance. Similarly, a study by Zulkefly & Baharudin [23] among Malaysian college students also obtained a three-factor structure with 51.9% variance. The results were also consistent with a previous study conducted by Talwar and Fadzil [24] where the total variance of the three dimension scale was reported to be 59%.

The reliability analysis for the entire sample in the present study yielded Cronbach's alpha coefficient of 0.78, indicating satisfactory internal consistency. Similar findings were also observed by other studies in Malaysia. Yusoff et al. [25] in their study reported that Cronbach's alpha value for the GHQ-12 was 0.85. Talwar and Fadzil [24] obtained an alpha value of 0.84. The results are also consistent with studies conducted in Iran, whereby Montazeri et al.[26], found Cronbach's alpha coefficient to be 0.87. Moreover, they also demonstrated alpha coefficients of 0.79 and 0.77 for male and female students respectively, thereby depicting a good fit of internal consistency for both genders.

The utilization of a pertinent cut-off point for the GHQ-12 scores is necessary in order to determine probable psychological morbidity among individuals. This was also corroborated by Kim et al. [27], who opined that it is essential to firmly establish a cut-off point, since it is only once an appropriate cut-off point is chosen that the GHQ-12 can be used to effectively identify persons with mental illness. Goldberg et al. [10] recommended that the best cut-off point to identify 'cases' was a score of 2 or more. However, the cut-off point for the GHQ-12 is debatable and has varied from one study to another. The variations observed in the optimal threshold of the GHQ scores across different settings have proven difficult to be explained [28]. According to Godlberg et al. [29], the GHQ threshold is partly determined by the prevalence of multiple diagnoses. Hence, a rough guide to the best threshold could be provided by the mean GHQ score for the whole population of respondents.

In the present study, a threshold level of 2 and above was utilized, which resulted in determining that 43% were psychological healthy and majority (57%) had psychological distress. The results also showed that male students had a higher GHQ score suggesting psychological distress when compared to female students, however it was not statistically significant. This is consistent with the previous study conducted in Malaysia, which reported that more males were found to have psychiatric problems when compared to females (14.1% vs. 11%) [30]. Students in the lower age group between the ages of 20 to 21 years showed less psychological distress compared to higher age group students between the ages of 22 to 24 years, however not significant statistically. Probably, senior students were more stressed since they were likely to complete their education soon and under academic pressure. Similarly, Shamsuddin et al. [13] in their study demonstrated that stress scores were significantly higher among older students. In the past, very few students from rural areas would pursue their higher education. However, over the years the trend has changed positively with students from both rural and urban areas studying in universities. In this study, majority (72%) of the students came from rural area. It was generally observed that respondents from urban areas were more likely to have high GHQ-12 scores compared to those from rural areas. However, in this study there were no differences in the scores between the two groups. Similarly, a previous study reported that it was difficult to discern any overall trend in the prevalence of psychiatric morbidity from most urban to most rural [2].

Students with Hindu's religion had highest GHQ indicating psychological problems, when compared to students of other religions. It is difficult to highlight as to why Hindus had high GHQ score. Our results also showed that psychological well-being was different between students from low and high-income families. This was indicated by a higher GHQ score for low-income students indicating poor psychological health when compared to high-income students. Differences in psychological health were also observed between students who received adequate and inadequate social support. Specifically, our results suggest that students who received inadequate social support had psychological distress. A similar study in France, reported that students with lower quality social support, as measured by

the Multidimensional Scale of Perceived Social Support, were more likely to experience mental-health problems, including a six-fold risk of depressive symptoms relative to students with high-quality social support [31]. The present study also found that students in a relationship had psychological distress compared to those who were single. The reason could be conflicts and stress in interpersonal relationship. This is contrary to the results by Zaid et al. [32] who reported that students not involved in a relationship were significantly more stressed (51.7%) when compared to those who were involved (37%). No significant differences were noted between students who acquired high and low CGPA. However, significant differences in psychological well-being were evident among students who had encountered negative life event compared to those who had not encountered any negative life event.

Many college students engage in heavy episodic drinking that frequently results in a range of negative consequences and participation in other risky behaviours [33]. Several studies reveal high rates of alcohol use among college students affecting their health and performances [34]. In this study, 21% reported to taking alcohol and 10% were regular smokers. However, no relationship was found between the GHQ-12 scores and students who smoked or consumed alcohol. Based on these results, participants who were susceptible to psychological distress in the present study were identified as students from low income families, with poor social support, in a relationship with partner, as well as Hindus and male students. Several socio-demographic variables were also revealed to influence the prediction of psychological distress among the students. A multiple regression analysis with an overall model fit of 34% identified the variables as gender, income, area of residence, relationship with parents, negative life events, smoking, drinking and social support. The present study had some limitations that should be considered when interpreting the results. The methodology makes use of convenience sampling technique with a small sample size and was restricted to only one university, hence the results cannot be generalized to the Malaysian student population as a whole.

In conclusion, it is evident to this study that a considerable number of students had psychological distress, which is a cause for concern. It could be foreseen that if prompt intervention is not provided to students in distress, they may be predisposed to depression, anxiety and stress. The findings have implications for teachers and counsellors, who are in a position to influence a wide range of students and provide support to improve the psychological well-being of students.

**References**

1. Hamdan-Mansour AM, Marmash LR. Psychological well-being and general health of Jordanian university students. J Psychosoc Nurs Ment Health Serv. 2007; 45(10): 31–39.

2. Üner S, Özcebe H, Telatar TG, Tezcan S, Hilal O. Assessment of Mental Health of University Students with GHQ-12. Turk J Med Sci. 2008; 38 (5): 437–446.

3. Julal FS. Use of student support services among university students: associations with problem-focused coping, experience of personal difficulty and psychological distress. Br J Guid Counc. 2013;41(4): 414–425.

4. Lin HJ, Saiful M, Yusoff B. Psychological Distress , Sources of Stress and Coping Strategy in High School Students. Int Med J. 2013; 20(6): 1–6.

5. Lally JI, Cantillon P. Uncertainty and ambiguity and their association with psychological distress in medical students. Acad Psychiatry. 2014; 38(3):339-44.

6. Huynh Q, Craig W, Janssen I, Pickett W. Exposure to public natural space as a protective factor for emotional well-being among young people in Canada. BMC Public Health. 2013; 13: 407.

7. Salam A, Yousuf R, Bakar SMA, Haque M. Stress among Medical

Students in Malaysia: A Systematic Review of Literatures. Int Med J. 2013; 20 (6): 649 – 655.

8. Abdulla NAC, Dan MS. A Study on Stress Level Among Part-Time Students in a Higher. J Global Management. 2011; 3(1): 93-105.

9. Duckworth AL, Steen TA , Seligman MEP. Positive Psychology in Clinical Practice. Annu. Rev. Clin. Psychol. 2005. 1:629–51.

10. Goldberg D & Williams P. A user's guide to the General Health Questionnaire. Windsor UK: NFER-Nelson; 1988.

11. Cronbach LJ. Coefficient alpha and the internal structure of tests. Psychometrika. 1951; 16: 297-334.

12. Nunnaly J. Psychometric theory. New York: McGraw Hill; 1978.

13. Shamsuddin K, Fadzil F, Ismail WSW, Shah SA, Omar K, Muhammad NA, Mahadevan R. Correlates of depression, anxiety and stress among Malaysian university students. Asian J Psychiatr. 2013; 6(4):18–323.

14. Hunt J & Eisenberg D. Mental Health Problems and Help-Seeking Behavior Among College Students. J Adolescent Health. 2010; 46(1): 3–10.

15. Salam A, Yousuf  R, Bakar SMA, Haque M. Stress among medical students in malaysia: A systematic review of literatures. Int Med J. 2013; 20(6): 649–655.

16. Regehr C, Glancy D, Pitts A. Interventions to reduce stress in university students: A review and meta-analysis. J Affect Disord. 2013; 148: 1-11.

17. Graetz B. Multidimensional properties of the General Health Questionnaire. Soc Psychiatry Psychiatr Epidemiol.1991; 26(3): 132–138.

18. Penninkilampi-Kerola V, Miettunen J, Ebeling H: A comparative assessment of the factor structures and psychometric properties of the GHQ-12 and the GHQ-20 based on data from a Finnish population-based sample. Scand J Psychol. 2006; 47:431-440.

19. Padrón A, Galán I , Durbán M , Gandarillas A , Rodríguez-Artalejo F. Confirmatory factor analysis of the General Health Questionnaire (GHQ-12) in Spanish adolescents. Qual Life Res. 2012; 21(7): 1291–8.

20. Gao W, Stark D, Bennett M I, Siegert RJ, Murray S, Higginson IJ. Using the 12-item General Health Questionnaire to screen psychological distress from survivorship to end-of-life care: Dimensionality and item quality. Psycho-Oncol. 2012;21(9): 954–961.

21. Salama-Younes M , Montazeri  A , Ismaïl A, Roncin C. Factor structure and internal consistency of the 12-item General Health Questionnaire (GHQ-12) and the Subjective Vitality Scale (VS), and the relationship between them: a study from France. Health Qual Life Out.2009; 7: 22.

22. Sánchez-López MDP, Dresch V. The 12-Item General Health Questionnaire (GHQ-12): reliability, external validity and factor structure in the Spanish population. Psicothema.2008; 20(4): 839–43. Available from: http://www.ncbi.nlm.nih.gov/pubmed/ 18940092 (accessed January 2015).

23. Zulkefly NS, & Baharudin R. Using the 12-item General Health Questionnaire to Assess the Psychological Health of Malaysian College Students. Glob J Health Sci. 2010; 2(1):73–80.

24. Talwar P, Mohd Fadzil AR. Cross-sectional Study of General Health Questionnaire Among University Students in Malaysia. A Reliability

Study. Malays J Psychiat. 2014. Available from: http://www.mjpsychiatry.org/index.php/mjp/article/viewFile/298/229 (accessed December 2014).

25. Yusoff MSB, Abdul Rahim AF, Yaacob M J. Prevalence and Sources of Stress among Universiti Sains Malaysia Medical Students. Malays J Med Sci. MJMS.2010; 17(1): 30–7. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3216143&tool=pmcentrez&rendertype=abstract (accessed January 2015).

26. Montazeri A, Harirchi A M, Shariati M, Garmaroudi G, Ebadi M, Fateh A. The 12-item General Health Questionnaire (GHQ-12): translation and validation study of the Iranian version. Health Qual Life Out.2003; 1: 66.

27. Kim YJ, Cho MJ, Park S, Hong JP, Sohn J H, Bae JN, Park JI. The 12-item general health questionnaire as an effective mental health screening tool for general Korean adult population. Psychiatry Investig. 2013; 10(4): 352–358.

28. Willmott SA, Boardman JAP, Henshaw CA & Jones PW. Understanding General Health Questionnaire (GHQ-28) score and its

threshold. Soc Psych Psych Epid. 2004; 39(8): 613–617.

29. Goldberg DP , Oldehinkel T, & Ormel J. Why GHQ threshold varies from one place to another. Psychol Med. 1998; 28(4): 915–921.

30. Teoh HJ, Nur Afiqah R. Self Esteem Amongst Young Adults: The Effect of Gender, Social Support and Personality. Malays J Psychiat . 2010;19 (2). Available from: http://www.mjpsychiatry.org/index.php/mjp/article/viewFile/96/88 (accessed January 2015).

31. Hefner J, Eisenberg D. Social support and mental health among college students. Am. J. Orthopsychiatry. 2009; 79(4).

32. Zaid ZA, Chan SC & Ho JJ. Emotional disorders among medical students in a Malaysian private medical school. Singapore Med J. 2007; 48(10): 895–899.

33. Werneke U, Goldberg DP, Yalcin I, & Ustün BT. The stability of the factor structure of the General Health Questionnaire. Psychol Med. 2000; 30(4): 823–829.

34. Weinstock J, Capizzi J, Pescatello L S, Petry NM. Contingency management for exercise: An intervention for hazardous drinking college students. Alcohol Clin Exp Res .2011; 35: 87A.

**Corresponding author:** *Prashanth Talwar, Associate Professor, Faculty of Cognitive Sciences and Human Development, University Malaysia Sarawak 94300 Kota Samarahan, Sarawak, Malaysia.*

**Email:** talpra61@hotmail.com