

Psychosocial Factors associated with Health Related  
Quality of Life among University Students

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Dedicated to

The mental health professionals of Bangladesh

## Abstract

**Introduction:** Health-related quality of life (HRQoL) is individual's subjective perception of his or her health condition that covers physical, psychological and social domains. HRQoL has been increasingly used as an indicator of well-being and outcome measure across various studies including randomized control trials (RCTs). Although a large body of research has explored various factors associated with HRQoL for a range of health conditions, very few investigated that for the university populations. The university groups are critical in relation to health due to their distinct psychosocial and physical characteristics. Exploring modifiable factors associated with HRQoL of this group might open a useful avenue for potential health and wellness interventions. The current research was undertaken to explore HRQoL and its associated psychosocial factors among university students.

**Method:** The study followed a cross-sectional survey design to meet its objectives. Participants were the graduate students of a leading public university of Bangladesh. A total of 588 graduate students from randomly selected five faculties (out of 11) responded to a questionnaire survey. HRQoL was measured using revised Indian (Bengali) adapted Short Form of Health version 2 (SF-12 v 2) questionnaire. Permission was obtained from QualityMetric Inc., the copyright holders of SF-12 v 2 (License agreement # QM030016). Psychological distress and self-esteem were captured using Bangla translated 12-items General Health Questionnaire (GHQ-12) and Rosenberg Self-esteem Scale (RSE), respectively. Information on demographic (e.g., sex, age, relationship status, living status), behavioural (e.g., smoking, physical activity, physical illness), and academic (e.g., faculty, CGPA) factors were recorded in a

separated sheet. Ethical approval was obtained from the concerned university ethics committee.

**Results:** The SF-12 v 2 questionnaire generates eight subscales score and two summary scores. The highest score was found in ‘Physical Functioning’ subscale out of the eight sub-domains. Females were better in ‘Social Functioning’ (*mean*: 67.09 vs. 60.10), ‘Role Emotional’ (*mean*: 58.76 vs. 54.08) subscales than males. Males were better in ‘Physical Component Summary (PCS)’ (*mean*: 44.71 vs. 43.53) than females.

‘General Health’ and ‘Mental Health’ were better for those who had no romantic relationship. ‘Social Functioning’ was better for those who are in a relationship. Break up in a romantic relationship is associated with poorer scores in all dimensions. Residential students pose higher ‘Mental Component Summary (MCS)’ than their non-residential counterparts (*mean*: 44.77 vs. 43.09). As for academic orientation, Arts faculty students reported significantly higher MCS followed by Fine Arts, Sciences, and Business studies.

Engaging in physical activity is associated with higher PCS (*mean*: 45.08 vs. 43.61). Likewise, the absence of physical illness was associated with higher PCS (*mean*: 44.64 vs. 42.93) and MCS (*mean*: 44.91 vs. 40.11). The smoking cigarette was also associated with poorer mental health (*mean*: 41.76 vs. 44.74).

Both PCS and MCS were significantly and negatively associated with psychological distress but positively with self-esteem. Multivariate analyses revealed male gender, socio-economic status (SES), non-residential status, psychological distress, and self-esteem as significant predictors of PCS [ $R^2=0.133$ ,  $F(14, 573)=6.30$ ,  $p<.0001$ ] with self-esteem ( $\beta=0.215$ ,  $p<.0001$ ) and psychological distress ( $\beta=-0.131$ ,  $p<.01$ ) being the two most crucial predictors. Similarly, non-residential status, the

absence of physical illness, psychological distress and self-esteem all emerging as significant predictors for MCS with psychological distress ( $\beta=-0.288, p<.01$ ) and self-esteem ( $\beta=0.215, p<.0001$ ) being the two most crucial predictors.

**Discussion and conclusion:** The current study highlighted some key areas that might be critical for the HRQoL of the university students of Bangladesh. Attention should be paid to social-emotional aspects of male students while physical well-being for the female students. Necessary psychological support such individual and/or group counselling for the students going through relationship break-up would be useful to cope with the arisen strain and vulnerability.

Specific intervention addressing the mental well-being of non-residential as well as students belonging to sciences, fine arts and business faculties is warranted. Promoting physical activity by creating plenty of games and sports would yield as higher physical and mental health of the students. In addition, extracare should be paid to students suffering from any kind of diseases as it has direct consequences on HRQoL. Furthermore, the campaign against smoking should be strengthened across the campus. Finally, adequate mental health support in the form counselling and psychotherapy, mental health workshops, and seminars, for the students in need could improve students' overall health status.

**Statement of Original Authorship**

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: Md. Azharul Islam

Date: August 27, 2017

**SUPERVISOR'S CERTIFICATE**

This is to certify that the work embodied in the accompanying thesis entitled “Psychosocial Factors associated with Health-Related Quality of Life among University Students” has been carried out entirely by the candidate Md. Azharul Islam (Reg. No 226/2013-2014) as a research scholar under my direct supervision and guidance and that the candidate has fulfilled the requirements of the regulations laid down for the Master of Philosophy (MPhil) Degree examination of the University of Dhaka.

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**List of Abbreviations**

ANOVA=Analysis of Variance

BDI=Beck Depression Inventory

BP=Bodily pain

CDC=Centers for Disease Control and Prevention

CGPA=Cumulative grade point average

GH=General health

GHQ 12=General Health Questionnaire-12 item

HRQoL=Health-Related Quality of Life

MCS= Mental component summary

MH=Mental health

MOS=Medical Outcome Study

PCS= Physical component summary

PF=Physical functioning

PRO=Patient-reported outcome

QoL= Quality of Life

RE=Role limitations due to emotional problems

RP=Role limitations due to physical problems

RSE=Rosenberg Self-Esteem Scale

SD=Standard deviation

SES=Socioeconomic status

SF=Social functioning

SF-12 v2=Short Form of Health Survey 12, version 2

SF-36=Short Form of Health Survey 36

SRHS=Self-reported health status

VT=Vitality

WHOQoL=World Health Organization Quality of Life (WHOQoL)

## **Chapter 1 Introduction**

### **1.1 Overview**

Health issues of the university going cohort are different from other population groups in various ways. Health-related ‘concern, worries and burdens’ of the young adults are particularly different from older people (Powers, Wisocki, & Whitbourne, 1992). This is the life stage when an individual goes through many physical, psychological, social, sexual changes and struggles for establishing self-identity. Consequently, it is considered as a heightened risk period for developing negative health outcomes. The impact of various stressors such as academic pressure, social and financial issues on young adults’ health and well-being has been well documented (Acharya, 2003; Raj, Simpson, Hopman, & Singer, 2000). They are also vulnerable of being affected by negative psychological well-being, i.e., stress, depression (Pekmezovic, Popovic, Tepavcevic, Gazibara, & Paunic, 2011), suicide, antisocial behaviour, substance and alcohol abuse (Wechsler, Lee, Kuo, & Lee, 2000). All these together can lead to profound negative consequences with respect to academic achievements and quality of life of the university students (Acharya, 2003; Goldin et al., 2007; Ibrahim, Kelly, Adams, & Glazebrook, 2013).

The quality of life (QoL) as defined by The World Health Organization (WHO) is “an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person’s physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment”(Kuyken, Orley, Power, & Herrman, 1995). When the quality of life is considered in the context of health and



disease, it is commonly referred to as health-related quality of life (HRQoL) to differentiate it from other aspects of quality of life (Services, 2010).

Recently, there has been an increasing trend in the literature to assess HRQoL and its correlates of the university students (Arslan, Ayrançi, Unsal, & Arslantas, 2009; Dučinskienė, Kalėdienė, & Petrauskienė, 2003; Fallahzadeh & Mirzaei, 2012). This is partly due to the immense importance of this period in relation to health and well-being to the later life and partly due to the distinct psychosocial and physical characteristics. Evidence in this area indicates that various areas including learning, productivity, creativity, relationships, pro-social behaviour, health and life expectancy can be flourished by increasing levels of quality of life (Huppert & So, 2013). Understanding HRQoL and exploring associated psychosocial factors of HRQoL of the university pupil, therefore, are deemed as critical.

### **1.2 Health related quality of life (HRQoL)**

The construct of HRQoL and its associated factors have gained consistent attention since the 1980s. The major obstacle in relation to the use of HRQoL as an outcome measure, however, is linked with the absence of a uniform definition as well as standardized measures. In the last two decades, notable works in conceptualizing HRQoL have been done by Lohr (1988), Bergner et al., (1976) and the famous Medical Outcome Study conducted by J. E. Ware & Sherbourne (1992). Throughout their works, function appeared to be the most fundamental dimension of HRQoL that incorporates various aspects including physical, social and role functions. After function, comes the individual perception of his or her mental health and general health. This is a notable improvement in health care practice as it considers patient voice. Later, vitality, pain and cognitive functions are included as important domains of HRQoL (Wilson & Cleary, 1995). In summary, it is apparent that the construct of

HRQoL sincerely embrace the spirit of the World Health Organization (WHO)'s definition of health (Guyatt, 1993).

HRQoL is a multidimensional construct that incorporates a wide range of health conditions, including symptoms of diseases, treatment side effect and/or functional status across physical, social and mental health domains (Revicki, Kleinman, & Cella, 2014). However, there is a lack of consensus on an operational definition of HRQoL. Most researchers define HRQoL as 'a subjective perception of the patient's level of physical, emotional and social functioning and well-being, as well as its repercussion on his daily life' (Bullinger, 2003).

Two fundamental aspects can be derived from this definition. Firstly, HRQoL is a generic health status covering all possible domains such as physical, psychological and social. Secondly, it is based on one's subjective reporting of his or her own health condition. The Centers for Disease Control and Prevention (CDC) of the USA further incorporates group perception of physical and mental health along with individual as a criterion for HRQoL definition (Centers for Disease Control and Prevention, 2000).

### **1.3 HRQoL as an indicator of well-being**

HRQoL has increasingly been used as an outcome indicator of health and well-being in numerous studies (Chen, Li, & Kochen, 2005). There are some vital reasons behind this trend. Firstly, with the advancement of medical treatment, the longevity of the people, in general, has increased. Simultaneously, the presence of two or more health conditions also has risen. There are now substantial numbers of people living with multiple chronic diseases irrespective of the country of origin. This pattern of morbidity warrants a paradigm shift in how health and well-being are being evaluated. Different health conditions require a different approach to respond. Therefore,

traditional indicators such as mortality rate or objective clinical parameters are no longer adequate to respond diverse health conditions (Chen et al., 2005). Secondly, since HRQoL is a subjective perception of individual's health and well-being, the inclusion of HRQoL in the health-care decision making means including the voice of the patient in the system. This again has changed the dynamic of clinical practice and outcome research. Thirdly, clinical trials are also considering HRQoL as a patient-reported outcome (PRO) measure which has already been acknowledged by many professional authorities (O'Brien et al., 2006; Picci et al., 2014).

#### **1.4 Measuring HRQoL**

As noted earlier, the principle challenge has been remained with standardization of the construct HRQoL and its measurement. Consequently, varied measures of HRQoL are being increasingly used in health surveys primarily centered around patient-reported outcome (PRO) measures (Revicki et al., 2014).

1.4.1 In 1993, the Centers for Disease Control and Prevention (CDC) developed a 4-item Healthy Days Core Module as a tool for public health surveillance of HRQOL (Centers for Disease Control and Prevention, 2000). For example, would you say that in general your health is excellent, very good, good, fair or poor? These items are included in the Behavioural Risk Factor Surveillance System (BRFSS) currently being used in all states, the District of Columbia, and three territories, as well as in the National Health and Nutrition Examination Survey (NHANES). The CDC added the 5-item Healthy Days Symptoms Module and 5-item Activity Limitation Module as optional modules in 1995 (Centers for Disease Control and Prevention, 2000). The 9-item CDC HRQOL (4-item Healthy Days Core Module and 5-item Healthy Days Symptoms Module) found to have strong psychometric properties while

comparing with Short form of health (SF-36) version 2 questionnaire using arthritis patient sample (Mielenz, Jackson, Currey, DeVellis, & Callahan, 2006).

- 1.4.2 The World Health Organization Quality of Life (WHOQoL) assessment is another widely used tool to tap QoL (The WHOQOL Group, 1996). The original 100-items version was later modified to construct a brief version called WHOQoL-BREF. The WHOQoL-BREF retained only 26 items of the original questionnaire which makes its usage convenient and time-saving. The tool captures the physical health, psychological health, social relationships, and environment when reporting QoL (The WHOQOL Group, 1996).
- 1.4.3 When it comes to the chronic mentally ill patient, The Quality of Life Interview (QOLI) (Lehman, 1988) seemed to be the best index for HRQoL. The QOLI was developed in the late 1980s in response to the need for evaluation tools for use in community outpatient treatment for the seriously mentally ill. The tool is based on a conceptual model that incorporates personal characteristics and objective and subjective quality of life indicators leading to a sense of global well-being. Questions are asked first about objective HRQoL, and then, using a 7-point Likert-type scale, subjective HRQoL. There are eight core domains: living situation, daily activities and functioning, family relations, social relations, finances, work and school, legal and safety issues, and health (Lehman, 1988). The QOLI has demonstrated good reliability and validity (Lehman, 1988) and consists of the original long form and a short form.
- 1.4.4 Another useful measure of HRQoL is the Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q) (Endicott, Nee, Harrison, & Blumenthal, 1993). The Q-LES-Q has both the long and short form (Q-LES-Q-SF), with wide usage for measuring HRQoL and satisfaction. Originally developed for

use in clinical trials and among trial participants with a wide variety of mental and medical diseases or disorders (Endicott et al., 1993).

The Q-LES-Q was developed to measure the degree of enjoyment and satisfaction experienced by respondents in daily life. It includes items assessing physical health, subjective feelings, work, household duties, school/coursework, leisure time activities, social relationships and general activities. A short form is available. The Q-LES-Q has demonstrated good internal consistency reliability, stability (reproducibility), and validity in patients with numerous health conditions including schizophrenia, bipolar disorder, depression, generalized anxiety disorder, and post-traumatic stress disorder studies (Demyttenaere, Andersen, & Reines, 2008; Endicott, Nee, Harrison, & Blumenthal, 1993; Mick, Faraone, Spencer, Zhang, & Biederman, 2008; Revicki, Brandenburg, Matza, Hornbrook, & Feeny, 2008; Ritsner, Kurs, Gibel, Ratner, & Endicott, 2005; Schechter, Endicott, & Nee, 2007). The Q-LES-Q is a HRQoL measure that has the potential to extend and complement clinical efficacy end points. Since the development of the Q-LES-Q, this measure has been incorporated into multiple clinical trials across a range of psychiatric disorders.

- 1.4.5 The Short Form of Health-36 (SF-36) questionnaire: Among the other self-reported measures of HRQoL, Medical Outcome Study SF-36 (J. E. Ware & Sherbourne, 1992) questionnaire generated thousands of empirical studies. The SF-36 is a 36-item generic instrument of HRQoL that taps eight dimensions of health and well-being. These are physical functioning, role limitations due to physical health problems, bodily pain, social functioning, general mental health, role limitations due to emotional problems, vitality, energy and fatigue and general health perceptions (J. E. Ware & Sherbourne, 1992).

In physical functioning subscale, items measure to what extent health limits one's vigorous physical activities including bathing or dressing. Problems with work or other daily activities are recorded in role limitations due to physical health subscale. Same problems accounted for emotional issues are reported in role limitations due to emotional problems subscale. The bodily pain subscale asks whether pain limits individual's normal functioning. Vitality is checked to what extent person feels full of energy. The extent of disruption in social functioning caused by either physical or emotional problem further recorded in social functioning subscale. Person's evaluation and perception regarding overall health fall under general health subscale while reports of psychological well-being such as peacefulness, happiness, and calmness are considered in mental health subscale (J. E. Ware & Sherbourne, 1992). The eight subscales further can be grouped into two components, physical and mental. Each of these components represents a summary of the four subscales (J. E. J. Ware, Kosinski, Turner-Bowker, & Gandek, 2002). Further description and scoring procedure is described in Chapter 3.

The SF-36 was developed as part of the large Medical Outcome Study (MOS) during the 1970s by the initiatives of RAND Corporations. Afterward, several updated and abridged versions of the instruments such as SF-20, SF-12, and SF-8 have been developed (J. E. J. Ware et al., 2002).

## **1.5 Psychosocial factors linked with HRQoL**

### **1.5.1 Education level.**

Higher education level has been found to be associated with better HRQoL among inflammatory bowel disease (IBD) patients (Casellas, López-Vivancos, Casado, & Malagelada, 2002). A study with primary care receiver in

Spain also revealed that participants with university education rated better health compared to individuals with primary education (Farmer, Easley, & Farmer, 1992). Higher education is linked with better socio-economic status which in turn might influence HRQoL.

### **1.5.2 Gender.**

Female gender is frequently found to have worse mental health. However, it is unclear whether the gender itself has any direct effect on HRQoL as symptom reporting is higher among females than men (Goodwin, Fairclough, & Poole, 2013). Since, HRQoL is a subjective reporting of one's health, men probably under-evaluate some of the quality of life domain.

### **1.5.3 Smoking.**

Smoking is a well-understood determinant of worse health in various health conditions including cardiovascular diseases. However, effect of smoking on HRQoL is less documented.

### **1.5.4 Academic stress.**

It is particularly evident for the student population. Students perceiving higher level of academic stress reported worsen physical and mental health and quality of life in general (El Ansari, Labeeb, Moseley, Kotb, & El-Houfy, 2013; Paro et al., 2010).

### **1.5.5 Academic field.**

By academic field we refer major study area of the students. Students major in hard sciences (e.g., physics, chemistry, etc.) and medical sciences (Pekmezovic et al., 2011) experienced lower HRQoL than the students of social sciences and arts.

### **1.5.6 Physical health.**

Presence of one or more health conditions undoubtedly affects individual's daily functioning, vitality and lowers psychological well-being.

Overall, sound physical health is expected to have positive effect on HRQoL.

## **1.6 HRQoL among non-clinical young adults**

The extant literature on HRQoL primarily centered around clinical populations. Little attention has been paid on the non-clinical population, particularly among young adults. However, health-related issues of the young adults are different from other population groups in various ways.

### **1.6.1 A distinct developmental stage.**

According to Erik Erikson's developmental stage, by young adulthood we refer all individuals age 19 to 40 years (Eriksen & Erikson Erik, 1950). Health-related 'concern, worries and burdens' of the young adults are particularly different from older people (Powers et al., 1992). This is the stage when an individual goes through many physical, psychological, social, sexual changes. They struggle for establishing self-identity. Consequently, this period is considered as a heightened risk factor for developing negative health outcomes. The impact of various stressors such as academic pressure, social and financial issues on young adults' health and well-being has been well documented (Acharya, 2003; Raj, Simpson, Hopman, & Singer, 2000). They are also vulnerable of being affected by negative psychological well-being, i.e., stress, depression (Pekmezovic et al., 2011), suicide, antisocial behaviour, substance and alcohol abuse (Wechsler et al., 2000). In a recent study, Islam & Hossin (2016) reported that around 24% of the graduate students of Dhaka University use Internet in a way that can be categorized as problematic. This



problematic user of Internet exhibits poor mental health, e.g., higher stress, and worse physical health.

Of all the young adults, university and college going population again demands scientific attention. They are considered as the future of any nation. The present university and college students are future leaders in different sectors. The above discussion on the potential risk for the young adults in general and university students in particular could lead to profound negative consequences with respect to academic achievements and quality of life (Acharya, 2003; Goldin et al., 2007; Ibrahim, Kelly, Adams, & Glazebrook, 2013).

#### **1.6.2 Factors associated with HRQoL among university students: Existing evidence.**

Although HRQoL has been extensively studied for different health conditions using various clinical samples, studies with the university populations remain relatively less extensive. Few cross-sectional studies reported psychosocial factors associated with HRQoL. For instance, a higher score in the physical functioning area was observed in the university samples in Serbia and Iran (Fallahzadeh & Mirzaei, 2012; Pekmezovic et al., 2011). Depression, as measured by Beck Depression Inventory (BDI) (Beck, Steer, & Brown, 1996), was negatively associated with all the domains of SF-36 (Pekmezovic et al., 2011).

Several studies also investigated socio-demographic and behavioural factors of HRQoL. Academic faculty such as medical sciences students of Belgrade University, for example, scored the lowest while respondents reported to live with parents did significantly high in all eight domains of SF-36. Further,

average monthly income was positively associated with the total SF-36 score. Finally, non-smokers and physically active students showed significant different score in total SF-36 than the smokers and physically inactive counterparts (Fallahzadeh & Mirzaei, 2012; Mikolajczyk et al., 2008; Pekmezovic et al., 2011).

Likewise, self-reported health status (SRHS) of the university students in three European countries was found to be affected by different physical, psychological and psychosomatic aspects of health; however, its strongest association was with psychosomatic complaints (Mikolajczyk et al., 2008). Another study conducted with Slovenian students observed ‘the presence of chronic pain, the presence of depression and anxiety, need for urgent medical help and at least one visit to a clinical specialist in the past year’ as the independent factors linked with HRQoL (Klemenc-Ketis, Kersnik, Eder, & Colaric, 2011).

### **1.6.3 Interventions to promote well-being for university populations.**

Considering the heightened risk of being affected with negative physical, psychological and emotional consequences of the university students, institutional authorities have undertaken several psychosocial interventions in order to address students’ well-being.

#### ***1.6.3.1 Psychological support.***

Many universities around the world, especially in the western context, have set up student counselling and psychotherapy centers. These offices provide face to face individual and group counselling and psychotherapy to the students suffering from severe mental health conditions to minor problems such as handling stress, adjustment with changing context and relationship issues.

The centers also offer group support in the form of workshop and training. Students seeking for psychological support can contact confidentially to the designated office. Usually professionals with adequate training and qualifications render the psychological support.

#### ***1.6.3.2 Mindfulness-based interventions***

Recent years, training in mindfulness—the intentional cultivation of moment-by-moment non-judgmental focused attention and awareness (Kabat-Zinn, 2003)—has spread from its initial western applications in medicine to other fields, including education. With the advancement of technology and digital media, the world has become a place with full of distraction. Young adults such as university students are often seen using the Internet compulsively without being aware what they are doing (Islam & Hossin, 2016). This in turn left them unfocused and inattentive to their important daily tasks. As a consequence, they might experience distress and hopeless. Mindfulness-based interventions, in that context would be very effective in turning the distracted mind focused and attentive to here and now (Meiklejohn et al., 2012). Turning the thought into here and now is the key to peace and success in academic as well as overall quality of life (Brown & Ryan, 2003).

#### ***1.6.3.3 Internet based intervention***

With the increasing trend of Internet usage among students, interventions delivered via online would appear as promising. Several initiatives have been developed and tested (Meiklejohn et al., 2012; Stallman & Kavanagh, 2016). For instance, Queensland University of Technology, Australia developed an Internet based psychological support service called TheDesk. TheDesk offer psychoeducation on various physical, psychological

and emotional issues, self-help guide, quiz and assessment. Students need to register securely to access its services. A review of the data of its first 3.5 years concludes that ‘while further research is needed to evaluate the effects of the desk on wellbeing and distress, the current results suggest that it provides highly accessible support that is well accepted by most tertiary students and has the potential for use as a stand-alone intervention or, adjunctively, to increase the impact of other student support’ (Stallman & Kavanagh, 2016).

## **1.7 University students’ scenario in Bangladesh**

### **1.7.1 Number of students is increasing.**

Bangladesh is one of the densely populated countries in the world; with most of them are young adults. The university going cohort is also increasing day by day. Currently, around 3.2 million students are enrolled in tertiary level education with an estimation to reach the number to 4.6 million by 2026 (Mannan, 2017). This huge university student population could be invaluable wealth for Bangladesh if nurtured adequately. By adequate nurturing means fostering their HRQoL. If not done properly, this could be very lethal for the future of the country as well as for the world.

### **1.7.2 Mental health is a challenge.**

Mental health of this huge student population is the biggest challenge for Bangladesh. Academic pressure, financial hardship and uneven socio-economic benefits for students in general are key risk factors to maintain mental health.

### **1.7.3 Limited support to promote psychological well-being.**

Very few universities, mostly located in Dhaka, have psychosocial support service for the students. Dedicated counselling centers are available only in the University of Dhaka, Jahangirnagar University, Brac University,

North South University, University of Liberal Arts Bangladesh, and Eastern University. Even though the above mentioned institutions are running psychological services for their students and staff, so far no systematic evidence is available on their effectiveness or role on promoting well-being. The rest of students studying all other universities and colleges remained unattended when it comes for psychological support. Furthermore, there is no formal and well-designed online service that can offer some sort of psychological support particularly addressing university students' issues.

#### **1.7.4 Students voice is absent.**

In Bangladesh, there is no such intervention that hears the voice of the students. Hearing the voice of the students in the health care planning and intervention would facilitate effective outcome. Due to lack of adequate and systematic research, absent of functional student bodies as well as reluctance in seeking support from the students' side (Lally, O'Conghaile, Quigley, Bainbridge, & McDonald, 2013) hinder the delivery of effective psychosocial support for the promotion of well-being.

#### **1.7.5 Stigma attached to mental health support seeking.**

There is a strong stigma attached to mental health problems in the socio-cultural context of Bangladesh. Having a mental health issue is seen as a shameful state of health. Therefore, people in general are not willing to talk about their psychological difficulties or seek professional services. Rather, they are seen seeking support from traditional healers. This strong stigma, both in social and public level is found to be a strong barrier in mental health service utilization among university students (Hunt & Eisenberg, 2010; Lally et al., 2013).

### **1.8 Summary**

The above discussion highlighted some crucial phenomena in relation to HRQoL among university students.

- The university going population has the immense possibility to foster for the betterment of the Bangladeshi society.
- They are also at risk of physical, psychological, emotional and social challenges that might hinder the expected growth.
- HRQoL has been extensively studied only for clinical population. University students remain in the margin.
- Sociocultural context of Bangladeshi youths put them even more heightened risk affecting overall quality of life.
- Very limited interventions, mainly centered in capital city Dhaka, are available to address psychosocial needs of the student population.

## **Chapter 2 The Present Study**

### **2.1 Overview**

Health-related quality of life (HRQoL) is individual's subjective perception of his or her health condition that covers physical, psychological and social domains. HRQoL has been increasingly used as an indicator of well-being and outcome measure across various studies including randomized control trials (RCTs). Although a large body of research has explored various factors associated with HRQoL for a range of health conditions, very few investigated that for the university populations. The university groups are critical in relation to health due to their distinct psychosocial and physical characteristics. Exploring modifiable factors associated with HRQoL of this group might open a useful avenue for potential health and wellness interventions. The current research was undertaken to explore HRQoL and its associated psychosocial factors among university students of Bangladesh.

### **2.2 Gap in the literature**

As we discussed earlier (Chapter 1), HRQoL has been thoroughly investigated for the various health conditions. Systematic studies involving non-clinical samples, especially young adults are very little. Review of existing literature indicates very few studies around the globe investigated HRQoL among university going student population (Dučinskienė et al., 2003; Fallahzadeh & Mirzaei, 2012; Klemenc-Ketis et al., 2011; Mikolajczyk et al., 2008; Paro et al., 2010; Pekmezovic et al., 2011). HRQoL of university students was associated with academic faculty, smoking, family income, marital status, employment status (Fallahzadeh & Mirzaei, 2012), physical activity, physical exercise, depression, (Pekmezovic et al., 2011). None of these studies considered a range of other variables potential for HRQoL.

In Bangladesh, two systematic studies have been undertaken to estimate the feasibility of the SF-36 questionnaire in the local context. The first study conducted in 1999 tested whether SF-36 can be used as a subjective health status measurement in an non-clinical sample of Bangladesh (Ahmed, Rana, Chowdhury, & Bhuiya, 2002). Around a decade later, Feroz et al., (2012) evaluated psychometric properties of the Bangla SF-36 questionnaire for the patients with rheumatoid arthritis. Afterward, no empirical investigation on HRQoL using large sample has been conducted. One study reported HRQoL of the recovering substance users (Islam & Akter, 2015b) while another comparative research reported HRQoL of British Bangladeshis in comparison with local Bangladeshis and recovering substance users (Islam & Akter, 2015a). Either of these studies were employed limited sample that was not representative to generalize to student populations or any sub-group. Furthermore, one study used HRQoL as a validating measure in a mindfulness scale adaptation (Islam & Siddique, 2016).

### **2.3 Specific objectives**

The present study was undertaken to investigate HRQoL among university students.

More specifically the study was designed to address the following objectives;

- To assess HRQoL among university students of Bangladesh;
- To find out associated psychosocial factors with HRQoL among university students of Bangladesh.

### **2.4 Selected factors**

For the current study, a range psychological, socio-demographical, academic, behavioural and lifestyle predictors were chosen. Each of these predictors are described below.



#### **2.4.1 Psychological distress.**

Depression and anxiety were found to be associated with HRQoL among university students (Arslan et al., 2009; Klemenc-Ketis et al., 2011; Pekmezovic et al., 2011). However, there is no conclusive evidence of association between HRQoL and psychological distress among this group. We anticipate psychological distress would have significant effect on students' quality of life due to its widespread prevalence among university students (Acharya, 2003; Hudd et al., 2000; Kouzma & Kennedy, 2004).

#### **2.4.2 Self-esteem.**

Individual's self-evaluation is critical to his or her psychological and social well-being. It is believed to be a protecting factor of health and well-being. Substantial evidence is illustrating that 'self-esteem can lead to better health and social behaviour, and that poor self-esteem is associated with a broad range of mental disorders and social problems, both internalizing problems (e.g. depression, suicidal tendencies, eating disorders and anxiety) and externalizing problems (e.g. violence and substance abuse)' (Mann, Hosman, Schaalma, & De Vries, 2004). We were keen to see whether self-esteem predicts university students HRQoL.

#### **2.4.3 Physical activity.**

A large body of research suggested that participating in physical activity is one of key factors in maintaining health in modern society (Health, 2010). A review of college students physical activity behaviour indicates that around 50% of the students are reluctant in engaging any sort of physical activity (Keating, Guan, Pinero, & Bridges, 2005). In case of Iranian university students, physical activity in the form of regular exercise had resulted in better

mental health summary score of the HRQoL domains (Fallahzadeh & Mirzaei, 2012). Similarly, Serbian university students' HRQoL was also differed by the category of physical activity with physically active students reporting higher HRQoL than their non-active counterparts (Pekmezovic et al., 2011). We also assumed that for the present sample physical activity might play vital role in explaining HRQoL.

#### **2.4.4 Smoking cigarette.**

Smoking cigarette has been well-documented for its harmful role in physical and mental well-being for various age groups. It is a direct and indirect risk factor for developing a number of health consequences including cancer, heart disease. When examining smoking effect on HRQoL among university students, few studies reported a poor overall HRQoL score among smokers (Fallahzadeh & Mirzaei, 2012; Pekmezovic et al., 2011). In a recent study conducted with the Dhaka University students, revealed that around 20% participants reported to smoke cigarette daily which again was associated with higher Internet addiction and psychological distress (Islam & Hossin, 2016). We believe smoking could also affect university students HRQoL.

#### **2.4.5 Duration of sleep.**

Sleep is another critical factor for maintain sound physical and mental health. The US National Sleep Foundation recommended 7 to 9 hours of sleep as normal and required for sound health for the adult populations. Below 7 hours and above 9 hours of daily sleep have been categorized as short sleep and long sleep (Hirshkowitz et al., 2015). The university students are often seen to have irregular sleeping habit which might cause poor quality of life. Short habitual sleep duration, for instance, has been shown to be linearly associated

with persistent psychological distress in young adults (Glozier et al., 2010). We were interested to look into this factor for the current sample.

#### **2.4.6 Presence of physical illness.**

When comparing HRQoL of participants having some sort of physical illness with normal, the illness group always scored lower in all domains of HRQoL. Physical illness hampers productivity and affects psychological balance, therefore causing lower quality of life. We included this factor to see to what extent presence of physical illness influences overall HRQoL and any specific domain of the university students.

#### **2.4.6 Academic results (CGPA).**

Academic results often appear as strain in the students' life. In Bangladesh, cases of committing suicide after publication of results often appeared in the newspaper. Fail to achieve expected CGPA is one of the strongest determinants of worse mental health including depression, hopelessness. Specifically, one study observed positive correlation between SF-36 score and academic achievement although the strength of the relation was low (Fallahzadeh & Mirzaei, 2012). Multivariate analyses revealed academic achievement had increased the risk of having mental composite scores above the median. The present study also sought to understand the role of academic results on students' HRQoL.

#### **2.4.7 Academic faculties.**

By academic faculties, we refer broad categories students pursuing their higher studies. The present sample consists of participants from Sciences, Arts,

Business, Social Sciences and Fine Arts Faculties. Previous research has demonstrated that students study area affects HRQoL. For example, Belgrade University students of medical sciences had the lowest scores in almost all SF-36 domains (Pekmezovic et al., 2011). When used WHOQOL-BREF as a measure, the Lithuanian university sample reflected varying score according to the study area. For instance, in the social domain of QoL, Humanitarian profile students scored higher than the Biomedical and Technical background students, but in environmental domain, it happened inversely (Dučinskienė et al., 2003).

#### **2.4.8 Age.**

Physical and psychological well-being is also linked with participants' age. In case of medical students, it was observed that participants' quality of life and sleep declined as they progressed onwards (Goldin et al., 2007). For instance, second, third, fourth and sixth years of medical training reported to have lower scores for mental and physical dimensions of HRQoL compared with the incoming Year 1 group ( $p < 0.01$ ), with the largest difference observed for Year 3 students (Paro et al., 2010). We aimed to see whether this inverse association is also evident in case of non-medical university students.

#### **2.4.9 Residential status.**

Living arrangement of students is another critical factor for their well-being and academic performance. Students' residence can be categorized into two broad categories. First, living with family or parents. Second, they may live in the university halls of residence or privately rented houses. Although family or parents is thought to be a supportive factor, students who are living with their

parents, however, reported a lower health status compared with students living with peers or alone/with a partner(Boot, Rietmeijer, Vonk, & Meijman, 2009). Living in student dormitories can be helpful in socializing and learning pro-social behaviour while living with parents can be good for physical well-being. We wanted to examine what impact residential status might have on students' HRQoL.

#### **2.4.10 Marital and relationship status.**

Having a romantic relationship usually resulted in better mental health. However, young adults often experience conflict leading to break-up in relationship which in turn taxes psychological and emotional resources. We particularly wanted to examine to what extent relationship issue interferes with students' HRQoL.

#### **2.4.11 Socio-economic Status.**

Higher socio-economic status is generally associated with better physical and psychological health. It is a well-established fact called as social gradient in health. People living in higher grade in the society enjoy better health (Marmot, 2009). Inequalities in social status also reflected in health and well-being. This research also aimed to investigate this particular phenomenon for the student sample.

### **2.5 Rationale of this study**

HRQoL of the university students has never been studied in Bangladesh. Successful completion of this study is expected to generate valuable findings regarding HRQoL of this population. Results of this study can help university administration to implement specific interventions to promote QoL of the students. Existing services, i.e., Students Counselling and Medical facilities might be benefitted by prioritizing most

important factors to address. This study can be considered as a pilot study for the university pupils in general for Bangladesh which would lead future research in broader context.

## **Chapter 3 Method**

### **3.1 Participants and Sampling**

The participants of this study were the graduate students of a leading public university of Bangladesh. The selected university is one of the oldest universities in the South Asia region. Currently, there are around 35,000 students pursuing their higher studies in 70 different departments categorized under 11 faculties. Studying at a public university in Bangladesh is almost free, as the state bears almost entire budget. Therefore, students from all socioeconomic backgrounds can pursue higher studies if they were passed the very competitive entrance exam. We chose this university for this study due to its diverse population distribution in terms of social and economic orientation. Around six hundred graduates from various faculties were approached for participation. Few of them refused to take part, another few returned with incomplete questionnaires. Removing them, data for 588 participants were subjected to final analyses. Out of the 11 faculties, 5 were selected randomly. From these five faculties, participants were selected proportionately. Detail description of the study sample can be found in Table 1.

### **3.2 Measures**

#### **3.2.1 HRQoL.**

The main measure of this study was health-related quality of life (HRQoL). The study used Bangla validated the 12-item short form of the health survey, version 2 (SF-12 v 2) (J. E. J. Ware, Kosinski, Turner-Bowker, & Gandek, 2002) questionnaire to index HRQoL. Permission was sought from QualityMetric Inc., the copyright holders of SF-12 v 2 (License agreement # QM030016). Since there was no Bangladeshi validated Bangla version of SF-12 v 2, the QualityMetric provided an Indian validated Bangla SF-12 v 2 (Annex E. a.). India and Bangladesh are neighbouring country and

share many similar cultures including language, we decided to use Indian Bangla tool for the Bangladeshi sample. Prior to field study, the tool has been reviewed by language experts to judge whether it was sufficient to capture the meaning it is designed to measure. Few language revisions on the Indian version of SF-12 v 2 have been made and the tool is set for final data collection.

The SF-12 v 2 is a shorter alternative of the original SF-36 instrument that includes 12 questions and 8 subscales: (i) physical functioning (PF-2 items on limitations doing moderate activities and climbing several flights of stairs), (ii) role limitations due to physical problems (RP-2 items on less accomplishment than one would like to achieve and limitation in kind of work or other activities), (iii) bodily pain (BP-1 item on pain interference with one's normal work), (iv) general health (GH-1 item on general health perception), (v) vitality (VT-1 item on having energy), (vi) social functioning (SF-1 item on interference of physical health or emotional problems with one's social activities), (vii) role limitations due to emotional problems (RE-2 items on less accomplishment than one would like to achieve and not being careful in doing activities as usual) and (viii) perceived mental health (MH-2 items on feeling calm or peaceful and feeling sad or blue).

Items are rated on three to a five-point Likert scale where poor health status gets a lower score. Scores of negative items (# 2, 3, 4, 5, 6, 7, 11, and 12) are reversed so that higher score indicates better health. Scale scores were transformed into the 0 to 100 range according to the scoring manual (Maruish & DeRosa, 2009). The 12 items are used to derive two summary measures (i.e. physical component summary [PCS] and mental component summary [MCS])(J. E. J. Ware et al., 2002). Internal consistency of the Bangla SF-12 v 2 for the current sample was very high (Cronbach's Alpha= 0.85).



***Scoring procedure of SF-12 v 2:***

The SF-12 v 2 can be scored in two scoring procedures (J. E. J. Ware et al., 2002). The first one is general scoring where subscales scores are presented in 0 to 100 range. The second procedure is called Norm-based scoring (NBS) which involves comparing raw scores with the US general population (Mean 50, *SD* 10). In this section, we are going to describe each procedure elaborately.

***Procedure 1: General scoring***

SF-12v2 items are scored so that a higher score indicates a better health state. For example, functioning items are scored so that a high score indicates better functioning, and the pain item is scored so that a high score indicates freedom from pain. After data entry, items are scored in three steps:

- (1) Item recoding for the four items that require recoding;
- (2) Computing scale scores by summing across items in the same scale (raw scale scores); and,
- (3) Transforming raw scale scores to a 0-100 scale (transformed scale scores).

In order to transform raw scale scores the following formula is used.

$$\text{Transformed scale} = \left[ \frac{(\text{Actual raw score} - \text{lowest possible raw score})}{\text{Possible raw score range}} \right] * 100$$

This transformation converts the lowest and highest possible scores to zero and 100, respectively. Scores between these values represent the percentage of the total possible score achieved.

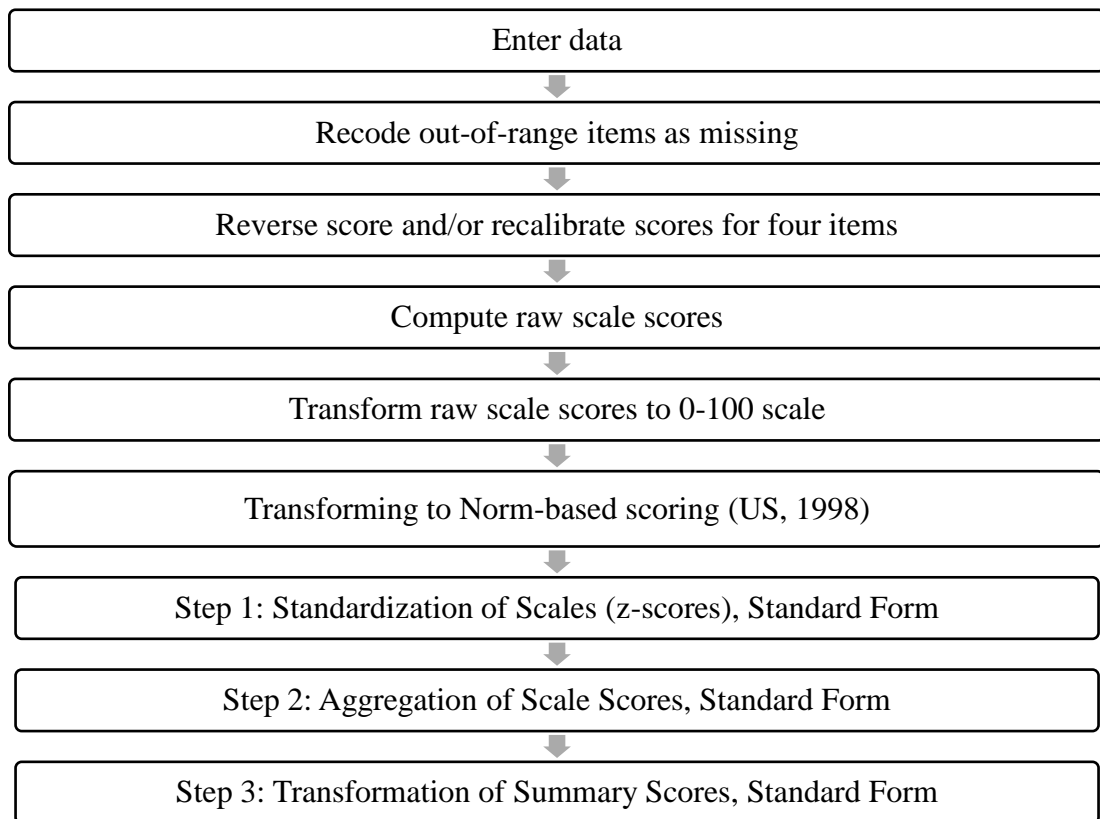


Figure 1. Flow chart of SF-12 v 2 scoring

#### *Procedure 2: Norm-based scoring*

In order to make the interpretation much easier the norm-based scoring (NBS) was introduced. Data from the 1998 US general population survey using the SF-36 tool were used as norm to compare subscales score and composite summary score respectively. Using NBS, each scale is scored to have the same mean (50 points) and the same *SD* (10 points) in the general U.S. population in 1998. Without referring to tables of norms, it is clear with this method that anytime a scale score is below 50, health status is below average, and each point is one-tenth of a *SD*. To accomplish NBS the following steps are recommended in SF-12 v2 manual (J. E. J. Ware et al., 2002). The following steps are taken from the SF-12 v2 Manual.

Step 1: Standardization of Scales (z-scores), Standard Form

First, each SF-12v2 scale is standardized using a z-score transformation using SF-12v2 scale means and *SDs* from the 1998 general U.S. population as given in Table 8.2. A z-score for each scale is computed by subtracting the 1998 general U.S. population mean from each SF-12v2 scale score (0-100 scale) and dividing the difference by the corresponding scale *SD* (0-100 scale) from the 1998 general U.S. population. Note that the SF-12v2 scales scored on the 0-100 scale are used in Step 1 Norm-based SF-12v2 scale.

Formulas for z-score standardization of SF-12v2 scales, Standard Form:

$$PF\_Z = (PF - 81.18122) / 29.10558$$

$$RP\_Z = (RP - 80.52856) / 27.13526$$

$$BP\_Z = (BP - 81.74015) / 24.53019$$

$$GH\_Z = (GH - 72.19795) / 23.19041$$

$$VT\_Z = (VT - 55.59090) / 24.84380$$

$$SF\_Z = (SF - 83.73973) / 24.75775$$

$$RE\_Z = (RE - 86.41051) / 22.35543$$

$$MH\_Z = (MH - 70.18217) / 20.50597$$

Step 2: Aggregation of Scale Scores, Standard Form

After a z-score has been computed for each SF-12v2 scale, the second step involves computation of aggregate scores for the physical and mental summaries using the physical and mental factor score coefficients from the 1990 general U.S. population as given in the manual (J. E. J. Ware et al., 2002).

Computation of an aggregate physical summary score consists of multiplying the z-score of each SF-12v2 scale by its respective physical factor score coefficient and summing the eight products, as shown below. Similarly, an aggregate mental summary

score is obtained by multiplying the z-score of each SF-12v2 scale by its respective mental factor score coefficient and summing the eight products.

Formulas for aggregating scales in estimating aggregate physical and mental summary scores:

$$\begin{aligned} \text{AGG\_PHYS} = & (\text{PF\_Z} * .42402) + (\text{RP\_Z} * .35119) + (\text{BP\_Z} * .31754) + \\ & (\text{GH\_Z} * .24954) + (\text{VT\_Z} * .02877) + (\text{SF\_Z} * -.00753) + \\ & (\text{RE\_Z} * -.19206) + (\text{MH\_Z} * -.22069) \end{aligned}$$

$$\begin{aligned} \text{AGG\_MENT} = & (\text{PF\_Z} * -.22999) + (\text{RP\_Z} * -.12329) + (\text{BP\_Z} * -.09731) + \\ & (\text{GH\_Z} * -.01571) + (\text{VT\_Z} * .23534) + (\text{SF\_Z} * .26876) + \\ & (\text{RE\_Z} * .43407) + (\text{MH\_Z} * .48581) \end{aligned}$$

### Step 3: Transformation of Summary Scores, Standard Form

The third step involves transforming the aggregate physical and mental summary scores to the norm-based (50, 10) scoring. This is accomplished by multiplying each aggregate summary score from Step 2 by 10 and adding the resulting product to 50. Formulas are listed below.

Formulas for t-score transformation of summary scores:

$$\text{Transformed Physical (PCS)} = 50 + (\text{AGG\_PHYS} * 10)$$

$$\text{Transformed Mental (MCS)} = 50 + (\text{AGG\_MENT} * 10)$$

### **3.2.2 Psychological Distress.**

The Bangla validated (Sorcar & Rahman, 1990) 12-item version of General Health Questionnaire(GHQ-12) (Goldberg, 1972) was used to index psychological distress(see Annex E. b.). The GHQ-12 is one of the widely used self-report measures of general psychological health. The instrument was originally developed as a screening test for detecting minor psychiatric disturbance or strain which assesses changes in affective and somatic symptoms relative to usual levels of health, e.g. feelings of strain, depression, inability to cope, anxiety-based insomnia and lack of confidence (Goodchild & Duncan-Jones, 1985). There are four different scoring procedure available for GHQ-12(Goldberg, Oldehinkel, & Ormel, 1998). In the current study, the 0-1-2-3 scoring procedure was followed which gives a range of 0 to 36. A higher score indicates higher psychological distress. Internal consistency of the Bangla GHQ-12 was found satisfactory in previous studies (i.e.,  $\alpha > 0.80$ ) (Islam & Hossin, 2016). Cronbach's alpha for this sample was very good ( $\alpha = 0.89$ ).

### **3.2.3 Self-esteem.**

Bangla version (Huque & Zaman, 2002) of Rosenberg Self-Esteem Scale (RSE) (Rosenberg, 1989) was used to index self-esteem (see Annex E. c.) . The RSE is also a widely used measure of self-esteem in research (Johnston, Wright, & Weinman, 1995). The scale consists of ten items where half of the items are expressions of positive self-esteem, i.e. "on the whole, I am satisfied with myself" and half are negative, i.e. "I certainly feel useless at times". The answers are scored on a four-point Likert scale (strongly agree, agree, disagree, strongly disagree), giving a range from 10 to 40. Items are originally scored in the direction of negative self-esteem, where low scores indicate high self-esteem. For easier interpretation of the research in this study, the scores have been reversed so that high scores indicate high self-esteem. The RSE test-retest

correlations are typically in the range of 0.82 to 0.88, and Cronbach's alpha for various samples are in the range of 0.77 to 0.88 (Blascovich and Tomaka 1991; Rosenberg 1989). The Bangla RSE scale has been frequently used in Bangladeshi research with satisfactory internal consistency (Islam & Akter, 2015a, 2015b). Internal consistency for the current sample was satisfactory (Cronbach's alpha=0.73).

### **3.2.4 Behavioural and Lifestyle measures.**

To assess participation in the moderate physical activity, students were asked if they do moderate activities for at least 10 minutes at a time, such as brisk walking, cycling, swimming, or any other activity that causes some increase in breathing or heart rate. Responders who answered “yes” were again asked how frequently they engage in moderate activities, defined as every day, weekly (1–6 times per week), occasionally (rarely, less than one time per week), and never. Information on smoking was obtained through questions on smoking, including average number of cigarettes smoke per day. Respondents' duration of sleep was recorded in hour. Respondents reported whether they had been suffering from any sort of physical illness by answering ‘yes’ or ‘no’ (see Annex D).

### **3.2.5 Academic measures.**

Cumulative grade point average (CGPA) of the 4<sup>th</sup>-year final was recorded and counted as a measure of academic performance. The CGPA ranges from 0 to 4 with higher score indicate better performance. Respondents were broadly categorized into five faculties. These are Sciences, Arts, Business Studies, Social Sciences and Fine Arts.

### **3.2.6 Subjective Social Economic Status.**

The MacArthur Scale of Subjective Social Status was used (Adler, Epel, Castellazzo, & Ickovics, 2000) to capture subjective sense of social economic status (SES). Participants are given a drawing of a ladder with 10 rungs and are asked to place an “X” on the rung on which they feel they stand (see Annex D). It is described as follows: “Think of this ladder as representing where people stand in our society. At the top of the ladder are the people who are the best off, those who have the most money, most education and best jobs. At the bottom are the people who are the worst off, those who have the least money, least education, and worst jobs or no jobs”. Each rung is rated from 1-10 where 1 is the highest subjective SES and 10 is the lowest subjective SES (see Annex D). The SES has a good test-retest reliability and good validity (Operario, Adler, & Williams, 2004).

### **3.2.7 Demographics.**

Demographic information consisting of age, residential status (residential vs. non-residential), marital status (married vs. single), romantic relationship (yes, no or breakup) were recorded through a separate demographic information recording sheet (see Annex D).

## **3.3 Data Collection Procedure**

The final survey tool comprised psychological (e.g., SF-12, GHQ-12, and RSE), behavioural and lifestyle measures (e.g., Physical activity, smoking, sleep) along with a demographic information recording sheet. A clear written informed consent sheet (see Annex C) was presented to each participant before collecting data. Each participant

gave his or her written consent. Prior to commencing the study ethical approval was taken from the concerned university ethics committee. Five research assistants holding at least MS degree in psychology/clinical/counselling psychology supported the field data collection. They were given necessary training on the research tool, data collection procedure and ethics of research with human participants. Participation in this study was voluntary. Participants were not given any privilege or not discriminated by any means due to their participation or not participation. Thus, over a period of 8-weeks data collection were accomplished.

### **3.4 Statistical Analyses**

Data were processed using computer program SPSS version 20. Data were cleaned for outliers and other errors. For descriptive statistics, categorical variables are presented using frequency and percentage while continuous variables are presented using mean and standard deviation (*SD*). Association among continuous variables was checked through Pearson's correlation. To explore variance among groups, independent sample t-test (in the case of two groups) and ANOVA (more than two groups) were employed. Mean differences were further explained using Cohen's *d* (Cohen, 1988). To investigate potential factors associated with HRQoL, multiple regression analyses were done separately for PCS and MCS.



## CHAPTER 4 RESULTS

### 4.1 Introduction

This study was carried out to evaluate health-related quality of life(HRQoL) among university students and find out associated factors believed to be mediate/moderate HRQoL. Findings of this empirical investigation have been presented in this chapter. Firstly, descriptive statistics of the study variables are displayed in Table 1, 2 and 3. Table 4 to 10 depict HRQoL as a function of different demographic, academic, behavioural and lifestyle factors. Table 11 illustrates the association of physical (PCS) and mental component summary (MCS) scores with psychosocial dimensions. Finally, Table 12 and 13 portray multivariate models explaining psychosocial factors associated with PCS and MCS respectively.

### 4.2 Sample characteristics

In this cross-sectional investigation, 588 graduate students took part. Around 70% of them were male, most of them were single (90.3%). Roughly half of the respondents had no intimate relationship, one-third reported to engage in romantic relation while 16.8% said to split up their existing relation. The majority of the students reside in university residential facilities (60.7%). Students belong to five faculties although the majority of them were from either Arts (36.9%) or sciences faculty (35.4%) (Table 1).

Table 1

*Demographic and Academic Characteristics of the Study Sample*

Character	Attribute	Frequency	Percentage
Sex	Female	177	30.1
	Male	411	69.9
Marital status	Married	57	9.7
	Single	531	90.3
Having intimate relationship	Yes	215	36.6
	No	274	46.6
	Separated	99	16.8
Living	Residential	357	60.7
	Non-residential	231	39.3
Faculty	Sciences	208	35.4
	Arts	217	36.9
	Business studies	50	8.5
	Social Sciences	75	12.8
	Fine Arts	38	6.5

In response to the behavioural and physical measures, half of the respondents reported to engage moderate to rigorous physical activity, 20.9% smoked a cigarette and 16.7% experiencing some sort of physical illness (Table 2).

Table 2

*Behavioural and Physical Characteristics of the Study Sample*

Character	Attribute	Frequency	Percentage
Physical activity	Yes	50.5	50.5
	No	49.5	49.5
Smoking cigarette	Yes	123	20.9
	No	465	79.1
Physical illness	Yes	98	16.7
	No	490	83.3

Participants were asked to report their usual sleeping duration in hours. As can be seen from the figures of Table 3, the mean sleeping duration was 7.13 hours ( $SD=1.23$ ). The mean SES was 4.82 with  $SD$  1.77. Students mean CGPA after four years was 3.37. The mean age was 23.93 years with  $SD$  1.53. Psychological distress as indexed by GHQ-12 was ranged from 0 to 36, with a mean of 12.07 and  $SD$  6.41. Self-esteem was measured by Rosenberg Self-esteem (RSE) scale where the mean was 28.73 and  $SD$  4.28.

Table 3

*Descriptive Statistics of the Major Continuous Variables*

Variable	N	Minimum	Maximum	Mean	$SD$
Sleeping duration (hour)	588	4.00	14.00	7.13	1.23
Socioeconomic status (SES)	588	1	10	4.82	1.77
Honours result (CGPA)	585	2.25	4.00	3.37	.27
Age	588	21.00	34.00	23.93	1.52
Psychological distress	588	.00	36.00	12.07	6.41
Self-esteem	588	14.00	40.00	28.73	4.28

**4.3 HRQoL and demographic variables**

In order to determine demographic factors of HRQoL, subscale scores of SF-12v2 were analyzed for various potential determinants. The first is the sex of the respondents. Eight subscales and two component summary scales' scores were subjected to independent sample t-test to see whether there was any significant difference between the sexes of the respondents. As can be seen from the figures of Table 4, females demonstrated significantly higher scores in social functioning [ $t(310) = 2.995, p < .05$ ], and role emotional [ $t(586) = 2.337, p < .05$ ] subscales. The magnitude of the differences in the means for social functioning subscale (mean difference = 6.99, 95%  $CI$ : 2.34 to 11.65) was small (Cohen's  $d=0.335$ ). Similarly, the magnitude of the mean differences between female and male in role emotional domain (mean difference

= 4.68, 95% *CI*: 0.75 to 8.62) was also small (Cohen's  $d= 0.193$ ) (Cohen, 1988). Males, on the other hand, showed significantly improved physical component summary scores [ $t(586) = -1.827, p < .05$ ]. The magnitude of this differences (mean difference = -1.18, 95% *CI*: -2.45, 0.09), however, was small (Cohen's  $d = -0.151$ ). There were no significant differences in rest of the domains.

Table 4

*Sex Difference in Subscales and Summary Scores of SF-12 v 2*

SF-12 v 2 subscales	Sex	Mean (SD)	Mean difference (95% CI)	<i>T</i>	Effect size, <i>d</i>
Physical functioning	Female <sup>a</sup>	70.76 (27.75)	-3.57	-1.354	-0.114
	Male <sup>b</sup>	74.33 (29.96)	[-8.744, 1.61]		
Role physical	Female	48.87 (18.86)	-2.41	-1.349	-0.137
	Male	51.28 (21.96)	[-5.91, 1.10]		
Pain	Female	71.61 (25.89)	0.26	.111	0.0092
	Male	71.35 (26.17)	[-4.35, 4.87]		
General health	Female	45.76 (20.55)	-2.05	-1.015	-0.084
	Male	47.81 (23.19)	[-6.01, 1.91]		
Vitality	Female	65.40 (20.46)	-2.73	-1.332	-0.110
	Male	68.13 (23.75)	[-6.76, 1.30]		
Social functioning	Female	67.09 (26.93)	6.99	2.995*	0.335
	Male	60.10 (24.85)	[2.34, 11.65]		
Role emotional	Female	58.76 (23.97)	4.68	2.337*	0.193
	Male	54.08 (21.51)	[0.75, 8.62]		
Mental health	Female	63.14 (17.84)	-2.71	-1.596	-0.161
	Male	65.85 (21.10)	[6.05, 0.63]		
PCS	Female	43.53 (6.63)	-1.18	-1.827*	-0.151
	Male	44.71 (7.42)	[-2.45, 0.09]		
MCS	Female	44.93 (9.48)	1.16	1.401	0.116
	Male	43.76 (9.11)	[-0.47, 2.79]		

*Note.* PCS=Physical component summary, MCS=Mental component summary; <sup>a</sup> $n=177$ . <sup>b</sup> $n = 411$ . \* $p < .05$ .

To examine effect of relationship status on HRQoL, one-way ANOVA was conducted. Participants were divided into three groups based on relationship status (e.g., 'having a relationship' 'No relationship' and 'Separated'). Results of the ANOVA showed that the three groups significantly differed in three subscales and one summary scale. Significant differences were observed in General Health,  $F(2, 585) = 4.178, p = .016$ , Social Functioning,  $F(2, 585) = 3.742, p = .024$ , Mental Health,  $F(2, 585) = 4.256, p = .015$ , and MCS,  $F(2, 585) = 4.682, p = .010$ . Post-hoc comparisons using Tukey HSD test indicate that respondents with no romantic relationship scored significantly better in general health and mental health subscales and mental summary score while participants having a relationship showed improved social functioning than the 'separated' group. Participants who have experienced a break up in a relationship, displayed lowered scores in all dimensions (Table 5).

Table 5

*One-way ANOVA of SF-12 v 2 Subscale and Summary Scores by Relationship Status*

SF-12 v2 Subscales	Source	SS	Df	MS	F	p
Physical functioning	Between Groups	258.01	2	129.00	0.149	.861
	Within Groups	504830.21	585	862.96		
	Total	505088.22	587			
Role physical	Between Groups	433.30	2	216.65	0.486	.615
	Within Groups	260637.07	585	445.53		
	Total	261070.37	587			
Pain	Between Groups	2543.37	2	1271.69	1.878	.154
	Within Groups	396206.63	585	677.28		
	Total	398750.00	587			
General Health	Between Groups	4159.14	2	2079.59	4.178	.016
	Within Groups	291210.76	585	497.80		
	Total	295369.90	587			
Vitality	Between Groups	2506.25	2	1253.13	2.417	.090
	Within Groups	303296.25	585	518.46		
	Total	305802.51	587			
Social Functioning	Between Groups	4886.57	2	2443.29	3.742	.024
	Within Groups	381936.35	585	652.88		
	Total	386822.92	587			
Role Emotional	Between Groups	718.13	2	359.07	0.717	.489
	Within Groups	292843.73	585	500.59		
	Total	293561.86	587			
Mental Health	Between Groups	3435.05	2	1717.52	4.256	.015
	Within Groups	236083.18	585	403.56		
	Total	239518.23	587			
PCS	Between Groups	33.39	2	16.70	0.321	.726
	Within Groups	30456.63	585	52.06		
	Total	30490.02	587			
MCS	Between Groups	788.61	2	394.31	4.682	.010
	Within Groups	49265.54	585	84.22		
	Total	50054.15	587			

*Note.* PCS=Physical component summary, MCS=Mental component summary, SS= Sum of Squares, MS = Mean Square, Df= Degrees of freedom

An independent sample t-test was conducted to see whether subscales and summary scores of SF-12 v 2 vary by the respondents' living arrange, i.e., residential or non-residential. A significant difference was observed only for mental health summary (MCS) scores [ $t(568) = 2.164, p < .05$ ], with residential students showing improved MCS than their non-residential counterparts. The magnitude of the differences in the means for MCS (mean difference = 1.68, 95% CI: 0.16 to 3.21) was, however, small (Cohen's  $d = 0.179$ ). Residential status did not have any significant effect on any of the other domains of HRQoL of the university students (Table 6).

Table 6

*HRQOL as a Function of Residential Status*

SF-12 v 2 subscales	Residential status	Mean (SD)	Mean difference (95% CI)	<i>t</i>	Effect size, <i>d</i>
Physical functioning	Residential <sup>a</sup>	72.27 (29.89)			
	Non-residential <sup>b</sup>	74.78 (28.46)	-2.51 [-7.38, 2.35]	-1.015	-0.084
Role physical	Residential	49.54 (20.66)			
	Non-residential	52.11 (21.69)	-2.57 [-6.06, 0.93]	-1.442	-0.119
Pain	Residential	72.13 (25.08)			
	Non-residential	70.35 (27.53)	1.78 [-2.54, 6.11]	0.810	0.067
General health	Residential	46.15 (22.19)			
	Non-residential	48.81 (22.75)	-2.66 [-6.38, 1.06]	-1.406	-0.116
Vitality	Residential	68.70 (23.08)			
	Non-residential	65.15 (22.31)	3.55 [-0.23, 7.32]	1.844	0.152
Social functioning	Residential	63.66 (24.66)			
	Non-residential	59.96 (27.05)	3.69 [-0.55, 7.95]	1.709	0.141
Role emotional	Residential	55.64 (22.08)			
	Non-residential	55.25 (22.85)	0.39 [-3.32, 4.10]	0.204	0.017
Mental health	Residential	66.04 (20.53)			
	Non-residential	63.47 (19.62)	2.56 [-0.78, 5.91]	1.504	0.124
PCS	Residential	43.95 (7.19)			
	Non-residential	44.98 (7.20)	-1.03 [-2.23, 0.16]	-1.701	-0.141
MCS	Residential	44.77 (9.38)			
	Non-residential	43.09 (8.92)	1.68 [0.16, 3.21]	2.164*	0.179

*Note.* PCS=Physical component summary, MCS=Mental component summary;

<sup>a</sup>*n*=357. <sup>b</sup>*n* = 231. \**p*<.05.



#### 4.4 HRQoL and academic variables

To explore impact of academic discipline on HRQoL, one-way ANOVA was conducted. Participants were divided into five groups based on their academic faculty (e.g., ‘Sciences’, ‘Arts’, ‘Business’, ‘Social Sciences’ and ‘Fine arts’). Results of the ANOVA showed that the five groups significantly differed only in mental summary score,  $F(2, 585) = 4.178, p = .016$ . Post-hoc comparisons using Tukey HSD test indicate that students from Arts faculty showed significantly higher MCS, followed by Fine arts, Sciences, and Business Studies. There were no significant faculty wise variations in the scores of PCS (Table 7).

Table 7

*One-way ANOVA of SF-12 v 2 Summary Scores by Respondents’ Academic Faculty*

SF-12 v 2 summary	Source	SS	Df	MS	F	p
PCS	Between Groups	316.26	4	79.07	1.528	.193
	Within Groups	30173.76	583	51.76		
	Total	30490.02	587			
MCS	Between Groups	815.45	4	203.86	2.414	.048
	Within Groups	49238.70	583	84.46		
	Total	50054.15	587			

*Note.* PCS=Physical component summary, MCS=Mental component summary, SS= Sum of Squares, MS = Mean Square, Df= Degrees of freedom

#### 4.5 HRQoL and Behavioural and Lifestyle factors

Independent sample t-test between students by physical activity category (yes or no) showed a significant difference in the physical summary scores [ $t(568) = 2.480, p < .05$ ] of the SF-12 v 2, with physically active respondents scored higher than the non-active respondents did. The magnitude of the differences in the means for PCS (mean

difference = 1.47, 95% *CI*: 0.31 to 2.63) was, however, small (Cohen's  $d = 0.205$ ).

Engaging in physical activity did not have any impact in mental health summary scores for the present sample (Table 8).

Table 8

*HRQOL as a Function of Physical Activity*

SF-12 v 2 Summary scores	Physical Activity	Mean ( <i>SD</i> )	Mean difference (95% <i>CI</i> )	<i>t</i>	Effect size, <i>d</i>
PCS	Yes <sup>a</sup>	45.08 (7.35)	1.47	2.480*	0.205
	No <sup>b</sup>	43.61 (6.99)	[0.31, 2.63]		
MCS	Yes	44.30 (8.98)	0.39	0.509	0.042
	No	43.92 (9.50)	[-1.11, 1.89]		

Note. PCS=Physical component summary, MCS=Mental component summary;  
<sup>a</sup> $n = 297$ . <sup>b</sup> $n = 291$ . \* $p < .05$ .

To see whether smoking cigarette has any effect on HRQoL, an independent sample t-test was conducted by respondents' smoking category (yes or no). Results showed a significant difference in the mental summary scores [ $t(568) = 3.204$ ,  $p < .01$ ] of the SF-12 v 2, with non-smoker respondents scoring significantly higher than the smokers do. The magnitude of the differences in the means for MCS (mean difference = -2.98, 95% *CI*: -4.80 to -1.15) was, however, small (Cohen's  $d = -0.265$ ). Although non-smokers had a lightly better PCS, but this difference did not reach statistical significance (Table 9).

Table 9

*HRQOL as a Function of Smoking Cigarette*

SF-12 v 2 Summary scores	Smoking cigarette	Mean ( <i>SD</i> )	Mean difference (95% <i>CI</i> )	<i>t</i>	Effect size, <i>d</i>
PCS	Yes <sup>a</sup>	43.43 (7.67)	-1.16	-1.595	-0.132
	No <sup>b</sup>	44.60 (7.07)	[-2.60, 0.27]		
MCS	Yes	41.76 (7.99)	-2.98	-3.204**	-0.265
	No	44.74 (9.45)	[-4.80, -1.15]		

Note. PCS=Physical component summary, MCS=Mental component summary;  
<sup>a</sup> $n = 123$ . <sup>b</sup> $n = 465$ . \*\* $p < .01$ .

Finally, to examine effect of physical illness on HRQoL, an independent sample t-test was conducted by respondents' presence of illness category (yes or no). Results showed a significant difference in both the physical summary scores [ $t(568) = -2.145$ ,  $p < .05$ ] and mental summary scores [ $t(568) = -4.792$ ,  $p < .001$ ] of the SF-12 v 2, with participants having some sort of physical illness scored significantly lower than the healthy students do. The magnitude of the differences in the means for PCS (mean difference = -1.71, 95% CI: -3.27 to -0.14) was, however, smaller (Cohen's  $d = -0.177$ ) than that of the MCS (mean difference = -4.81, 95% CI: -6.78 to -2.84, Cohen's  $d = -0.396$ ). (Table 10).

Table 10

*HRQOL as a Function of Physical Illness*

SF-12 v 2 Summary scores	Physical illness	Mean (SD)	Mean difference (95% CI)	<i>t</i>	Effect size, <i>d</i>
PCS	Yes <sup>a</sup>	42.93 (7.48)			
	No <sup>b</sup>	44.64 (7.12)	-1.71 [-3.27, -0.14]	-2.145*	-0.177
MCS	Yes	40.11 (10.08)			
	No	44.91 (8.85)	-4.81 [-6.78, -2.84]	-4.792***	-0.396

Note. PCS=Physical component summary, MCS=Mental component summary.

<sup>a</sup> $n=98$ . <sup>b</sup> $n = 490$ . \* $p < .05$ , \*\*\* $p < .001$ .

#### 4.6 Bivariate associations of HRQoL with psychosocial factors

Pearson Product-Moment Correlation coefficient was checked for the major quantitative variables. Results showed PCS was significantly and negatively associated with psychological distress,  $r(588) = -0.244$ ,  $p < .001$ , but positively with self-esteem,  $r(588) = 0.275$ ,  $p < .001$ . The results demonstrated that a decrease in psychological distress and an increase in self-esteem is associated with an increase in PCS score. Likewise, MCS was also significantly and negatively associated with psychological

distress,  $r(588) = -0.481$ ,  $p < .001$ , but positively with self-esteem,  $r(588) = 0.465$ ,  $p < .001$ . The strength of the association between MCS and two psychological indexes was stronger than that was for PCS. In addition, MCS also significantly and negatively associated with SES and positively with CGPA. The strength of the associations was however very negligible (Table 11).

Table 11

*Pearson Product-Moment Correlations of the PCS and MCS with Psychosocial Factors*

HRQoL	PCS	MCS	SES	CGPA	Age	Psychologic al distress	Self esteem	Sleeping duration
PCS	1	-.040	.022	-.001	.012	-.244**	.275**	.021
MCS	-.040	1	-.180**	.093*	-.033	-.481**	.465**	-.060

*Note.* PCS=Physical component summary, MCS=Mental component summary, HRQoL=Health related quality of life, SES=Socio-economic status, CGPA=Cumulative Grade Point Average

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

\* . Correlation is significant at the 0.05 level (2-tailed).

#### 4.7 Multivariate analyses

Multivariate analyses using linear regression were performed to identify independent factors for PCS and MCS separately. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. Categorical predictors such as sex, relationship status, residential status, faculty, smoking cigarette, physical activity and physical illness were transformed into dummy variables to fit with the regression analysis (Field, 2007). Variables with statistically significant differences in a univariate analysis were entered. A  $p$ -value  $< 0.05$  was considered statistically significant.

Table 12 illustrates the findings of the model predicting PCS. The model explained 13.3% variation in the score of PCS [ $R^2 = 0.133$ ,  $F(14, 573) = 6.30$ ,  $p < .0001$ ].

As indicated in bold, male gender, SES, non-residential status, psychological distress and self-esteem all emerging as significant predictors of PCS with self-esteem ( $\beta=0.215, p<.0001$ ) and psychological distress ( $\beta=-0.131, p<.01$ ) being the two most influential determinants.

Table 12

*Psychosocial Factors Associated with Physical Component Summary Score (PCS)*

Factors	$\beta$	95% CI		p-value	
		Lower bound	Upper bound		
Sex					
	<i>Female [ref]</i>				
	<b>Male</b>	<b>0.118</b>	<b>0.505</b>	<b>3.204</b>	<b>.007</b>
Intimate relationship					
	<i>Yes [ref]</i>				
	<i>No</i>	-0.010	-1.378	1.090	.819
	<i>Separated</i>	-0.023	-2.104	1.210	.596
<b>Socioeconomic status</b>	<b>0.100</b>	<b>0.079</b>	<b>0.737</b>	<b>.015</b>	
Residential status					
	<i>Residential [ref]</i>				
	<b>Non-residential</b>	<b>0.120</b>	<b>0.589</b>	<b>2.949</b>	<b>.003</b>
Faculty					
	<i>Sciences [ref]</i>				
	<i>Arts</i>	0.056	-0.491	2.151	.218
	<i>Business studies</i>	0.075	-0.174	4.071	.072
	<i>Social sciences</i>	0.018	-1.438	2.204	.680
	<i>Fine Arts</i>	0.078	-0.124	4.671	.063
Smoke cigarette					
	<i>Yes [ref]</i>				
	<i>No</i>	0.053	-0.525	2.410	.208
Physical illness					
	<i>Yes [ref]</i>				
	<i>No</i>	0.029	-0.985	2.105	.477
Physical activity					
	<i>Yes [ref]</i>				
	<i>No</i>	-0.067	-2.099	0.155	.091
<b>Psychological distress</b>	<b>-0.131</b>	<b>-0.254</b>	<b>-0.040</b>	<b>.007</b>	
<b>Self-esteem</b>	<b>0.215</b>	<b>0.207</b>	<b>0.518</b>	<b>&lt;.0001</b>	

Note. Figures indicated in bold are statistically significant ( $p < .05$ )

Table 13 illustrates the findings of the model predicting MCS. The model explained 32.2% variation in the score of MCS [ $R^2=0.322$ ,  $F(14, 573)=19.46$ ,  $p < .0001$ ]. As indicated in bold, non-residential status, the absence of physical illness, psychological distress and self-esteem all emerging as significant predictors of MCS

with psychological distress ( $\beta=-0.288, p<.01$ ) and self-esteem ( $\beta=0.215, p<.0001$ ) again appeared as the two most influential determinants.

Table 13

*Psychosocial Factors Associated with Mental Component Summary Score (MCS)*

Factors	$\beta$	95% CI		p-value
		Lower bound	Upper bound	
Sex				
<i>Female [ref]</i>				
<i>Male</i>	-0.019	-1.906	1.153	.629
Intimate relationship				
<i>Yes [ref]</i>				
<i>No</i>	0.061	-0.261	2.536	.111
<i>Separated</i>	-0.040	-2.866	0.890	.302
Socioeconomic status	-0.060	-0.686	0.060	.099
Residential status				
<i>Residential [ref]</i>				
<i>Non-residential</i>	<b>-0.080</b>	<b>-2.841</b>	<b>-0.167</b>	<b>.028</b>
Faculty				
<i>Sciences [ref]</i>				
<i>Arts</i>	0.028	-0.959	2.035	.480
<i>Business studies</i>	0.001	-2.361	2.449	.971
<i>Social sciences</i>	-0.054	-3.569	0.557	.152
<i>Fine Arts</i>	-0.003	-2.812	2.621	.945
Smoke cigarette				
<i>Yes [ref]</i>				
<i>No</i>	0.019	-1.242	2.084	.619
Physical illness				
<i>Yes [ref]</i>				
<i>No</i>	<b>0.088</b>	<b>0.430</b>	<b>3.931</b>	<b>.015</b>
Physical activity				
<i>Yes [ref]</i>				
<i>No</i>	0.016	-0.974	1.580	.641
<b>Psychological distress</b>	<b>-0.288</b>	<b>-0.536</b>	<b>-0.293</b>	<b>&lt;.0001</b>
<b>Self-esteem</b>	<b>0.274</b>	<b>0.416</b>	<b>0.767</b>	<b>&lt;.0001</b>

Note. Figures indicated in bold are statistically significant ( $p<.05$ )

## Chapter 5 Discussion

### 5.1 Introduction

This cross-sectional research assesses health-related quality of life (HRQoL) and associated psychosocial factors among graduate students of Bangladesh. Total 588 students responded to a self-administered questionnaire that recorded demographic, academic, behavioural and lifestyle variables as well as psychological measures such as HRQoL, psychological distress, and self-esteem. Data were analyzed using descriptive and inferential statistics. The results are presented in chapter 4. Here in chapter 5, findings of this study are discussed in the context of existing literature. Additionally, limitations, recommendations and future directions are discussed.

### 5.2 Summary of the key findings

- The highest score was found in physical functioning subscale among the eight sub-domains.
- Females were better in Social Functioning (*mean: 67.09 vs. 60.10*), Role Emotional (*mean: 58.76 vs. 54.08*) subscales of SF-12 v2 than males. Males were better in PCS (*mean: 44.71 vs. 43.53*) than females.
- General health and mental health were better for those who had no romantic relationship. Social Functioning was better for those who are in a relationship. Break up in a romantic relationship is associated with poorer scores in all domains.
- Residential students pose higher MCS than their non-residential counterparts (*mean: 44.77 vs. 43.09*). As for academic orientation, Arts faculty students reported significantly higher MCS followed by Fine Arts, Sciences, and Business studies.



- Engaging in physical activity is associated with higher PCS (*mean*: 45.08 vs. 43.61). Likewise, the absence of physical illness was associated with higher PCS (*mean*: 44.64 vs. 42.93) and MCS (*mean*: 44.91 vs. 40.11). The smoking cigarette was also associated with poorer mental health (*mean*: 41.76 vs. 44.74).
- Both PCS and MCS were significantly and negatively associated with psychological distress but positively with self-esteem.
- Male gender, SES, non-residential status, psychological distress, and self-esteem all emerging as significant predictors of PCS [ $R^2=0.133$ ,  $F(14, 573) = 6.30$ ,  $p < .0001$ ] with self-esteem ( $\beta=0.215$ ,  $p < .0001$ ) and psychological distress ( $\beta=-0.131$ ,  $p < .01$ ) being the two most crucial predictors. Similarly, non-residential status, the absence of physical illness, psychological distress and self-esteem all emerging as significant predictors of MCS with psychological distress ( $\beta=-0.288$ ,  $p < .01$ ) and self-esteem ( $\beta=0.215$ ,  $p < .0001$ ) being the two most crucial predictors.

### 5.3 Interpretation in the context of the literature

#### 5.3.1 HRQoL and demographic variables.

The results indicated significant differences in two domains of HRQoL between male and female students. Females scored significantly higher in social functioning and role emotional subscales than their male counterparts. This implies that physical or mental problems are less likely to affect female students' social functioning or daily activities. In other words, female respondents seem to be more responsive to social interactions and/or more capable of dealing with emotional issues in a way that did not affect normal activities. Males, on the other hand, showed improved physical component summary (PCS) score than females. This finding is partly consistent with the results obtained in university samples of Serbia (Pekmezovic et al., 2011) and

Brazil (Paro et al., 2010) where males scored higher in most of the domains. Another study with Iranian university sample did not indicate any significant gender difference in any of the domains (Fallahzadeh & Mirzaei, 2012). The inconsistency of the present results with the existing literature surrounding females scoring higher in social functioning and role emotional domains can be interpreted in terms of respondents' academic orientation and cultural distinctiveness. The earlier samples comprised of students from medical sciences whereas the current study sample consists of non-medical subjects. Generally, medical and engineering students experience higher stress (Atkinson, Millar, Kay, & Blinkhorn, 1991; Sultana, 2014) especially females (Hudd et al., 2000; Misra, McKean, West, & Russo, 2000) than the students of non-professional disciplines. This, in turn, could buffer the stress experience and quality of life in general. Nonetheless, the current study findings highlight that attention should be paid to social-emotional aspects of male students while physical well-being for the female students.

Status of a romantic relation is also associated with varying degree of HRQoL in specific domains. For instance, respondents with no romantic relationship scored better in general health and mental health domains than those who either had a relationship or split up. Social functioning was better for those who are in a relationship. Break up in a romantic relationship was linked with poorer scores in all dimensions. The extent literature is however not sufficient to show any direct evidence of romantic relation as a potential determinant of HRQoL among university students. Split-up of romantic relation is found to be linked with higher problematic Internet use within the young adults (Islam & Hossin, 2016) which in turn might affect mental health (Simon & Barrett, 2010). Necessary psychological support such individual

and/or group counselling for the students going through relationship break-up would be useful to cope with the arisen strain and vulnerability.

As for living arrangement, there was no significant difference between residential and non-residential respondents in relation to the domains of HRQoL except for the MSC. Students residing in halls with other students scored higher in MCS than their non-residential counterparts (MSC mean: 44.77 vs. 43.09). This finding was partially supported by the Dutch study where students living with their parents indicated lower perceived health status in comparison with students residing with peers or alone/with a partner(Boot et al., 2009). In contrast, living arrangements, categorized as 'living with relatives or no' had no significant impact on HRQoL among respondents of Brazil (Paro et al., 2010). Living without relatives, however, did not specify the exact living arrangement. In another occasion, it was revealed that students living with parents scored significantly higher in most of the domains of SF-36 than those living in dorms and alone (Pekmezovic et al., 2011).

The contradictory evidence in the literature and in our study can be explained by the fact that living arrangement was operationalized loosely and varied across studies. For instance, we included all respondents living outside residential halls as 'non-residential' which includes students living with parents, with friends in rented flats or simply alone. In our study mental summary score was significantly better for residential students. Living outside the home during university years could be seen as an opportunity of exploiting one's ability to be independent in leading his or her life. Despite the fact that university dorm life accompanies many challenges, it is an expected phenomenon indicating healthy psychological growth. This finding is also supported the existing literature that reports the comparatively lower prevalence of depression among the students who live in a dormitory(Arslan et al., 2009).

### **5.3.2 HRQoL and academic variables.**

We observed significant but small differences in MCS in relation to HRQoL within the respondents classified under five faculties with Arts faculty students reported significantly higher MCS followed by Fine Arts, Sciences, and Business studies. A similar observation was noted in a Lithuanian study where humanitarian profile students scored higher in social domain of QoL measures (Dučinskienė et al., 2003). Contrary to this finding, Belgrade University students of Engineering and Technology faculty scored significantly higher in MCS followed by Social Sciences and Humanities faculty (Pekmezovic et al., 2011). The Arts faculty students for the current sample typically experience less study load than the other faculty students do. Hence, this group of students might get sufficient time to engage pro-social and cultural activities which in turn results in positive mental well-being.

### **5.3.3 HRQoL and Behavioural and Lifestyle factors.**

The current research found engaging in physical activity is linked with higher PCS (*mean*:45.08 vs. 43.61) score, a finding that is largely inconsistent with previous findings (Fallahzadeh & Mirzaei, 2012; Pekmezovic et al., 2011) We found more than fifty percent students reported to engage daily or weekly moderate physical activities, which is also compatible with college students data in other studies(Keating et al., 2005). Engaging vigorous activities bring neuro-chemical changes which in turn boost mood and self-esteem (Irwin, 2004).

The presence of some sort of physical illness was associated with lower PCS and MCS. A considerable proportion (16.7%) of the study sample reported having a physical illness in any of the forms (e.g., mild or moderate or severe). This finding is also supported by the existing literature where independent factors associated with HRQoL were ‘the presence of chronic pain, the presence of depression and anxiety, need for urgent medical help and at least one visit to a clinical specialist in the past

year' among Slovenian university students (Klemenc-Ketis et al., 2011). Physical illness undoubtedly limits one's ability to exploit full potential, thereby impacting overall health status.

Another critical behavioural factor affecting students' overall health is smokingcigarette. In the present sample, around 21% respondents reported smokingcigarette regularly which was linked with poorer mental health (*mean*:41.76 vs. 44.74) in comparison with the non-smoker students. The percentage of daily smokers found in this study was higher than the findings observed in Iran (7.2%) (Fallahzadeh & Mirzaei, 2012) but almost similar to that of in Serbia (21.1%) (Pekmezovic et al., 2011).

#### **5.3.4 Bivariate associations of HRQoL with psychosocial factors.**

As expected both the PCS and MCS were significantly and negatively associated with psychological distress but positively with self-esteem. The extant literature has established that negative psychological status such as depression (Arslan et al., 2009; Paro et al., 2010; Pekmezovic et al., 2011) and anxiety (Klemenc-Ketis et al., 2011) were negatively associated with HRQoL.

#### **5.3.5 Predictors of HRQoL.**

The multivariate analyses revealed male gender, SES, non-residential status, psychological distress, and self-esteem all emerging as significant predictors of PCS with self-esteem and psychological distress being the two most crucial predictors. This result is largely in consistent with the existing literature. We, however, noted SES as an independent predictor of physical components of HRQoL. There is a lack of studies depicting direct association with SES and HRQoL. Studies rather used indicators of SES such as family income in order to investigate potential link (Pekmezovic et al., 2011).

With respect to MCS, non-residential status, the absence of physical illness, psychological distress and self-esteem all are emerging as significant predictors of MCS with psychological distress and self-esteem being the two most crucial predictors. Living outside of university facilities, having a physical illness and higher psychological distress all contributed to lowering the mental well-being of the students.

#### **5.4 Limitations and future directions**

Findings of this study, however, should be interpreted with caution as it has some limitations. Firstly, due to the cross-sectional nature of the study design, we cannot infer any causal association of the variables of interest. A prospective study design with various time points would yield vital insight which would even be more critical for any intervention addressing students HRQoL. Secondly, some of the study variables were measured very loosely such as, indices of physical activity, the presence of physical illness, relationship and residential information. Future study should consider employing objective and systematic measurement of these variables. Thirdly, the sampling from only one university seemed inadequate to depict overall HRQoL of the student population of Bangladesh. Despite the fact that the chosen university is the largest and most heterogeneous one in terms of students' SES, incorporating participating from few other private universities and from other cities would give a more comprehensive picture.

#### **5.5 Conclusions and recommendations**

Even with the above limitations, the current study highlights some key areas that might be critical for the HRQoL of the university students of Bangladesh. Attention should be paid to social-emotional aspects of male students while physical well-being for the female students. Necessary psychological support such individual and/or group counselling for the students going through relationship break-up would be useful to cope with the arisen strain and vulnerability.

Residential students pose better mental health than the non-residential students. Similarly, students belong to sciences, fine arts and business faculties reported lower in the mental component. Specific intervention addressing the mental well-being of non-residential as well as students belonging to aforementioned faculties is therefore warranted.

Promoting physical activity by creating plenty of games and sports would yield as higher physical and mental health of the students. In addition, extracare should be paid to students suffering from any kind of diseases as it has direct consequences on HRQoL. Services of the university health facilities might need to be evaluated and updated according to the need of the students. Furthermore, although smoking was not significant predictor of HRQoL, univariate analysis indicated poorer mental health of the smokers. Therefore, the campaign against smoking should be strengthened across the campus. The existing policy on smoke-free campus needs to be implemented giving highest priority. Finally, adequate mental health support in the form counselling or psychotherapy, mental health workshops, and seminars, for the students in need could improve students' overall health status.

### References

- Acharya, S. (2003). Factors affecting stress among Indian dental students. *Journal of Dental Education*, 67(10), 1140–8. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/14587679>
- Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: preliminary data in healthy white women. *Health Psychology Official Journal of the Division of Health Psychology American Psychological Association*, 19(6), 586–592. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11129362>
- Ahmed, S. M., Rana, A. K. M. M., Chowdhury, M., & Bhuiya, A. (2002). Measuring perceived health outcomes in non-western culture: Does SF-36 have a place? *Journal of Health Population and Nutrition*, 20(4), 334–342.
- Arslan, G., Ayranci, U., Unsal, A., & Arslantas, D. (2009). Prevalence of depression, its correlates among students, and its effect on health-related quality of life in a Turkish university. *Upsala Journal of Medical Sciences*, 114(3), 170–7. <http://doi.org/10.1080/03009730903174339>
- Atkinson, J. M., Millar, K., Kay, E. J., & Blinkhorn, A. S. (1991). Stress in dental practice. *Dental Update*, 18(2), 60.
- Bergner, M., Bobbitt, R. A., Kressel, S., Pollard, W. E., Gilson, B. S., & Morris, J. R. (1976). The sickness impact profile: conceptual formulation and methodology for the development of a health status measure. *International Journal of Health Services*, 6(3), 393–415.



- Boot, C. R. L., Rietmeijer, C. B. T., Vonk, P., & Meijman, F. J. (2009). Perceived health profiles of Dutch university students living with their parents, alone or with peers. *International Journal of Adolescent Medicine and Health, 21*(1), 41–50.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822–848. <http://doi.org/10.1037/0022-3514.84.4.822>
- Bullinger, M. (2003). Measuring Health Related Quality of Life. In C. Zouboulis (Ed.), *Adamantiades-Behçet's Disease SE - 23* (Vol. 528, pp. 113–122). Springer US. [http://doi.org/10.1007/0-306-48382-3\\_23](http://doi.org/10.1007/0-306-48382-3_23)
- Casellas, F., López-Vivancos, J., Casado, A., & Malagelada, J. (2002). Factors affecting health related quality of life of patients with inflammatory bowel disease. *Quality of Life Research, 11*(8), 775–781. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/12482161>
- Centers for Disease Control and Prevention. (2000). *Measuring healthy days*. Atlanta, Georgia.
- Chen, T.-H., Li, L., & Kochen, M. M. (2005). A systematic review: how to choose appropriate health-related quality of life (HRQOL) measures in routine general practice? *Journal of Zhejiang University. Science. B, 6*(9), 936–40. <http://doi.org/10.1631/jzus.2005.B0936>
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. L. Erlbaum Associates.
- Demyttenaere, K., Andersen, H. F., & Reines, E. H. (2008). Impact of escitalopram treatment on Quality of Life Enjoyment and Satisfaction Questionnaire scores in

major depressive disorder and generalized anxiety disorder. *International Clinical Psychopharmacology*, 23(5), 276–286.

Dučinskienė, D., Kalėdienė, R., & Petrauskienė, J. (2003). Quality of life among Lithuanian university students. *Acta Medica Lituanica*, 10(2), 76–81.

El Ansari, W., Labeeb, S., Moseley, L., Kotb, S., & El-Houfy, A. (2013). Physical and psychological well-being of university students: Survey of eleven faculties in Egypt. *International Journal of Preventive Medicine*, 4(3), 293–310.

Endicott, J., Nee, J., Harrison, W., & Blumenthal, R. (1993). Quality of Life Enjoyment and Satisfaction Questionnaire: a new measure. *Psychopharmacology Bulletin*.

Eriksen, E., & Erikson Erik, H. (1950). *Childhood and society*. New York.

Fallahzadeh, H., & Mirzaei, H. (2012). Health-Related Quality of life and Associated Factors among Iranian University Students. *The Journals of Health Researches*, 1(2), 122–130. Retrieved from [http://jhr.ssu.ac.ir/browse.php?a\\_code=A-10-1-24&slc\\_lang=en&sid=1](http://jhr.ssu.ac.ir/browse.php?a_code=A-10-1-24&slc_lang=en&sid=1)

Farmer, R. G., Easley, K. A., & Farmer, J. M. (1992). Quality of life assessment by patients with inflammatory bowel disease. *Cleveland Clinic Journal of Medicine*, 59(1), 35–42.

Feroz, A. H. M., Islam, M. N., ten Klooster, P. M., Hasan, M., Rasker, J. J., & Haq, S. a. (2012). The Bengali Short Form-36 was acceptable, reliable, and valid in patients with rheumatoid arthritis. *Journal of Clinical Epidemiology*, 65(11), 1227–35. <http://doi.org/10.1016/j.jclinepi.2012.05.004>

Field, A. (2007). *Discovering Statistics Using SPSS*. SAGE Publications. Retrieved

from <https://books.google.com.bd/books?id=5253SAL5nDgC>

- Glozier, N., Martiniuk, A., Patton, G., Ivers, R., Li, Q., Hickie, I., ... Stevenson, M. (2010). Short Sleep Duration in Prevalent and Persistent Psychological Distress in Young Adults. *Sleep, 33*(9), 1139–1145.
- Goldberg, D. P. (1972). *The detection of psychiatric illness by questionnaire*. London: Oxford University Press.
- Goldberg, D. P., Oldehinkel, T., & Ormel, J. (1998). Why GHQ threshold varies from one place to another. *Psychological Medicine, 28*(4), 915–21.  
<http://doi.org/10.1017/S0033291798006874>
- Goldin, S. B., Wahi, M. M., Farooq, O. S., Borgman, H. a, Carpenter, H. L., Wiegand, L. R., ... Karl, R. C. (2007). Student quality-of-life declines during third year surgical clerkship. *The Journal of Surgical Research, 143*(1), 151–7.  
<http://doi.org/10.1016/j.jss.2007.08.021>
- Goodchild, M. E., & Duncan-Jones, P. (1985). Chronicity and the General Health Questionnaire. *The British Journal of Psychiatry, 146*(1), 55–61. Retrieved from <http://bjp.rcpsych.org/content/146/1/55.abstract>
- Goodwin, L., Fairclough, S. H., & Poole, H. M. (2013). A cognitive-perceptual model of symptom perception in males and females: The roles of negative affect, selective attention, health anxiety and psychological job demands. *Journal of Health Psychology, 18*(6), 848–57. <http://doi.org/10.1177/1359105312456321>
- Guyatt, G. H. (1993). Measurement of health-related quality of life in heart failure. *Journal of the American College of Cardiology, 22*(4 SUPPL. 1), A185–A191.  
[http://doi.org/10.1016/0735-1097\(93\)90488-M](http://doi.org/10.1016/0735-1097(93)90488-M)

Health, D. of. (2010). *Healthy lives, healthy people: Our strategy for public health in England* (Vol. 7985). The Stationery Office.

Hirshkowitz, M., Whiton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., ...

Adams Hillard, P. J. (2015). National sleep foundation's sleep time duration recommendations: Methodology and results summary. *Sleep Health, 1*(1), 40–43.

<http://doi.org/10.1016/j.sleh.2014.12.010>

Hudd, S. S., Dumlao, J., Erdmann-Sager, D., Murray, D., Phan, E., Soukas, N., &

Yokozuka, N. (2000). Stress at college: Effects on health habits, health status and self-esteem. *College Student Journal, 34*(2), 217–228.

Hunt, J., & Eisenberg, D. (2010). Mental health problems and help-seeking behavior among college students. *The Journal of Adolescent Health : Official Publication of the Society for Adolescent Medicine, 46*(1), 3–10.

<http://doi.org/10.1016/j.jadohealth.2009.08.008>

Huppert, F. a, & So, T. T. C. (2013). Flourishing Across Europe: Application of a New Conceptual Framework for Defining Well-Being. *Social Indicators Research, 110*(3), 837–861. <http://doi.org/10.1007/s11205-011-9966-7>

Huque, P., & Zaman, A. (2002). Parental attitudes and adolescent's self esteem. *Dhaka Univeristy Journal of Psychology, 26*, 19–26.

Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research, 47*(3), 391–400.

<http://doi.org/10.1016/j.jpsychires.2012.11.015>

Irwin, J. D. (2004). Prevalence of university students' sufficient physical activity: a

systematic review. *Perceptual and Motor Skills*, 98(3), 927–943.

Islam, M. A., & Akter, A. (2015a). Exploring Health Related Quality of Life of British Bangladeshis living in Tower Hamlets. *Bangladesh Psychological Studies*, 25, 01–10.

Islam, M. A., & Akter, A. (2015b). Health Related Quality of Life and Self Esteem of Substance Users in Bangladesh. *The Dhaka University Journal of Biological Sciences*, 24(2), 199–207.

Islam, M. A., & Hossin, M. Z. (2016). Prevalence and Risk Factors of Problematic Internet Use and the Associated Psychological Distress among Graduate Students of Bangladesh. *Asian Journal of Gambling Issues and Public Health*, 6(11), 1–14.  
<http://doi.org/10.1186/s40405-016-0020-1>

Islam, M. A., & Siddique, S. (2016). Validation of the Bangla Mindful Attention Awareness Scale. *Asian Journal of Psychiatry*, 24, 10–16.  
<http://doi.org/10.1016/j.ajp.2016.08.011>

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, 10(2), 144–156.  
<http://doi.org/10.1093/clipsy/bpg016>

Keating, X. D., Guan, J., Pinero, J. C., & Bridges, D. M. (2005). A meta-analysis of college students' physical activity behaviors. *J Am Coll Health*, 54(2), 116–125.  
<http://doi.org/10.3200/JACH.54.2.116-126>

Klemenc-Ketis, Z., Kersnik, J., Eder, K., & Colaric, D. (2011). Factors associated with health-related quality of life among university students. *Srpski Arhiv Za Celokupno Lekarstvo*, 139(3–4), 197–202. <http://doi.org/10.2298/SARH1104197K>

- Kouzma, N. M., & Kennedy, G. A. (2004). Self-Reported Sources of Stress in Senior High School Students. *Psychological Reports, 94*(1), 314–316.  
<http://doi.org/10.2466/pr0.94.1.314-316>
- Kuyken, W., Orley, J., Power, M., & Herrman, H. (1995). The World Health Organization quality of life assessment (WHOQOL): position paper from the World Health Organization. *Soc Sci Med, 41*(10). Retrieved from  
<http://bib.irb.hr/prikazi-rad?lang=en&rad=341074>
- Lally, J., O’Conghaile, a., Quigley, S., Bainbridge, E., & McDonald, C. (2013). Stigma of mental illness and help-seeking intention in university students. *The Psychiatrist, 37*(8), 253–260. <http://doi.org/10.1192/pb.bp.112.041483>
- Lohr, K. N. (1988). Outcome measurement: concepts and questions. *Inquiry, 37*–50.
- Mann, M., Hosman, C. M. H., Schaalma, H. P., & De Vries, N. K. (2004). Self-esteem in a broad-spectrum approach for mental health promotion. *Health Education Research, 19*(4), 357–372. <http://doi.org/10.1093/her/cyg041>
- Mannan, A. (2017, February 25). Achieving our higher education targets. *The Daily Star*. Dhaka, Bangladesh. Retrieved from <http://www.thedailystar.net/education-employment/achieving-our-higher-education-targets-1366513>
- Marmot, M. (2009). Social determinants of health inequalities. *Lancet, 365*(9464), 1099–1104. [http://doi.org/10.1016/S0140-6736\(05\)71146-6](http://doi.org/10.1016/S0140-6736(05)71146-6)
- Maruish, M. E., & DeRosa, M. A. (2009). *A Guide to the Integration of Certified Short Form Survey Scoring and Data Quality Evaluation Capabilities*. QualityMetric, Incorporated. Retrieved from  
<https://books.google.com.bd/books?id=BWKTPgAACAAJ>

Meiklejohn, J., Phillips, C., Freedman, M. L., Griffin, M. L., Biegel, G., Roach, A., ...

Saltzman, A. (2012). Integrating Mindfulness Training into K-12 Education: Fostering the Resilience of Teachers and Students. *Mindfulness*, 3(4), 291–307. <http://doi.org/10.1007/s12671-012-0094-5>

Mick, E., Faraone, S. V., Spencer, T., Zhang, H. F., & Biederman, J. (2008). Assessing the validity of the quality of life enjoyment and satisfaction questionnaire—short form in adults with ADHD. *Journal of Attention Disorders*, 11(4), 504–509.

Mikolajczyk, R. T., Brzoska, P., Maier, C., Ottova, V., Meier, S., Dudziak, U., ... El Ansari, W. (2008). Factors associated with self-rated health status in university students: a cross-sectional study in three European countries. *BMC Public Health*, 8, 215. <http://doi.org/10.1186/1471-2458-8-215>

Misra, R., McKean, M., West, S., & Russo, T. (2000). Academic stress of college students: Comparison of student and faculty perceptions. *College Student Journal*, 34(2), 236–246.

O'Brien, S., Mattick, R. P., White, J., Breen, C., Kimber, J., Ritter, A., & Lintzeris, N. (2006). Maintenance Pharmacotherapy for Opioid Dependence and SF-36 Health Status: A Comparison With General Population Norms and Other Chronic Disorders. *Addictive Disorders & Their Treatment*, 5(4), 155–164. <http://doi.org/10.1097/01.adt.0000210078.99735.27>

Operario, D., Adler, N. E., & Williams, D. R. (2004). Subjective social status: reliability and predictive utility for global health. *Psychology and Health*, 19(2), 237–246. <http://doi.org/10.1080/08870440310001638098>

Paro, H. B. M. S., Morales, N. M. O., Silva, C. H. M., Rezende, C. H. A., Pinto, R. M.

- C., Morales, R. R., ... Prado, M. M. (2010). Health-related quality of life of medical students. *Medical Education*, *44*(3), 227–235.  
<http://doi.org/10.1111/j.1365-2923.2009.03587.x>
- Pekmezovic, T., Popovic, A., Tepavcevic, D. K., Gazibara, T., & Paunic, M. (2011). Factors associated with health-related quality of life among Belgrade University students. *Quality of Life Research*, *20*(3), 391–7. <http://doi.org/10.1007/s11136-010-9754-x>
- Picci, R. L., Oliva, F., Zuffranieri, M., Vizzuso, P., Ostacoli, L., Sodano, A. J., & Furlan, P. M. (2014). Quality of life, alcohol detoxification and relapse: is quality of life a predictor of relapse or only a secondary outcome measure? *Quality of Life Research : An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, *23*(10), 2757–67. <http://doi.org/10.1007/s11136-014-0735-3>
- Powers, C. B., Wisocki, P. A., & Whitbourne, S. K. (1992). Age-Differences and Correlates of Worrying in Young and Elderly Adults. *Gerontologist*, *32*(1), 82–88.
- Raj, S. R., Simpson, C. S., Hopman, W. M., & Singer, M. A. (2000). Health-related quality of life among final-year medical students. *CMAJ*, *162*(4), 509–510.
- Revicki, D. A., Brandenburg, N., Matza, L., Hornbrook, M. C., & Feeny, D. (2008). Health-related quality of life and utilities in primary-care patients with generalized anxiety disorder. *Quality of Life Research*, *17*(10), 1285.
- Revicki, D. A., Kleinman, L., & Cella, D. (2014). A history of health-related quality of life outcomes in psychiatry. *Dialogues in Clinical Neuroscience*, *16*(2), 127–135.  
<http://doi.org/10.1080/0144287042000208206>
- Ritsner, M., Kurs, R., Gibel, A., Ratner, Y., & Endicott, J. (2005). Validity of an



- abbreviated Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q-18) for schizophrenia, schizoaffective, and mood disorder patients. *Quality of Life Research*, 14(7), 1693–1703. <http://doi.org/10.1007/s11136-005-2816-9>
- Schechter, D., Endicott, J., & Nee, J. (2007). Quality of life of “normal” controls: association with lifetime history of mental illness. *Psychiatry Research*, 152(1), 45–54.
- Services, U. D. of H. and H. (2010). *Health-Related Quality of Life and Well-Being*.
- Simon, R. W., & Barrett, A. E. (2010). Nonmarital romantic relationships and mental health in early adulthood: does the association differ for women and men? *Journal of Health and Social Behavior*, 51(2), 168–182.  
<http://doi.org/10.1177/0022146510372343>
- Sorcar, N. R., & Rahman, A. (1990). Occupational stress, marital status and job satisfaction of working women. *The Dhaka University Studies*, XI(1), 55–61.
- Stallman, H. M., & Kavanagh, D. J. (2016). Development of an Internet Intervention to Promote Wellbeing in College Students. *Australian Psychologist*, 3, 1–8.  
<http://doi.org/10.1111/ap.12246>
- Sultana, N. (2014). Stress and Depression among undergraduate Medical Students of Bangladesh. *Bangladesh Journal of Medical Education*, 2(1), 6–9.  
<http://doi.org/10.3329/bjme.v2i1.18130>
- Ware, J. E. J., Kosinski, M., Turner-Bowker, D. M., & Gandek, B. (2002). *User’s manual for the SF-12v2 Health Survey with a Supplement Documenting SF-12 Health Survey*. Lincoln, RI: QualityMetric Incorporated.

Ware, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Medical Care*, *30*(6), 473–483. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/1593914>

Wechsler, H., Lee, J. E., Kuo, M., & Lee, H. (2000). College Binge Drinking in the 1990s: A Continuing Problem. *Journal of American College Health*, *48*(5), 199–210.

Wilson, I. B., & Cleary, P. D. (1995). Linking clinical variables with health-related quality of life. A conceptual model of patient outcomes. *Jama*, *273*(1), 59–65. <http://doi.org/10.1001/jama.1995.03520250075037>

**Annexure**

Annex A: Ethics Approval Letter

Annex: B License Agreement with QualityMetric











Annex C: Informed consent sheet

Annex D: Demographic, behavioural and lifestyle questionnaire

Annex E: Scales used

*a. SF-12 v 2*

*b. GHQ-12*

*c. Rosenberg Self-esteem Scale*