INTERACTION OF PHYSICAL ACTIVITY, MENTAL HEALTH, HEALTH LOCUS OF CONTROL AND QUALITY OF LIFE: A STUDY ON UNIVERSITY STUDENTS IN PAKISTAN

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ABSTRACT

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Physical activity involvement is considered as beneficial both for physiological and psychological health. In Pakistani society an elevated level of physical inactivity has been identified lately. Nevertheless, studies examining the association between physical activity and psychological health are limited to the young population of university students in Pakistan. University students are considered to be at a risk stage due to academic stress and physiological changes Therefore, the purpose of this study was to explore the associations between physical activity, quality of life and psychological health related variables to university students in Pakistan.

Participants *(N=378)* of the current study were from seven universities in Pakistan (*265 female*, *112 males*). General Health Questionnaire, SF-36 quality of life matrix, multidimensional health locus of control and international physical activity questionnaire were administered.

Results reveal a large number of students as physically inactive (37.6%). t-Test revealed male students were more active and having a better quality of life in comparison to the female. The high prevalence of psychological distress (25%) has also been identified by using correlation. Results indicated a linear positive relationship of physical activity with mental component summary and a negative association with psychological distress. Conversely, psychological distress was negatively related overall health related quality of life and PA. Results also demonstrated that students with a better internal locus of control were discovered to be more physically active. Findings were discussed in comparison with studies from other countries e.g. US, UK, Norway, Poland, Turkey and Australia However, the results suggest the replication of the study with a larger sample size. Additionally, it is also imperative to explore the barriers to PA among the student population in Pakistan.

Keys words: Physical activity, mental health, health locus of control, psychological distress, university students in Pakistan.

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1 INTRODUCTION

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (World Health Organization, 2003). Though, there are many variables related to the health that might have a significant impact on physical and psychological well being of an individual. Some of these variables are Physical activity (PA), mental health, the quality of life and health locus of control (HLOC). These variables are imperative to study in connection to the university students; who are considered to be at the risk age due to the academic stress and rapid physiological changes (Ongori and Agolla, 2009).

1.1 Physical Activity

Physical activity (PA) is termed as movements produced by the body muscles with the expenditure of energy (World Health Organization, 2013). The updated guidelines for physical activity, suggest a vigorous PA for at least 20 minutes, three times a week or a moderate PA for 30 minutes 5 times a week in adults age from 18-65, for a healthy life span (Haskell, Lee, Pate,2007). PA is considered to be vital for maintaining health. Research has revealed PA to be linked with the numerous physical and psychological health advantages specifically in the prevention of cardiovascular disease, certain types of cancer, obesity, hypertension (Center for Disease Control, 1996), depression and anxiety (Abu-Omar, Rutten & Lehtinen, 2004; Bhui and Fletcher, 2000; Farmer, Locke, Mosciki, Dannenberg, Larson & Radloff, 1988; Dunn, Trivedi, O'Neal, 2001; Goodwin, 2003; Haarasilta, Marttunen, Kapiro & Aro, 2004; Lampinen, Heikkinen, Ruoppila, 2000; Motl, Birnbaum, Kubik, Dishman, 2004). Nowadays, the modern technological advancement has made the life easy. It has increased the productivity and efficiency of work but with the reduction of physical activity that is required for a healthy life. Because human body is designed in a way that each skeleton muscle required certain physical movements that can only be attained by physical activity. Due to that, physical inactivity has become a leading contributor for non-communicable disease (WHO, 2010). Andersen, Schnohr, Schroll and Hein (2000) recommended a 20-40% of reduction in deaths with the participation in sports or physical activity. Globally 6-10% of deaths are discovered to be associated physical inactivity. Majority of these deaths are caused by non-communicable disease which is

connected with physical inactivity. It is estimated that the life expectancy could be increased to 0.68 years if the physical inactivity is eradicated (Lee, Shiroma, Lobelo, Puska, Blair & Katzmarzyk, 2012). Thus, it can be stated that physical inactivity has become one of the world's leading problems. According to Hallal, Andersen, Bull, Guthold & Haskell (2012) overall the prevalence of physical inactivity around the world is 31.1%. In Africa, it is estimated as 27.5%, in Southeast Asia as 17.0%, in America it is 43.3%, 34.8% in Europe and 43.2% in Eastern Mediterranean.

In reference to Pakistan, the same study indicated females are less physically active as compared to the males in Pakistan. 30-39.9 % of males and 40-49.9% of females are physically inactive in Pakistan. Moreover, 80-89.9% of adolescent's boys and over 90% of adolescents girls are not accomplishing at least 1 hour of moderate level of physical activity. National Health Survey of Pakistan (1990-1994) illustrated that the expected over weight is 25% among the overall population, while the prevalence of obesity is reported to be 10%. The prevalence of coronary heart disease among the middle aged adults is also quite high, as one in four of adults are suffering from coronary artery disease. Furthermore, quarter of Pakistani adults revealed to have high blood pressure and the burden of breast cancer in Pakistan is highest in the world (Khuwaja & Kadir, 2010).

1.2 Mental Health

The World Health Organization (2013) has defined mental health as a state of one's full mental potentials, not merely the absence of a mental disorder, rather a state in which a person exerts productively, able to stand the stressors and successfully be able to provide contributions to the society. Mental illness has been estimated by 2020 to become a15% of the global burden of disease (Biddle & Mutrie, 2008). Thus, it is increasingly becoming a significant public health problem. Some of the leading mental health problems are depression, anxiety and eating disorders especially among the young individuals (Viner & Booy, 2005). Ayub, Irfan, Naeem and Blackwood (2012) reported the overall prevalence of depression and anxiety in Pakistan as 29%-60% among women and 10%-33% among men. This suggests a very high prevalence of mental illnesses in Pakistan. Moreover, physical activity has identified to be effective in the reduction of depression and anxiety symptoms (Hamer, Stamatakis & Steptoe, 2008; Strohle, 2009; Asztalos, Bourdeaudhuij & Cardon,

2009). However, no study in Pakistan has been detected to assess the association between of physical activity and mental illness.

1.3 Quality of Life

Moreover, the term quality of life was defined as an inclusion of wellbeing and functioning in one's health state .The functioning was characterized by the capability to carry out the daily living, cognitions and physical ability. While the wellbeing was integrated by healthy bodily and emotional states, self-concept and global perception linked with the life satisfaction (Stewart and King, 1991). Pavot (1993) has defined quality of life as a personal satisfaction with one's life, incorporated with conscious cognitive process. Medical research has reinstated the term quality of life by health related quality of life (HRQL) and integrated several categories: physical functioning, emotional well-being, social functioning, and role activities, as well as health perceptions and global assessment of life satisfaction (Shumaker, Anderson, Czajkowski, 1990). There is also an evidence of association of mental health and PA with the quality of life (Sawatzky, Ratner, Johnson, Kopec & Zumbo, 2010).

1.4 Health Locus of Control

In addition, the term locus of control was first coined by Rotter (1954) in social learning theory that refers to the individual's personal belief and perception about the occurrence of an event in his life, either as result of personal control or of the control of outside forces. The comprehensive expectancy that one's own behaviors are responsible for an event in his/ her life is termed as internal locus of control. However, if one's belief and perception about the outcome is on luck, fate, chance or powerful others is named as external locus of control (Rotter, 1966). Within the domain of health, locus of control has termed as health locus of control that refers to the belief in own self in remaining healthy or considering one's health under the influence of external forces like medical professionals, chance, luck, people or powerful others (Wallston, Wallston & DeVelis, 1978; Wallston, 2005).

Research has revealed locus of control to be interrelated with both PA and mental health. Roddenberry and Renk (2010) illustrated the association of locus of control with mental health. Similar findings were pointed out by Karayurt and Dicle (2008) among the Turkish

nursing students and Theofilou (2012) revealed the similar association in patients with chronic kidney disease. Whereas, Steptoe and Wardle (2001) indicated internal locus of control to be positively related to exercise whereas the chance and powerful others locus of control was significantly negatively associated with exercise. Similarly, Menec and Chipperfield (1997) empirically suggested an internal locus of control, exercise and leisure activity participation to be positively related to the improved perceived health and larger satisfaction in life. Moreover, the change in health locus of control with age and relative autonomy has been investigated (Bailis, Segall & Chipperfield, 2010). The sample was derived from a large scale survey in Manitoba. 480 individual were selected randomly from the original sample. The overall results of four years longitudinal study reveals that the internal locus of control belief declined among the older participants especially at the age of 42. The decline in internal locus of control was obvious in midlife when the powerful others and chance health locus of control rose at that age.

To the best knowledge, till date no study has been conducted in Pakistan to explore the interaction of PA with mental health, locus of control and quality of life, especially in reference to the university students in Pakistan.

2 LITERATURE REVIEW

2.1 Mental Health and Physical Activity

Previous literature has been published to highlight the effect of PA on mental health. However the PA or exercise impact on mental health among the student population has received a significantly less attention as compared to the other population. Within the mental health domain, most of the research has been documented in relation to depression (Craft & Landers, 1998; North & McCullagh, 1990; Mutrie, 2000; Larun, Nordhein & Ekeland, 2006). A meta- analysis study has been conducted by Biddle and Asari (2011) to emphasize on the connection between PA depression, anxiety, self-esteem and cognitive functioning among children and adolescents. The study used seven electronic databases (PubMed, SPORTDiscus, PsychINFO,Web of Science, Medline, Cochrane Library and ISI Science Citation Index) until October 2010. Results discovered five review articles pertaining to PA and depression, four on PA and anxiety and two concerning multi mental health issues. In the light of the results of these articles, overall it was suggested that the effect of PA on mental health is obvious. Conversely the evidence is limited due to the small effect size. Thus, the author advocated further research, examining the relationship of PA and mental health. Similarly several other authors also recommended the same (Landers, 2009; Fox, 1999; Biddle, Fox & Boutcher, 2000; Jones & 'Beney, 2004).

In addition, the variability in the intensity of PA was not measured that could have provided significantly different results. In this consideration, Asztalos, Bourdeaudhuij and Cardon (2009) investigated the relationship between different intensities of PA with diverse dimensions of mental health. The Belgian Scientific Institute of Public Health carried out the study. For this purpose, 12107 persons were contacted by taking the help of national registry. It is reported that all types of PA had a positive linear relationship with emotional wellbeing however; a negative linear association has been accounted with depression, anxiety and somatization. Conversely, overall mental health did not significantly correlate with PA specifically for women. Moreover, in men the association between vigorous PA and psychological complaints has been established. Nevertheless, the relationship between walking and moderate PA with emotional wellbeing and psychological complaints has been illustrated. With the reference to the intensity of PA, another study has revealed the

variability of findings. Bouchard, Shephard and Stephens (1994) stated that vigorous PA might have negative effects on mental health in the general population. Similarly, vigorous PA has been described inefficient in the management of anxiety among healthy population (Raglin, Wilson & Galper, 2007). The diversity in the results in consideration to PA intensity and mental health indicates further research to uncover the relationships between different level of PA intensity and mental health related variables.

Moreover, Hamer, Stamatakis and Steptoe (2008) conducted a research in Scotland to identify the dose response relation between PA and mental health. The results illustrated a significant positive relationship of PA and mental health. At least twenty minutes per week of activity was found to be beneficial for mental health. The greater level of PA especially sports has also been illustrated as helpful in the risk reduction. Though the results established a dose-response relation yet there are certain limitations. Firstly, the results cannot be generalized to other countries such as Pakistan due to the cultural variations. Secondly, subjective measure for PA was taken, without using any standardized tool that might have affected the results. Moreover, there could be other psychological factors acting as the mediators' variables i.e locus of control, in mental health-PA relationship. As suggested by Roddenberry and Renk (2010) psychological and physical illness is related to the greater level of external locus of control. A combined interaction of PA, mental health with locus of control and quality of life could be a prolific avenue to examine. Thus, in the current study the researcher intends to explore this association.

Strohle (2008) critically reviewed the literature on PA, exercise, depression and anxiety disorders. It is elucidated that several studies have repeatedly reported the association of PA and depression and anxiety disorders. The confirmation of positive effects of PA on depression and anxiety disorders is growing yet the standard type, intensity, frequency and duration of exercise, required to decrease these disorders is still to be investigated. Moreover, there is a query whether exercise should be used as a therapeutic approach. However, according to this review some of the studies also proposed importance of several psychological factors (a sense of mastery, distraction, self-concept, and self-efficacy) in the therapeutic effect of exercise on depression. One of these psychological factors could be locus of control. Therefore, as enlightened previously the current study is not only focusing

on mental health and PA but also aims to include locus of control as an imperative psychological variable.

2.2 Locus of Control and Physical Activity

The relationship between PA and locus of control is another fruitful avenue. A variability of results has been revealed in the past about the association of PA and locus of control (Steptoe & Wardle, 2001). Some research illustrated PA to be negatively correlated to the external locus of control while positively related to the internal locus of control (Norman & Bennett, 1996; Duffy, 1997; Reeh, Hiebert, Cairns, 1998). Steptoe and Wardle (2001) also confirmed this relationship. Furthermore it has also been indicated that individual with internal locus of control take responsibility of their health, make decisions more independently thus indulged more into the health related behaviors (Norman & Bennett, 1996). On the contrary, from a sample of 13,000 adults in Wales, a weak relationship between internal health locus of control and PA has been revealed (Norman, Bennett, Smith & Murphy, 1997).

Ogińska-Bulik and Osobowość (2008) extended external locus of control into powerful others and chance locus of control because the external locus of control was mostly found to be weakly related to health behaviors. Overall, it can be asserted that most of the studies have been completed with health locus of control and in relation to physical illness; survival after lung transplant, mortality, incidence of chronic conditions, breast cancer, kidney disease (Bailis, Chipperfield, & Perry, 2005; Burker, Evon,Galanko, & Egan, 2005; Lachman & Firth, 2004; Bettencourt, Talley, Molix, Schlegel & Westgate, 2008; Cvengros, Christensen & Lawton, 2005) However, not many health locus of control studies have been conducted in relation to PA in a non clinical population.

In the same regard, Guszkowska and Kuk (2012) documented the gender difference, type of PA and faculty according to the health locus of control among the undergraduates' university students in Poland. The participants were 241 full time students at the faculty of physical education, faculty of tourism and recreation and faculty of physiotherapy. Results reveal no gender difference on internal and powerful others LOC however, a slight difference was observed on chance locus of control. No difference according to the faculty

for internal and powerful others locus of control was detected. Similarly, health locus of control did not predict the type of PA. In this present study the faculty difference might not be very clear because of the fact that all the three faculties generally comes under the health and sports sciences. It is usually presumed that students from health and sports sciences generally are more involved in sports. Besides there were not many faculties included in the study therefore in the current study we have a diverse faculty included to have a broad faculty analysis. In addition, gender difference also has produced the mixed set of results in different studies in relation to locus of control and PA i.e Guszkowska and Kuk (2012) reported no gender difference however a gender difference was observed in locus of control previously (Rotter, 1966; Rubinstein, 2004). Thus, in the current study the research intends to explore the gender difference in relation to LOC as well as the examination of LOC according to different faculties.

Furthermore, health locus of control and different health related variables like exercise, smoking, alcohol intake, breakfast consumption, tooth brushing, seat belt use, fruit consumption, salt intake and fat consumption were investigated in young adults in 18 countries by Steptoe and Wardle (2001). Internal locus of control and four health related behaviors (exercise, fibre intake, avoidance of salt and fat avoidance) were significantly related to each other however chance locus of control was significantly negatively associated with exercise. Powerful others locus of control was also found to be negatively related with exercise. The sample was derived from the European countries and Australia. These countries far or less have same life style and economic conditions. Sample derived from the developing country like Pakistan that is also the collectivistic society, could have shown the appealing results. As in Pakistan, individuals attribute events and happenings on luck, fate and powerful others. Where they usually believe that having disease in merely due to the luck factor. Spector, Sanchez, Siu,Salgado and Ma (2003) also confirmed that people originating from eastern country have more external beliefs than the individuals from US. However, not much work has been completed in developing countries regarding PA and health locus of control. As indicated by Mustaq, Gull, Mushtaq, Shahid, Shad and Akram (2011) the connection between sedentary life styles and PA has been investigated worldwide but not in the developing countries like Pakistan. In the current study, the researcher intends to draw the sample from Pakistan.

2.3 Locus of Control and Mental Health

A previous research has been well documented in the context of locus of control and mental health. Research indicating evidences of association of anxiety symptoms and loss of internal locus of control with greater external locus of control both in the clinical and non-clinical sample of older adults (Hoehn-Saric & McLeod, 1985; Quinn & Norris, 1986; Wilkinson; Chamove, 1992; Alagaratnam, 1984; de Man & Simpson-Housley, 1985; Molinari & Neiderehe,1984± 1985). In a similar line of research, external locus of control is revealed to be associated with actual and perceived stress (Horner, 1996; Abouserie, 1994) and with a greater level of physical and psychological issues (Bollini, Walker, Hamann, & Kestler, 2004). Moreover, external locus of control is associated with more depression in cancer patients (DeBrander, Gerits, & Hellemans, 1997) and college students (Twenge, Zhang & Im, 2004).

The Influences of health status, health locus of control on anxiety in later life has been studied previously (Frazier & Waid, 1999). Results illustrated the influence of external locus of control on anxiety. Internal locus of control found to be related to the less distress. Further, the lesser perception of health was associated with hypochondriacs among the older adults. Evaluating the association between control and mental health in the university student is also of vital importance because of the fact that university period is full of challenges that might play a significant part in the development of distress. As suggested by Arnett (2000) that university students are at the age where they face versatile situations and changes, at the same time also have to face the academic stress. Thus, our research is focused with the university students.

In relative research in university students, Roddenberry and Renk (2010) studied locus of control and self-efficacy as mediators for stress, illness and utilization of health services among university students. Results from one hundred and fifty nine undergraduate university students revealed the relation of both psychological and physical illness with the greater level of external locus of control. Further, the results illustrated higher level of general self-efficacy to be related to lesser illness. Similarly, academic self-efficacy was associated with less symptoms of distress. Similarly, Karayurt and Dicle (2008) explored the relationship among locus of control and mental health status among 262 Turkish

nursing students. Results revealed that increased external locus of control was highly related with the high risk of mental health problems. The relationship between the mental health status and LOC was positively but weak during the first year nursing students however a constant increase has been noticed in the internal locus of control with the year of nursing that also had a positive influence on the mental health status. Both the above studies recruited students mainly from psychology department or from the nursing. The inclusion of students from different faculties might have provided varied results. Therefore, the inquiry is to investigate the interaction of locus of control with mental health from students of diverse faculties.

Additionally, Harrow, Hansford and Astrachan-Fletcher (2009) carried out a fifteen years longitudinal study determining the relationship of locus of control with depression and schizophrenia. The data was originally from the Chicago follow up study for schizophrenia and affective disorders. A significant relation among depression and external LOC was revealed. Patients who were having greater external LOC was found to be more depressed during the follow up period as compared to the patients with greater internal locus of control. In consideration to schizophrenia, the successive period of recovery was followed by the patients, once or more, with more internal locus of control over the interval of fifteen years. The study was conducted only with the clinically diagnosed patients though a question arises here is that how locus of control would be related to mental health among non-clinical population i.e university students.

There is a well documented evidence from literature that there is a strong relationship between external locus of control and Depression, smoking amongst adolescences and university students as well, in many countries (Hale & Cochran, 1987; Petrosky & Birkimer, 1991; Liu, Kurita,Uchiyama, Okawa, Liu, & Ma, 2000; Gomez, 1998; Takakura & Sakihara, 2000; Karayurt & Dicle, 2008). These studies illustrated the association of LOC with mental health, however interaction of other variables i.e PA and quality of life, with mental health and PA is still to be explored. Thus, with the inclusion of these two variables, the researcher might come up with interesting results, especially within the framework of university students. Secondly in reference to Pakistan, no previous study has

demonstrated the relationship of locus of control with PA, mental health and quality of life among the university students.

2.4 Quality of life and Mental Health:

Health related quality of life (HRQL) has been studied for adults reported chronic mental and physical condition. The study was a part of norm development of quality matrix. Participants above the age of, 18 reported if their doctor has diagnosed them with any of 23 chronic medical conditions or with any of 3 chronic mental conditions. Findings revealed the reflection of at least one chronic physical condition in physical component summary. Likewise, the effect of as a minimum of one chronic mental illness was reflected in mental component summary. However, further decline in health related locus of control has been noticed with the co morbid mental condition. The decline in health related locus of control in relation to comorbid mental and physical health conditions was found to be similar for both genders (Bayliss, Rendas-Baum, White, Maruish, Bjorner and Tunis, 2012).

A similar study was conducted by Cook and Harman (2008), where 4833 US adults were asked to describe the burden (how many days within the past 30 days they had inadequate activity because of mental and physical health issues) of chronic conditions in association to physical (back/neck problems, hypertension, diabetes)and mental health. Lesser health days, mean 6.8 was reported by the adults having mental issues in comparison to the adults without those mental health problems. In consideration to physical health, mean unhealthy days were revealed to be 1.0 to 3.6. Nevertheless, HRQL was showed significantly lesser for mental health conditions in comparison to the physical health conditions. In most of the studies the association of quality of life has only been investigated with physical and mental health or discretely with PA and locus of control. So far, no study has been conducted weighting the interaction of all these variables simultaneously.

There is a huge literature determining the connection between locus of control and Depression amongst the adolescences and university students in many countries (Hale & Cochran, 1987: Petrosky & Birkimer, 1991: Liu, 2000; Gomez, 1998; Takakura & Sakihara, 2000; Karayurt & Dicle, 2008). Similarly, the association between locus of control and PA (Steptoe & Wardle, 2001; Norman & Bennett, 1997; Duffy, 1997; Reeh,

Hiebert, Cairns, 1998) has been empirically formulated. Likewise, the impact of PA on mental health has been a prominent area of research since the last few decades (Asztalos, DeBourdeaudhuij & Cardon, 2009; Craft, 1998; North & McCullagh, 1990; Mutrie, 2000; Larun, 2006; Hamer et al, 2008; Khawajah, Qureshi & Azam, 2004; Khuwaja, Lalani, Dhanani, Azam, Rafique & White, 2010). In the same way, the interaction of quality of life with mental health and locus of control is well documented (Bayliss et al, 2012; Cook & Harman, 2008). Though, all these studies illustrate these associations, distinctly whereas a combined interaction of these variables is yet to be explored. Secondly, it is imperative to investigate the association of PA with these variables because previous literature has pointed out a high prevalence of mental and physical illness and sedentary life style in Pakistan (Rab, Mamdou &Nasir, 2008; Ghazala & Khuwaja, 2003; Khuwaja & Kadir, 2010; Yusuf, Reddy, Oˆunpuu, 2001). Therefore, the researcher considers as vital to examine these associations especially within the framework of university students in Pakistan. The population of university students according to Arnett (2000) is at an age facing various situations and changes, whereas at the same time is facing the academic stress. Moreover, the previous literature has focused mainly on the connection with medical illness without the intensions of a collective interaction of these variables among the university students for preventive purpose as well. Furthermore, although the results of the before mentioned studies revealed relationships of variables separately; they cannot be generalized to Pakistan due to the cultural variations. Grob, Little, Wanner and Wearing (1996) suggested that socioculture framework might be the mediating variable for the influential phenomena of perceived control over health. As a result, interaction of physical activity, mental health, health locus of control and quality of life in university students in Pakistan is considered as a prolific avenue to be examined.

3 PURPOSE OF RESEARCH

The purpose of the current study is to explore the relationship between health locus of control, PA, mental health and quality of life. Thus, the answer to the following questions in reference to the university students in Pakistan is seeked; 1) what is the prevalence of PA amongst the university students in Pakistan? 2) Is there any gender difference in accordance to PA, Quality of life, psychological distress and locus of control? 3) How is PA related to mental health, physical health, quality of life and locus of control? 4) What is the prevalence of psychological distress among the students? 5) How mental health, physical health, quality of life and locus of control are related to each other?

On the basis of research questions following hypothesis has been assumed:

1) Individual with internal locus of control would be more physically active as compared to the individuals with external locus of control.
2) Individuals with internal health locus of control belief would have a better mental health as compared to the individuals with external health locus of control.
3) It is assumed that there would be a positive relationship between PA and mental component summary, physical component summary and quality of life.
4) There would an inverse relationship between PA and psychological distress.
5) Male students would be more physically active as compared to the female students in Pakistan.
6) Male would be higher on quality of life and lower on psychological distress.

4 METHODS

4.1 Research Design

Correlational research design was used because the researcher is interested in exploring the combined as well as the separate relationship of psychological distress, quality of life, mental health, physical health, locus of control and physical activity.

4.2 Participants

The total number of participants were 378 Pakistani University students (male =112, female=265) from five universities in Lahore; University of Punjab, Government College University, University of Management & Technology, College of Home Economics and Beacon House National University, one university in Islamabad; NUMAL and one university in Kashmir; University of Azad Jamu & Kashmir.

4.3 Measures

4.3.1 A Demographic Questionnaire was developed to acquire the relevant demographic information of the participants, including gender, age, university year, subject being study, residing with and who is financially supporting their studies.

The age of the participants ranges from 18 years to 48 years, mostly within the age range of 19-24. One hundred and eighty two participants were enrolled in bachelor's degree, one hundred and seventy four were completing Masters and the rest twenty two were PhD scholars. Most of the participants were living with their parents (n=300), in comparison only small number of them were either living alone (n=14), in hostel (n=19), with friends (n=11), with relatives (n=12) or with the spouse (n=15).

4.3.2 General Health Questionnaire-12 (GHQ-12; Goldberg, 1970) measures mental health and it has been used extensively both in the clinical settings and for research purposes. GHQ-12 is derived from originally developed questionnaire GHQ-60 by Goldberg in 1970. GHQ-12 is a 12 items, self-administered scale that yields the current experience of a symptom and behavior specifically of psychological distress, on a four point (0-3) likert scale (less than usual, no more than usual, rather more than usual, or much more than usual)

with the total score of 36. It mainly focuses on the two major areas 1) the inability to carry out normal functions and 2) the appearance of new and distressing phenomena. A score obtained more than 20 on GHQ-12 indicates severe psychological problems and distress.

The psychometric properties of the GHQ-12 have been studied in various countries with different populations (Costa, Barreto, Uchoa, Firma, Lima-Costa & Prince, 2006). Recently, Lopez and Dresch (2008) investigated reliability, external validity and factor structure of GHQ-12 in Spanish population, internal consistency of the scale was found to be 0.76.

4.3.3 SF-36:Quality of Life Matrix (Ware, Snow, Kosinski, & Gandek, 1993) is a health survey comprises of 36 items that are divided into eight subscales; Physical functioning (10), Role limitations due to physical health (4), Role limitations due to emotional problems (3), Vitality (4), Mental health (5), social functioning (2), Body Pain (2) and General health (5). The eight subscales assess the functional health and wellbeing. In a broader index it incorporates the summary of physical and mental health. The subscales are divided into two main categories on the basis of what they assess. Physical health comprises of physical functioning, role physical, body pain and general health, whereas, role emotional, social functioning, mental health and vitality construct the category of mental health. The scale does not target a specific disease rather it measures general health. Most of the SF-36 items have been taken from different instruments that have been used in seventies and eighties (Stewart & Ware, 1992).

All the items are scored on a 0-100 scale, where 100 represent the highest value. The aggregate scores are summed up and average score is computed in all the eight scales. Further their percentage is calculated. For the two main domains; mental health and physical health, the subscales are compute into these categories respectively. Sf-36 has been widely used in the disease studies. Depression, migraine, stroke, spinal injuries, cancer cardiovascular disease, psychiatric diagnosis sleep disorders, arthritis, transplantation are the frequent disease conditions in which Sf-36 has been used (Turner-Bowker, Bartley & Ware, 2002). Furthermore, sf-36 has been used in International Quality of Life Assessment Project (IQOLA) and for that purpose it has been translated to more than 60 different languages for its use in different countries (IQOLA Project). Failde and

Ramos (2000) assessed the validity and reliability of SF-36 and reported the internal consistency as 0.72-0.94. Similarly, in another study, the overall Cronbach's α coefficient of the SF-36 questionnaire was 0.821 while the respective Cronbach's α coefficient for each dimension was > 0.70 (Qu, Guo, Liu, Zhang, & Sun, 2009).

4.3.4 International Physical Activity Questionnaire (IPAQ) short form is a questionnaire assessing the physical activity among the adults comprises of seven questions. The age range for questionnaire administration is from 15-69 years. There are three specific types of exercise that IPAQ assess; vigorous-intensity exercise, moderate-intensity exercise and walking, each includes two questions. The questionnaire is structured in a way that the scores of three domains are computed separated and additionally IPAQ total is also calculated. Item seven measures the sitting duration in a day however the scores for this item are neither computed with IPAQ total nor with any of the three categories. Before scoring, data cleaning is recommended. All the responses in hours should be converted to minutes and any activity reported to be less than 10 minutes should be deleted. Similarly, all the duration more than 180 minutes should be converted to 180 as it is considered to be the rationale maximum time, which can be expected from a person to indulge in physical activity.

The total scores are computed in the form of MET levels. METs are the multiples of the resting metabolic rate. For all the three categories, a different formula is used to calculate the MET levels. The validation and reliability study of IPAQ data was completed in 1998-99. The data was collected using standardized procedures, methods and protocols from different research centers in 12 countries on 6 continents. Generally, repetition of the data was observed and Spearman's correlation coefficient aggregates around 0.8. In general, the IPAQ formed sound psychometric properties (Craig, Marshall, Sjöström, Bauman, Booth, Ainsworth, Pratt, Ekelund, Yngve, Sallis, Oja, 2003). In one study, Kurtze, Rangul and Hustved (2008) suggested IPAQ as a good measure for physical activity**,** as it holds strong and considerable association with VO_{2max}, $r = 0.41$ ($p \leq 0.01$). The three (low, moderate and high) Categorization of PA correlated significantly with VO_{2max} (0.31 $p \leq 0.01$).

4.3.5 Multidimensional Health Locus of Control (MHLC; Wallston, Wallston, & DeVellis, 1978**)** assesses the health locus of belief for individuals on three subscales; internal health

locus of control (e.g.: if I can take care of myself, I can avoid illness), powerful others health locus of control (e.g.: health professionals control my health) and chance locus of control (e.g.: my good health is largely a matter of good fortune). The concept of locus of control originally derived from social learning theory (Rotter, 1966), that holds that a belief about a particular relationship between the outcome and actions (Lefcourt, 1991). The MHLC comprises of 18 questions which are equally divide into three categories. A total score is derived by computing the responses on the 1 to 6 likert scale, where the total score of 23 to 36 on any subscale suggests that the individual has a high inclination towards a particular subscale. Similarly, the score of 15 to 22 and 6 to 14 indicates the moderate and low tendencies on that subscale, respectively. Kuwahara, Nishino, Ohkubo, Tsuji, Hisamichi and Hosokawa (2004) explored the internal consistency of MHLC and revealed within range Cronbachs alpha (.62-.76).

4.4 Procedure

Demographic form was developed to acquire the relevant demographic information of the participants, including gender, age, university year, and subject being study, marital status, residing with and who is financially supporting their studies. Demographic form, GHQ, SF-36, IPAQ and MHLC were compiled together. Participants were approached in different universities, mainly from Government College University Lahore, Beacon House National University Lahore, University of management and technology, University of Punjab, University of Azad Jamu & Kahmir and National University of Modern Languages Islamabad. In all the universities, the questionnaire was administered with the help of the class teachers, in their classroom before or after the lecture. Consent was taken from all the students before administering the questionnaire. A small proportion of the questionnaires are also administered by sending them through the internet to the different universities students or to the students doing internships at the different work place during the summer vocations.

4.5 Data Analysis

Data was analysed by using SPSS. Descriptive statistics was used to describe the frequencies, percentage, mean and standard division. Bi-Variate correlation was employed

to assess the correlation of all the variables. The purpose of using t-Test is to check the gender difference of variables. However, to analyse the faculty difference, the variation of students in relation to financial support and the level of university education was tested through Analysis of Variance. Regression analysis was conducted to check the predictors in the relationships.

5 RESULTS

The analysis was run to ensure the missing values on each variable before running the further analysis. As suggested by George and Mallery (2009), missing values can be replaced if up to 15% of the responses are missing on a variable. In the current data, there were less than 15% of the missing values on each variable. Thus, the method recommended by George and Mallery (2009) to replace the missing values by the median score of the entire subject on that particular continuous variable is adopted.

5.1 Descriptive Statistics

The basic descriptive statistics were calculated for all the variables; mean, standard deviation, frequencies, skewness and kurtosis. The mean is the average value of the distribution, while the standard deviation reveals how much the values are deviating from the mean. Kurtosis measures the peakness or the flatness of the distribution of values on normal distribution, whereas skewness measures how much scores deviate from symmetry around the mean (George and Mallery, 2009). Table 1 presents the descriptive statistics of all variables, that is the total number of participants, mean score, standard deviation, skewness and kurtosis of total score on psychological distress (GHQ), Quality of Life (SF-36), Physical health component summary (PCS) and Mental health component summary (MCS) from SF-36, subscales of Health Locus of Control; Internal Health Locus of Control (Internal LOC), Powerful-Others Locus of Control (Power LOC), Chance Locus of Control (Chance LOC) and the subscales of International Physical Activity Questionnaire (IPAQ) ; Vigorous Physical Activity (P.A Vig), Moderate Physical Activity (P.A Mod) and Walking.

Table 1. *Means, Standard Deviation, Skewness, and Kurtosis Values of the variables (N=378).*

	Mean	S. D	Skewness	Kurtosis	Alpha
Psychological Distress	12.82	4.77	.713	.73	.59
Physical Health	62.94	17.05	-.208	-.546	-
Mental Health	61.22	18.01	-.139	-.52	-
Quality of Life	62.76	17.25	-.064	-.54	.68
Internal LOC	23.95	5.45	-.095	-.127	.68
Powerful-Others LOC	21.58	5.90	.075	-.283	.70
Chance LOC	19.95	5.24	-.205	.217	.61
P.A Vigorous	6.482	1524.39	3.22	12.03	-
P.A Moderate	3.72	886.16	3.4	12.93	-
Walking	3.98	576.82	2.02	4.55	-

The skewness and kurtosis values of most of the items are within the acceptable range of ± 2 that depicts the range of the scores within the normal distribution, except for the values of subscales of International physical activity Questionnaire (IPAQ). The possible explanation for this could be that some of the individual were highly physically active however on the contrary many individuals were not at all active. Secondly, IPAQ manual suggests excluding the individuals from analysis who have zero physical activity but due to the nature of study, it was compulsory to include the sedentary respondents in the analysis.

In addition, all the negative values for skewness in the table suggests that the data is negatively skewed on the normal distribution and majority of the values are lying above the mean value especially in the case of quality of life.

One hundred and forty two respondents are not taking part in any kind of physical activity from the sample of three hundred and seventy eight and their total percentage is 37.6%.

5.2 Group Comparison

Gender Differences of Physical Activity Level and Quality of Life

To compare the gender differences on the different physical activity levels i.e vigorous P.A, Moderate P.A, walking and over all PA, t-Test is conducted. Table 2 points out the results of the t-test that depicts a significant difference in gender on vigorous physical activity t (3.81), p <.01, indicating that women are more involved in vigorous physical activity as compare d to the men. A significant gender difference was also revealed on moderate level of physical activity t (2.63), p <.01. However, unlike vigorous physical activity, more males are involved in moderate level of physical activity as compared to female. Similarly, the significant gender difference on walking is revealed after conducting the t-Test t (2.56), p <.05, It indicates that male students are walking more compared to the female students. Likewise, there is a significant gender difference on overall physical activity as well; Table shows that males are doing more physical activity as compared to the female students t (4.12), p < .0001. Overall the t-test for gender indicates that female are doing more vigorous activity but males are doing more moderate and walking as compared to female. Overall the male students are more physically active than female students.

Table 2. *Results of t-test and Descriptive Statistics for Vigorous, moderate & overall PA and walking by Gender*

	Sex					
	Male		Female			
	M	SD	M	SD	t	df
P.A Vigorous	1.10	1971.86	4.57	1246.70	3.81**	376
P.A Moderate	5.56	1042.08	2.95	801.27	2.63**	376
Walking	5.15	621.94	3.49	550.60	2.56*	376
Overall P.A	2.17	1971.9	1.10	1952.23	4.12***	376

** p < .05, ** p < .01, * **p < .0001*

A significant gender difference on quality of life has been described in table 3, where men reported better scores on quality of life as compared to females *t* (.25), *p*< .01.

Table 3. *Results of t-test and Descriptive Statistics for Quality of life by Gender*

	Sex					
	Male		Female			
	M	SD	M	SD	t	df
Quality of life	63.1	15.0	62.6	18.1	.25**	376

** *p < .01*

5.3 Relationships

Table 4. *Correlation matrix of GHQ, Physical & Mental Health, Health Locus of Control Subscale's and IPAQ subscales.*

		2	3	4	5	6	7	8	9	10	11
1	Psycho Distress	-.27**	-.31**	-.32**	-.05	-.01	.10	-.10*	-.08	-.11*	-.12*
2	Physical Health		.72**	.91**	.06	-.03	-.19**	.10*	-.00	.08	.08
3	Mental Health			.91**	-.00	.033	-.16**	.12*	.04	.11	.12*
4	Quality of Life				.01	-.012	-.19**	.10*	.00	.86	.09
5	Internal LOC					.376**	.31**	.13*	.09	.03	.12*
6	Power LOC						.52**	.06	.05	-.01	.06
7	Chance LOC							.01	-.02	-.80	-.02
8	P.A Vig								.49**	.29**	.90**
9	P.A Mod									.23**	.75**
10	Walking										.52**
11	Overall P.A										

*** p < 0.01, *p<0.05*

The table 4 illustrates the bivariate correlation matrix among all used variables. As it can be seen there is a negative significant relationship between psychological distress with quality of life total score r =-.32, p<.01 and its subscales; mental component summary r=-.31, p<.01 and physical component summary r =-.27, p<.01. Psychological distress also has a negative correlation with all the IPAQ scores and significant negative relation with two of them; Vigorous physical activity r=-.10, p<.05 and walking r=-.113, p<.05. On the other hand, quality of life and its subscales have a significant positive relationship with Vigorous physical activity r =.108, p<.05. Chance health Locus of Control found to be significantly negatively related to both physical health r=-.19, p<.01 and mental health r= -.16, p<.01 and overall quality of life scores r=-.19, p<.01. However Internal Health Locus of control has a significant positive relationship with Vigorous Physical activity r=.13, p<.05 that further indicates that individuals with Internal health LOC are more into taking care of their health by being more physically active.

To examine the differences in all the variables according to demographic like; University degree, subject study, financial support for studies and mother's education, one way Analysis of variance has been performed. Some of the categorical demographic variables showed significant differences on few variables. Here are the results describing the significant difference.

Difference in Subject being studied according to study's Variables

The Subject being studied at the university by the participants in the study was manipulated to analyse the differences among the subject level with psychological distress, quality of life and locus of control by using a one-way between groups analysis of variance. Subjects were divided into five groups; social sciences, pure sciences, management, engineering and arts.

Results from ANOVA indicated a statistically significant group difference at p<.05 level in the scores of psychological distress: $F(4,373) = 3.0$, $p = .018$ was revealed. Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. Post-hoc comparisons using the Scheffe test indicated that the mean score

for management group (M =13.7, SD =4.9) was significantly different from engineering group (M =10.1, SD =5.4).

A significant difference of study subject on the scores quality of life was also found at the $p<.01$ level in the scores of five groups: F (4, 373) = 4.31, p = .002. Interactions of two groups were found to be significantly different from each other on Post Hoc test using Scheffe that indicated the mean score of social science group(M = 64.39, SD =18.56 was significantly different from management group(M = 57.40, SD = 13.24). Whereas, management group (M = 57.40, SD = 13.24) also significantly differs from engineering group (M =73.17, SD =16.77)**.**

A one-way between group analyses of variance explored the impact of internal locus of control on subject being studied. There was a statistically significant difference at the $p<.01$ level in internal locus of control scores for the 5 groups: F (4, 373) = 3.80, p = 0.005. To investigate the precise difference among the groups, Post-hoc test of Multiple comparison is conducted that indicated that the mean score for management group (M = 22.61, SD = 5.33) was significantly different from Arts group (M= 25.89, SD = 5.10).

Table 5. *Analysis of Variance for Subject Study (N=378).*

		M	SD	df	F	Sig	n^2
Psychological Distress	Between Groups	12.8	4.7	4	3.005	.018	.031
	Within Groups			373			
	Total			377			
Quality of Life	Between Groups	62.7	17.2	4	4.310	.002	.044
	Within Groups			373			
	Total			377			
Internal LOC	Between Groups	23.9	5.4	4	3.802	.005	.039
	Within Groups			373			
	Total			377			

***p< 0.01, *p< 0.05*

Financial Support differences according to Physical Activity

Analysis of variance was conducted to reveal the impact of financial support in vigorous physical activity. Participants were into six different groups; financial support by Parents, Financial support by having a part time job, supporting studies by having a full time job, scholarships, loan and others. The results of ANOVA indicates a significant difference at the p<.001 level in the scores of Vigorous Physical activity for the six groups *F*: (5, 372) = 4.21, *p* = .001. Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. Post-hoc comparisons using the Scheffe test indicated that the mean score for scholarship group (*M*= 5.04, *SD* = 7127.63) was significantly different from financial support by parents (*M* = 6.45, *SD* = 1488.03), having a part time job (*M* = 9.10, *SD* = 1595.96), having full time job (*M* = 72.00, *SD* = 2227.68), loan (*M* = 6.10. *SD* = 1137.72) and with group others (*M*= 24, *SD* = 75.89).

Similarly, ANOVA indicates a significant difference at the p<.05 levels in the scores of moderate Physical activity for the six groups *F*: (5,372) = 2.81, *p* = .017. Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. Post-hoc comparisons indicated that the mean score for scholarship group (*M* = 2.52, *SD* =3563.81) was significantly different from financial support by parents (*M* = 3.60 ,*SD* = 869.79), having a part time job (*M* = 4.82 , *SD* = 528.71), having full time job (*M* = 36.00, *SD* = 113.84), loan (*M* = 3.76 , *SD* = 628.19) and with group others (*M*= 5.04 , *SD* = 1359.76).

Table 6. *Analysis of Variance for Financial Support (N=378).*

		M	SD	df	F	Sig	n^2
Vig P.A	Between Groups	6.4	1524.39	5	4.216	.001	.054
	Within Groups			372			
	Total			377			
Mod P.A	Between Groups	3.72	886.16	5	2.812	.017	.036
	Within Groups			372			
	Total			377			

****p< 0.001, *p< 0.05*

Internal Health Locus of Control predicts Physical Activity

Linear regression analysis was used to test if the internal locus of control significantly predicts the Physical activity. The results of the regression points out that internal locus of control explained 55.1% of the variance in physical activity behaviour, *F:*1,376= 6.26, *p*<.05, indicating that internal locus of control significantly predicts physical activity (beta = .128, *p* = .05).

Table 7. *Simple linear regression predicting Physical activity (N =378).*

	B	SE B	β
Internal LOC	55.11	22.02	.128
R2		.128	
R		.016	
F		6.26	

* $p < .05$

6 DISCUSSION

The aim of the study was to investigate the relationship of PA with mental health, locus of control and quality of life among university students in Pakistan. So far to our best knowledge, no study has been conducted in Pakistan assessing these interactions among university students. It was imperative to investigate the association of PA with these variables because previous literature has highlighted that South Asian population originating from the Indian subcontinent suffer higher rates of coronary heart disease than other ethnic groups (Yusuf, Reddy, Ounpuu, 2001). According to the National Health Survey of Pakistan (1990-1994), over weight is expected to be 25% prevalent while the prevalence of obesity is reported to be 10%. Similarly, in consideration to mental health, a very high prevalence of depression and anxiety has been revealed especially in reference to the student population. Rab, Mamdou and Nasir (2008) and Khan, Mehmood, Badshah, Ali and Jamal (2006) indicated 43.7% prevalence of anxiety and 19.5 % of depression among the medical students in Pakistan. Evidence of PA benefits in preventing physical and mental health issues has also been published (Khawajah, Qureshi & Azam, 2004 ; Hamer, Stamatakis & Steptoe, 2009; Biddle, Mavis & Asare, 2011; Hassme, Koivula & Uutela, 2000; Asztalos, Bourdeaudhuij & Cardon, 2000). Though, Williams, Stamatakis, Chandola, Hamer (2011) illustrated South Asian in UK to be highly physically inactive than whites. Simultaneously, it has also been reported that in Pakistan only one fourth of adults engaged in regular PA (Ghazala & Khuwaja, 2003). Khuwaja and Kadir (2010) also confirmed that majority of adults are physically inactive in Pakistan. It was further demonstrated that psychological distress had negative association with PA. Moreover, it has been confirmed previously that academic environment accompanies with various stressors has negative impact on students mental and physical health (Ongori and Agolla, 2009).

Our results in relation to PA are consistent with the previous research (Aslam, Mahmud, Waheed, 2004; Dodani, Mistry, Farooqi, Khwaja, Qureshi & Kazmi, 2004; Khawajah and Kadir, 2010; Samir, Mahmud & Khuwaja, 2011). Aslam, Mahmud, Waheed (2004) reported insufficient PA among the medical students in Pakistan. In one study 64.8 % of the respondents were not taking part in any type of PA (Dodani, Mistry, Farooqi, Khwaja, Qureshi & Kazmi, 2004). Our results illustrate a vast majority of participants

(37.6%) were not taking part in any form of PA (72.8%) of respondents reported having no vigorous PA throughout the past seven days. Almost equally, 69.3% of students did not execute moderate intensity of PA during the last week. Almost half of the students (46.3%) were not walking. This finding indicates that the PA level among the university students in Pakistan is not satisfactory and enormous numbers of them are having a sedentary life style. Their activity level is not accordance to the guidelines provided by WHO for healthy lifestyle; a vigorous PA for at least 20 minutes, three times a week or a moderate PA for 30 minutes 5 times a week in adults age from 18-65 (Haskell, Lee, Pate et al,2007). Khawajah and Kadir (2010) have described a shift of recreational activities from outdoor to watching movies, playing video games and lack of safe play grounds and safe walking tracks as possible reasons for elevated level of physical inactivity.

Moreover, a significant gender difference was also observed in relation to PA in the current study. The overall PA index was significantly higher for male students as compared to the female. This was also consistent with the previous findings as Studies from US, UK, Norway and Australia also reported South Asian females to be less physically active as compared to the white counterparts (Hayes, White, Unwin, Bhopal, Fishcbacher, Harland, Alberti, 2002; Hosper, Deutekom, Stronks, 2008; Falaschetti, Chaudhury, 2006; Hjellset, Ihlebæk, Bjørge, Eriksen, Høstmark, 2011; Pollard& Guell, 2012; Råberg, Kumar, Holmboe-Ottesen & Wandel, 2010). Further, Hallal, Andersen, Bull, Guthold & Haskell (2012) also revealed women in Pakistan are more physically inactive as compared to men. One possible reason for the low activity level among female could be the cultural and traditional norms. Usually, women are not permitted to go out of their house alone and perform the PA i.e jogging and running in parks (Khawajah & Kadir, 2009). In addition, not all the female have access to gym and sports facilities. Besides, these facilities are unaffordable for many of them. One study in Pakistan has also identified lack of cost effective sports facility as one of the barriers to PA (Samir, Mahmud & Khuwaja, 2011). Though, the result indicates that female students reported to be involved in more vigorous PA however male students were walking and doing more moderate level of physical activities. It can be explained in a way that most of the women having vigorous PA might have an access to the gym. Nevertheless, it further indicates a need for future research on barriers to PA among women in Pakistan.

A significant gender difference on quality of life was also observed, male were much higher in quality of life matrix in comparison to the female respondents. Correspondingly, a significant difference in gender on mental component summary and physical component summary was revealed. Men reported to have a better score on mental and physical health summaries. This finding is supported by the previous research that revealed women having poorer scores than men on health related quality of life (Linzer, Spitzer, Kroenke, Williams, Hahn, Brody, deGruy, 1996; Kolotkin, Crosby, Williams, Hartley, Nicol, 2001). One possible reason for this finding could be that women are socially deprived as compared to men in Pakistani society. Munir and Sajid (2010) also illustrated women as being socially underprivileged and under-employed in Pakistan. Male have given more choices in life as compared to the women, who have to live their lives within the limited choices provided by this male dominating society. One study has revealed that women in Pakistan are enormously vulnerable to social radical forces that are extremely in opposition to the socially active position of women in the society (Raza & Murad, 2010). This factor might be making young females emotionally and physically vulnerable. Nevertheless, further research on gender discrimination in Pakistan is needed to explore the real causal factors.

No significant gender difference was observed on any of locus of control scales. Previously, several studies have revealed the same results. In reference to the locus of control, no gender difference was established among the Japanese social workers (Hirokawa, Yagi, Miyata, 2002). In similar, Polish population and students did not significantly differ in locus of control (Guszkowska & Kuk, 2012). Athale, Aldridge, Malcarne, Nakaji & Sadler (2010) also illustrated no gender difference while validating Multidimensional health locus of control scale. No gender difference on locus of control was pointed out in Canadian students as well (Saklofske, Austin, Galloway, Davidson, 2007).

It has been demonstrated by the previous research that PA has an inverse relation with mental distress and positive with physical health (Khawajah, Qureshi & Azam, 2004 ; Hamer, Stamatakis & Steptoe, 2009; Biddle, Mavis & Asare, 2011; Hassme, Koivula & Uutela, 2000; Asztalos, Bourdeaudhuij & Cardon, 2000; Kim , Park, Allegrante, Marks, Ok, Ok- Cho & Garber, 2012) . The same pattern was observed in regard to the mental

health among the university students in Pakistan; where over all PA had a significant positive relation with mental component summary and negative with psychological distress. However, no association between overall PA and physical component summary and quality of life has been detected on current participants. It can be asserted that the general trend for sedentary life style in Pakistani society might be a reason for that, as the results indicate a large percentage (37%) of respondents as inactive. It is also revealed by Samir, Mahmud and Khuwaja (2011) that sedentary life style is increasingly being promoted with the tremendous urbanization and modernization in Pakistan. Thus, it can be concluded that there might be many respondents scoring high on quality of life and physical component summary yet simultaneously are extremely physically inactive.

In consideration to the intensity of PA, vigorous PA displayed a significant positive association with mental health, physical health and quality of life; although a negative relation was revealed with the psychological distress. Though, there is an interesting finding that walking only had a significant interaction with psychological distress and mental health. Further, moderate PA did not correlate with any of them. The previous research has also indicated the variability of results in regards to the intensity of PA and mental health. Bouchard, Shephard and Stephens (1994) stated that vigorous PA might have negative effects on mental health in the general population. Asztalos, Bourdeaudhuij and Cardon (2009) revealed the association of vigorous PA and psychological complaints only in males. Further, the relationship between walking and moderate PA with emotional wellbeing and psychological complaints has been illustrated. Yet at the same time, we cannot neglect the benefits of PA over mental and physical health that somehow has also been verified by our results.

The finding that students with internal health LOC discovered to be more physically active was also supported by the previous research (Steptoe & wardle, 2001; Bailis, Segall, Mahon, Chipperfield & Dunn, 2001; Menec & Chipperfield, 1997). However, our study has shown the conflicting results as the internal health LOC did not significantly explain psychological distress, mental health and quality of life. This finding is inconsistent with the previous results. On the other hand it is interesting to record that chance LOC demonstrated a significant negative relationship with physical component summary, mental

component summary and quality of life. This is consistent with the previous literature (Harrow, Hansford & Strachan-Fletcher, 2009; Roddenberry & Renk, 2010; Frazier & Waid, 1999; Liu et al, 2000; Karayurt & Dicle, 2008). The researcher argues that cultural and religious context is imperative in the influential belief of internal or external health LOC. Pakistani society is a collectivistic religious society where more or less the individual's lives are influenced by the presence of one another. Grob, Little, Wanner and Wearing (1996) also proposed that the perceived control is related to the sociocultural perspective.

Interestingly, one fourth of the students (25%) in the present study revealed to be psychologically distressed. The similar results were presented in prior studies among students in Pakistan (Jadoon, Yaqoob, Raza, Shehzad, Choudhry, 2010; **S**hah**,** Hasan**,** Malik & Sreeramareddy, 2010; Ahmed, Riaz & Ramzan, 2013). Numerous reasons have been identified as a source of psychological distress among students. Firstly, they are physically at the intricate developmental stage that often makes them vulnerable to stress. The physiological changes occurring in their body frequently causes restlessness and fatigue (Liu et al, 2000).In addition, they are at the age of identity exploration that might make them an easy target of psychological distress. Secondly, a very high parental expectation about their grades is extremely stressing for them (Ahmed, Riaz & Ramzan, 2013). Khan, Gulzar and Yahya (2013) have identified financial stressor, inaccessibility to get a suitable life partner and living under strict rules and regulation as a family stressor. A majority of participants (79.3%) in the current study also reported to be living with parents. Pakistani society is moving towards the modernization and youngsters are often striving for their autonomy. Thus, the paramount struggle for individualism could be one of the factors for psychological distress. Several other reasons for psychological distress might be the examination, parental expectation, vastness of syllabus, sleeping problems, concern about future and loneliness (Shah, Hassan, Malik and Sreeramareddy, 2010).

Further, psychological distress has found to be negatively related to mental component summary, physical component summary, overall health related quality of life and PA. This finding is also in the line of prior research results (Roddenberry & Renk, 2010).

Faculty in comparison to Psychological Distress, Quality of Life and Locus of Control:

Another interesting finding is that management students significantly differ in psychological distress, quality of life and internal LOC from other faculties. Management students were significantly higher on psychological distress in comparison to the engineering students. This result is in agreement to the recent research that indicates 76.6 % of management students reported to have stress (Ahmed, Riaz & Ramzan, 2013). Simultaneously, management students scored lower in quality of life than social sciences and engineering graduates. In addition, they were also considerably lower in internal LOC against the Arts students. The reason could be the fact that there is an extremely tough competition in job hiring among the management field in Pakistan as compared to the engineers. This reason is supported by Ahmed, Riaz and Ramzan (2013) that uncertainty about getting a job in future is a reason of stress among 58% of management students in Pakistan. Unlike the faculty of Social Sciences and Arts, most of the respondents from the faculty of engineering and management were the males, who in our society are considered to bear the financial burden for the family after completing their education. On the other hand, there is no social pressure on female to seek a job as majority of them end up as house wives. Sadaqat and Sheikh (2011) confirmed that a minor percentage of women are employed in Pakistan. Moreover, that factor might have a considerable part in elevating psychological distress and belief in external control among the management students.

Financial Support in comparison to PA:

Students obtaining scholarship were significantly lower in both moderate and vigorous PA than the students whose parents were financially supporting them or they were supporting themselves by having a full time or part time employment. It explains that to maintain a minimum standards or CGPA, defined by the scholarship awarding institute to retain the scholarship, students on scholarship mainly focus on their goals. So they might have priority of goals over social events or sports based activities. Daley and Jasonryan (2000) also have revealed a small negative relationship between participation in sports activities and scores in English and science subjects at the school level. Nevertheless, many of the studies have shown a positive association between academic performance and participation in sports (Trudeau & Shephard, 2008; Fox, Barr-Anderson, Naumark-Sztainer & Wall,

2010; Coe, Pivarnik, Womack, Reeves & Malina, 2006). Yet, some researchers also have advocated the fact that this relation needs further research (Taras, 2009). Further research is also required because significant evidence is lacking about the association of scholarship achievement and participation in extracurricular activities. Moreover, it is also difficult to generalize previous findings to Pakistan, where the academic curriculum and structure is mostly based on a non-creative cramming mode.

6.1 Limitations and future research suggestions

The current research has several limitations. First due to the time strains, purposive sampling technique was used. Thus, a large number of the sample was derived from Social Science Faculties. That has disturbed the equal representation of male and female as most of the students in Social Science Faculties were female. Secondly, an equal number of students from each university degree were not derived. Thirdly, the use of self-reported questionnaire might have an impact on results. It is suggested that in future, an equal representation of gender, university degree and faculty should be derived. As some of the results were not in the line of previous literature, thus there is a need for the repetition of study with fewer variables to confirm these associations in university students in Pakistan. Furthermore, research is required to explore the physical activity in reference to demographic data. It is also suggested to investigate barriers to physical activity among the different groups in Pakistani society.

6.2 Conclusion

University students in Pakistan are having inadequate physical activity level with elevated prevalence of psychological distress. Female students are more physically inactive and having a poorer quality of life in comparison to the male students. To the researcher's best knowledge, this research is the first study revealing the association of psychological distress, quality of life and locus of control with physical activity among the university students in Pakistan. The results of current study are priceless in addressing inadequate level of physical activity as a crucial health issue among the youth in Pakistani society. Results of current study, also suggest the universities authorities to provide students with sports facilities such as gym, sports court, group exercises etc. It is also important to

include the physical education as a compulsory subject since the school level in order to develop student's habits towards exercise. Further, universities can design their syllabus with at least one compulsory course of physical activity in each semester.

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APPENDIX

Consent Form

I am a student of European Masters in Sports and Exercise Psychology in Finland. I am conducting a study on the interaction of physical activity, health locus of control, mental health and quality of life among the university students in Pakistan. In this regard, I need your help through participating in my study by filling up this form. You do not need to mention your name. The entire information gathering by this form is solely for the research purposes and your information would remain confidential. You can withdraw from research at any point. The participation in this research is on the volunteering basis.

Thanks for participating in this study.

I agree to participate in this research without any pressure……

Researcher

Bazila Akbar Khan

University of Jyvaskyla

Finland

Questionnaire for Reseach

Gender: Male: …….. Female: ……	Age: ……..
Nationality:	
Family status: Single: ……. Married: …….. Divorced: …….. Widow: ……. Other: …….	Year of university study Bachelor: …… Master: ……... PhD : ……...
Study Subject:	Who supports your study financially: Parents: …….. Part time job: …….. Scholarship: …… Loan: ……. Full-time job: …… Other: ……..
With whom are you living: Parents: …….. Alone: …….. Sharing: …….. Relatives: …… Friend: …….. Spouse/girl friend/boy friend: …….. Hostel: ……. Other …….	Area of residence:

How do you feel? Please tick the appropriate answer (X)	More than usual	As usual	Less than usual	Much less than usual
1. Have you felt tense during the past weeks?				
2. Have you had problems with your sleep during the past weeks				
3. Have you been able to concentrate on what you have been doing during the past weeks?				
4. Do you feel that you have been useful during the past weeks				

5. Have you been able to make decisions in different areas during the past weeks?				
6. Have you during the past weeks been able to appreciate what you have been doing during the days?				
7. Have you been able to deal with your problems during the past weeks?				
8. Generally speaking, have you felt happy during the past weeks				
How do you feel? Please tick the appropriate answer (X)	Not at all	No more than usual	More than usual	Much more than usual
9. Have you felt unable to deal with your own personal problems during the past weeks? 1&2				
10. Have you felt unhappy and depressed during the past weeks				
11. Have you lost faith in yourself during the past weeks?				
12. Have you felt worthless during the past weeks?				

Please tick the appropriate answer (X)				
1. In general, would you say your health is				
Excellent	Very Good	Good	Fair	Poor
2. Compared to one year ago, how would you rate your health in general now?				
Much better than a year ago	Somewhat better now than a year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?	Yes, limited a lot	Yes, limited a little	No, not limited at all
a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.			
b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf?			
c. Lifting or carrying groceries.			
d. Climbing several flights of stairs.			
e. Climbing one flight of stairs.			
f. Bending, kneeling or stooping.			
g. Walking more than one mile.			
h. Walking several blocks.			
i. Walking one block.			

j. Bathing or dressing yourself.			

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?	Yes	No
a. Cut down the amount of time you spent on work or other activities?		
b. Accomplished less than you would like?		
c. Were limited in the kind of work or other activities		
d. Had difficulty performing the work or other activities (for example, it took extra time)		
5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?	Yes	No
a. Cut down the amount of time you spent on work or other activities?		
b. Accomplished less than you would like		
c. Didn't do work or other activities as carefully as usual		

Please mark X in front of appropriate answer	Not at all	Slightly	Moderately	Quite a bit	Extremely
6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?					

7. How much bodily pain have you had during the past 4 weeks?					
8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?					

For each question, please give the one answer that comes closest to the way you have been feeling.						
9. These questions are about how you feel and how things have been with you during the past 4 weeks. How much of the time during the past 4weeks.	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
a. did you feel full of energy?						
b. have you been a very nervous person?						
c. have you felt so down in the dumps nothing						

could cheer you up?						
d. have you felt calm and peaceful?						
e. did you have a lot of energy?						
f. have you felt downheart ed and blue?						
g. did you feel worn out?						
h. have you been a happy person?						
i. did you feel tire?						
10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?						

11. How TRUE or FALSE is each of the following statements for you?	Definitely True	Mostly true	Don't know	Mostly False	Definitively False
a. I seem to get sick a little easier than other people					
b. I am as healthy as anybody I know					
c. I expect my health to get worse					
d. My health is excellent					

1=STRONGLY DISAGREE **(SD)** 2=MODERATELY DISAGREE **(MD)** 3=SLIGHTLY DISAGREE **(D)**	4=SLIGHTLY AGREE **(A)** 5=MODERATELY AGREE **(MA)** 6=STRONGLY AGREE **(SA)**

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?	
----------Days per week	No vigorous activities (Skip to question 3)
2. How much time did you usually spend doing vigorous physical activities on one of	

those days?		
------- hours per day	----------minutes per day	--------Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.	
----------Days per week	No moderate physical activities (*Skip to question 5)*

4. How much time did you usually spend doing moderate physical activities on one of those days?		
------- hours per day	----------minutes per day	--------Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure

5. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?	
----------Days per week	---------No walking (*Skip to question 7)*

6. How much time did you usually spend walking on one of those days?		
------- hours per day	----------minutes per day	--------Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the last 7 days, how much time did you spend sitting on a week day?		
------- hours per day	----------minutes per day	--------Don't know/Not sure

This is the end of the questionnaire, thank you for participating.