



Psychological Well-Being (PWB) of School Adolescents Aged 12-18 yr, its Correlation with General Levels of Physical Activity (PA) and Socio-Demographic Factors In Gilgit, Pakistan

**Yasmin KHAN¹, Muhammad Hussain TAGHDISI¹, Keramat NOURIJELYANI²*

1. School of Public Health, Tebran University of Medical Sciences, Tebran, Iran
2. Iran University of Medical Sciences, Tebran, Iran

***Corresponding Author:** Email: yasmin.khan.tums@hotmail.com

(Received 10 Sep 2014; accepted 21 Mar 2015)

Abstract

Background: Adolescence is a critical developmental stage marked by complex transitions. The purpose of study was to assess school adolescents' PWB, examine the relationship of PA and socio-demographic factors with PWB.

Methods: A cross sectional study conducted in five randomly selected schools with 345 adolescents (aged 12-18) from grade 6th-10th. A self-administered Well-Being index was adapted to measure PWB and questionnaire for adolescents PA (PAQ-A). Socio-demographic variables determined: age, gender, household income and parental education. Bivariate and multivariate regression analyses performed to examine the association between PWB, PA and covariates.

Results: Findings indicated the mean age 14.64 (SD=1.275), 55.4% were female. Without gender difference the majority (43.4%) of adolescents showed moderate, while (23.2%) revealed low level of PWB. Participants with low level likely to have depression but scores were significantly not different between low, moderate and high PWB with PA. Socio-demographic trends of adolescents' were observed significant ($P < 0.005$) for PWB. In multivariable analysis the mean wellbeing in females adjusted for other covariates was significant ($P = 0.004$) than males. PWB importantly ($P < 0.001$) decreased by 3.36 units as its covariates increased and PA score in boys found 0.05 unit more than girls.

Conclusion: The study results are invaluable in addressing low, moderate and high levels of PWB. Inadequate PA and PWB decreasing with some socio-demographic covariates is crucial health issue among female adolescents in Pakistan. Further studies need to find barrier, social indicators of PWB and implication of health among adolescents.

Keywords: Adolescents, Students, Psychological well-being, Health, Physical activity

Introduction

Historically, wellbeing research has largely focused on adults in developed countries (1). There has been little research on the self-reported (i.e., subjective) wellbeing of children and or adolescents, particularly in developing countries (2). Similarly, there has been minuscule research, which focuses comparisons of subjective wellbeing among different adolescent groups (e.g., gender, age, ethnicity, parental education, economic status and physical activity etc.) There are an estimated 1.2 billion

young people aged 10-19 in the world, comprising the largest generation of adolescents in history (3). Approximately 70 percent of these young people live in developing countries where complex economic, social, political and environmental contexts create a wide range of challenges for adolescents to surmount as they journey to adulthood. Many of these disadvantaged adolescents have few personal resources and little social support to confront the conditions that propagate poverty, inequi-

ty, and gender discrimination. Data indicate that more than half of all youth live in poverty worldwide (4).

WHO estimates that approximately one in five young people under the age of 18 experiences some form of developmental, emotional or behavioral problem, and one in eight experiences a mental disorder (5), International studies show that youth physical activity has decreased over time (6-8), it is responsible for 6% of deaths globally – around 3.2 million deaths per year, including 2.6 million in low- and middle income countries (9). Consequently children and adolescents belonging to different socioeconomic, demographic groups are thought to be more “vulnerable” for disparities that will impact their health and well-being (10). Also mental illness has been estimated by 2020 to become a 15% of the global burden of disease (11). 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 (12, 13).

From a broad perspective, the measurement and promotion of adolescent well-being is a desirable social and political objective (14, 15). Psychological wellbeing of adolescents means being content with life and understanding an abundance of positive emotions, when joined with the absence of psychopathology, is linked with greatest academic function, social skills and support and physical health, being a stage that lays strong foundation for future personality, and a critical period during human development in which life goals, values, direction and purpose in life are created (16, 17), guaranteeing psychological wellbeing of adolescents is a socio psychological necessity. A growing number of longitudinal studies confirm the power of well-being scales to predict outcomes, for example, longevity, physical health, quality of life, criminality, drug and alcohol use, employment, earnings and pro-social behavior (e.g. volunteering) (WHO,2009). Moreover, given the ever evading nature of complexities typical to their phase of development, researches into factors contributing to adolescent psychological well-being was always intimidating task for scientific

community. For any genuine approach for ensuring psychological well-being of a group, exploration into demographic correlates and predictors of psychological well-being by tracing the environmental, physiological or neurological underpinnings is not sufficient (18). Psychological distress is something strongly correlated with physical morbidity, reduced quality and duration of life and increased use of health service (19). At the same time, there is no guarantee that both psychological well-being and psychological distress will not occur together in a personality. According to one study positive psychological factors may have such a strong relationship with health as negative ones and extend to which these psychological states are independent of each other may vary according to the external and internal environmental challenges people face and researches will need to make choices about the value of measuring both (18). However, no particular study in Pakistan has been noticed to assess the association between general levels of physical activity and (WHO-five) psychological wellbeing in adolescents. Lifestyle, including physical activity is considered as one of the major determinants of health in a population (19), although strategies to increase physical activity are being developed (20, 21), and regularly physical activity is well documented to increase physical (22, 23), as well as mental health (24, 25). The concept of adolescence as a distinct period of human development is still fairly new in Pakistan. The Pakistan Population Association reports that 65% of Pakistani households contain one or more adolescents (26). Among adolescents, physical activity is associated with benefits in the prevention and control of emotional distress, and improvement of self-esteem (27).

The purpose of this research is to provide a broad picture of the psychological well-being of school adolescents and its relationship with general levels of physical activity and socio-demographic factors. The study analyses have evaluated the degree of co-existence of demographic factors, and to determine any gender, age, grade, physical activity specific differences in psychological wellbeing among School adolescents in Gilgit, Pakistan.

Methods

Research Design

A population-based cross-sectional quantitative correlational (descriptive and analytic) research design employed in this study to examine to understand if there is significant relationship between the psychological well-being, physical activity and socio-demographic factors carried out using a self-administered questionnaire.

The study was approved by the research ethical committee of Tehran University of Medical sciences in 2013.

Site and Population

It was conducted in five private schools of Gilgit city. Gilgit is the one of district and capital city of Gilgit-Baltistan province of Pakistan comprising of mixture of all major ethnic groups (Sheena, Burushaski, Khuwar and Wakhee). These schools have English medium coeducation system. To determine the sample size, the subjects of sample size of three hundred and forty five [n=345] was drawn for school adolescent (aged 12-18), among them, one hundred and ninety one (n = 191) were girls and one hundred and fifty four (n = 154) boys, mean age was 14.64 year.

Sampling

The probability simple random sampling method was applied to select the five schools from the list of 47 schools. The participation adolescents was voluntary from the class 6th to 10th and participant were from a five computerized randomly selected school were given chance to participate in survey from the list of 47 schools. The response rate was 99% except those students who were absent; completed the questionnaire in their classrooms at school timings in the presence of class teacher and guidance of researcher.

Research Tools and data collection

A tool, compromising of 2 frequently used and reliable questionnaires, was redesigned by the conductor of this study. The validity was confirmed by face validity and content validity. A pi-

lot study was conducted in a school with in same city and the questionnaires were given to 25 adolescents that were similar to the study participants in terms of all characteristics. Data used in the thesis is based on self-reported data from the questionnaire and consisted of three sections (A) socio-demographic part along with (B) well-being (WHO five index) and (C) physical activity questionnaire for adolescents (PAQ-A). The (WHO-five index) captures emotional, psychological well-being and was developed from the World Health Organization-Ten Well-Being Index (28). It was conceptualized as a one-dimensional measure that contains five positively worded items: "I have felt cheerful and in good spirits;" "I have felt calm and relaxed;" "I have felt active and vigorous;" "I woke up feeling fresh and rested;" and "My daily life has been filled with things that interest me."

The degree to which the aforementioned positive feelings were present in the last 2 weeks is scored on a 6-point Likert scale ranging from 0 (not present) to 5 (constantly present). The raw scores are transformed to a score from 0 (worst thinkable well-being) to 100 (best thinkable well-being). A score <50 suggests poor emotional well-being and is a sign for further testing. A score ≤ 28 is indicative of depression (29). In the present study ≤ 28 was for likely depression, ≤ 50 was for low mood or low level of emotional well-being in categorical is [0], it comes between 50th and 75th percentile was show moderate/medium and >75th [2] was show high level of well-being [3]. The PAQ-A was used to measure general levels of physical activity in adolescents. The PAQ-A was self-administer it provides last seven days summary of physical activity score derived from eight items, each scored on a 5-point scale (30). A score of 1 indicates low physical activity, whereas a score of 5 indicates high physical activity. A socio-demographic details and informed consent form page preceded the initial questionnaire.

Statistical Analysis

Descriptive

The data were analyzed using Statistical Package for Social Sciences (SPSS) 21 for Windows (SPSS,

Inc., Chicago, IL, USA). Prior to data entry, all forms were checked for completeness and consistency as well as coding of open ended responses. Descriptive statistics (including means and standard deviations,) were calculated for all scales and subscales. Frequencies and percentages were computed for categorical scores.

Analytical

Associations between well-being and socio-demographic variables were investigated in regression models and linear regression, with well-being as the dependent variable and socio-demographic variables as independents. The bivariate analysis Mann-Whitney is nonparametric test for two groups, Kruskal-Wallis test was used to compare three or more samples and Spearman's rank correlation coefficients (rho) were calculated for correlations of PWB (Score-A) and PA (PAQ-Score). While multi and bivariate regression model was

used to estimate correlation with other predictors. Multivariate analysis were used after adjusted ($R^2 = 0.15$) to control the effect of the other confounders and multiple comparisons were performed to compare participants' PWB with different classes using Bonferroni method, while this opportunity is not possible in bivariate analysis.

Results

Descriptive

A total of 345 adolescents were participated, the mean age of adolescents was 14.64 (SD=1.275) years; 55.4% were female and without gender differences that the majority (43.4%) of adolescents were shown moderate level of PWB, (33.3%) high while (23.2%) participants were revealed low level of PWB and were likely to have depression (Table 1).

Table 1: Descriptive statistics for participants PA score and standardized scores of (WHO-5) PWB

Main Variables	N	Minimum	Maximum	Mean	Std. Deviation
Physical Activity Score	345	1.02	4.66	2.0867	1.04139
Standardized Scores Of (WHO-five)Wellbeing	345	28.00	100.00	69.9594	14.91404

This study estimated the mean score of PWB ($m=69.96$) for adolescents, was observed moderate with standard deviation ($SD=14.914$) but the maximum score was 100 complete high and minimum PWB was 28.00 found in some of the adolescents, it indicates depression. While the mean general level of PA was found ($m=2.087$) with standard deviation ($SD=1.041$)

Socio-demographics variables examined for group differences on the PWB measures as well as for the general levels of PA (PAQ-A) among voluntarily participated school adolescents. General levels of PA were also observed on the PWB.

The mean of high PWB ($m=85.1765$), among class 6th was higher than other classes with standard deviation ($SD=11.38110$) and (CI=95%) confidence interval, although the mean PWB ($m=66.7755$) of class 6th was moderate with ($SD= 15.36265$). Almost for all the demographic

variables the mean PWB was remained moderate but shows distribution of sample according to PA score in relation to the gender, is showing that the mean PA ($m=2.1117$) with ($SD=1.020275$) was higher in male school adolescents than the mean level of PA ($m=2.0666$) with ($SD=1.05998$) among females in the present investigation.

The below Table 2 in present study found that PWB score in categories (1-low, 2-moderate and 3-high) a PWB was low in ($n=80$) participants and the mean PA ($m=2.108$) with standard deviation ($SD= 1.00758$) was moderate among subjects with low PWB its shows depression or low mood, while participants ($n=115$) were have high categorical PWB [3] found with moderate level of mean PA ($m=2.0515$) with Standard deviation ($SD= .97959$). This study finds that PA didn't have any big difference in participants with high and low PWB.

Table 2: Descriptive for PWB in categorical and general level of PA as a continuous variable

score –A cat	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
1.00	80	2.1080	1.00758	.11265	1.8838	2.3322
2.00	150	2.1024	1.10900	.09055	1.9235	2.2813
3.00	115	2.0515	.97959	.09135	1.8705	2.2324
Total	345	2.0867	1.04139	.05607	1.9764	2.1970

Analytical

By Spearman's, PWB (score A) of adolescents and general levels of PA (PAQ_score) the correlation coefficient = 0.36 was attainable value (b/w 0-1) but the association was not significant ($P = 0.511$) figures are mentioned in the Table 3. But according to literature many studies reported the strong relation between individuals' PWB and PA however for this study it didn't showed. Secondly as pre-

sented in Table 4 it's also demonstrated the associations between measured covariates and Standardized Scores of PWB along with their corresponding P-value in the bivariate a total score was significantly correlated with gender and class as stated school adolescent boys aged 12 to 18 (14.1%) were have high mean PWB ($m=71.74$) than the mean of PWB ($m=68.5$) among girls (15.4%).

Table 3: The Spearman's rho correlation between PAQ-Score and Score-A

Variables		PAQ_score	Score_A
Spearman's rho	PAQ_score	Correlation Coefficient	1.000
		Sig. (2-tailed)	.511
		N	345
Score_A	Score_A	Correlation Coefficient	.036
		Sig. (2-tailed)	.511
		N	345

Table 4: The bivariate analysis of the association between some measured covariates and standardized scores of (WHO-five) PWB in school adolescents

Independent Variable	Categories	Mean Of WHO Wellbeing	Type Of Test	P Value	N
Gender	Boys	71.74 (14.1)	Mann-Whitney	0.046	345
	Girls	68.5 (15.4)			
Class	6th class	85.1765 (11.38)	Kruskal-Wallis	0.0001	345
	7th class	66.9091 (13.5)			
	8th class	68.6437 (12.5)			
	9th class	71.9008 (15.38)			
	10th class	66.7755 (15.36)			
Last Grade	A+, A grade	72.3662 (13.3)	Kruskal-Wallis	0.16	345
	B grade	68.1185 (15.8)			
	C grade	68.4364 (15.5)			
	D grade	67.2727 (17.69)			
	E grade	80. (0)			
Language	Urdu	67.6923 (22.88)	Kruskal-Wallis	0.92	345
	Sheena	68.8850 (15.1)			
	Burshashki	70.2250 (14.78)			
	Khuwar	71.8710 (13.99)			
	Wakhe	71.5385 (11.93)			
	Pashto	74 (8.48)			

There was positive correlation between two factors PWB and gender it was statistically significant at ($P = 0.046$). In the Kruskal-Wallis test, was found strong indirect important association between PWB and classes of the participant with ($P = 0.0001$). But it wasn't found any major association among last grade, language with PWB ($P = 0.92$).

As mentioned in Table 5 multivariate analyses with 95% Confidence Interval the relationship between participants' PWB and gender was also significant ($P > t = 0.004$) where $t = -2.87$, where girls participants WPB were (Coef. = -4.600939 units)

less the boys. The PWB was found significant relationship with age of the participants ($P > t = 0.000$) the PWB was decreasing (Coef. = 3.366921 unit) with the increases in age. The association was strongly significant for PWB of school adolescents to their classes* ($P > t = 0.000$, $P > t = 0.000$, $P > t = 0.001$) as class were increasing WPB was decreasing. The PWB of class 7th adolescents was 17.7063 units less than class 6th. Last grade ($P > t = 0.015$), father education ($P > t = 0.028$) with $t = 2.21$ and number of family members ($P > t = 0.000$) were found strong important association with PWB.

Table 5: Multivariable analysis for psychological wellbeing (Adjusted R²=0.15) with some socio-demographic covariate gender, age, class, last grade, father education and family member

score_a	Base line	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
Gender		-4.600939	1.604152	-2.87	0.004	-7.756523	-1.445354
Age		-3.366921	.875044	-3.85	0.000*	-5.08825	-1.645591
Class	6th class						
7th class		-17.7063	4.529706	-3.91	0.000*	-26.61684	-8.795752
8th class		-15.3706	4.105548	-3.74	0.000*	-23.44677	-7.29443
9th class		-10.76151	4.204838	-2.56	0.011	-19.03299	-2.490023
10th class		-9.073389	4.651094	-1.95	0.052	-18.22272	.0759423
Last grade	a+, a grade						
b grade		-4.322298	1.760091	-2.46	0.015*	-7.784635	-.8599619
c grade		-4.266675	2.486673	-1.72	0.087	-9.158297	.6249477
d grade		-4.010743	4.526206	-0.89	0.376	-12.9144	4.892915
e grades		5.787928	9.840512	0.59	0.557	-13.56969	25.14554
Father education	No	4.872766	2.207146	2.21	0.028*	.5310117	9.21452
No. of Family members		-4.966108	.2303657	-2.16	0.032	-.9497713	-.0434504
_cons		139.8899	12.39569	11.29	0.000	115.5059	164.2739

Some Other results to take note of were, first the mean of PA score in boys were 0.05 more than girls, although this difference was not statistically different while the mean of PA score in students with different class was significantly different from each other, the association by Kruskal-Wallis was statistically significant ($P = 0.0034$). This study also found fathers education ($P = 0.03$) and mothers education ($P = 0.025$) important for AP.

In conclusion our study demonstrated that, school adolescents' PWB by with participants' general

levels of PA wasn't correlated but at the same time the result shows PWB was significantly associated with some important socio-demographic covariate, especially a strong association was observed with gender, age, class, parents education, parents with types of jobs and family members.

Discussion

The purpose of the current study was to provide a quantitative assessment for the relationship

among some measures of school adolescent PWB for both PA and socio-demographic factors. Another purpose was to understand the association was to comprehend the general levels of PA between boys and girls and to recognize, if there is an association of PA to a specific gender for this age group.

Moreover this research project aim was to extend the research on this current topic to understand the association in a Pakistani context. To investigator's knowledge, this is the first study which applied (WHO-five) PWB and relating to the relationship of these variables in north of Pakistan. According to the National Health Survey of Pakistan (1990-1994) consideration to mental health, very high prevalence of depression and anxiety has been revealed especially in reference to the student population (31). While two other studies indicated 43.7% prevalence of anxiety and 19.5 % of depression among the medical students in Pakistan (32). This research found 23.2% school students with low PWB which indicates depression or low mood while 43.5% participants with moderate PWB and 33.3% with high. The moderate mean PA ($m=2.0515$) with Standard deviation ($SD=.97959$) this study find that PA didn't have any big difference in participant with high and low PWB, it doesn't showed any statistical significance between PA and PWB of school students. 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 (33-35). While this research analysis composite the relationship between PWB and PA was attainable values 0-1 but correlation between these two variables was not significant ($P > .05$), thus indicating that PWB has a moderate negative association according to the study. whereas PWB and PA had a strong significant association with some of demographic variable including gender, age, class, father's educational status, number of family members and with last month illness. The negative association between PWB and PA suggests that as PWB scores raise but PA scores decreases even though the two variables were not significantly correlated

which may be due to other factors but it wasn't sure.

In other study they find consideration to the intensity of 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 (36). This study therefore could not make hypothesis that; PWB would significantly correlate with PA, and approves of the null hypothesis. Much of the recent research has consistently found that PA has a positive correlation with PWB (37, 38). In another study they found more than 60% of adolescents with mood disorders and 40% of those with anxiety disorders reported low levels of PA. These numbers correspond with other findings of low levels of PA in adults and adolescents with depression and anxiety (39, 40).

This research project has backed up and is consistent, to a certain extent, with previous literature on the topic. Nevertheless some research conducted on PA and PWB has led to contrasted conclusions relating to research has consistently found that PA has a positive correlation with PWB and mood (41).

One study reported 9 of their 11 studies reporting a negative association of PA with depression. Even though the association in this study was negative but it was still a considerable one (42), this result is similar to other findings related to PWB, for instance some researcher found a small effect size with PA and anxiety, a symptom of negative PWB and also found a small effect of exercise on WB, a relation of PWB, in a nonclinical population (43, 44). High percentage of female medical students reported feelings of anxiety and depression 43.7% and 19.5% respectively(45), the present research demonstrates 15.4 % females population have moderate level of mean PWB while 14.1% male school adolescent were have high mean PWB.

The third hypothesis of the present research indicated that males would have a higher Participation in PA than females would. The result was one of significance, leading to association between the two variables and the reason important gender difference was also observed in relation to physi-

cal activity in the in the literature. The overall PA index was significantly higher for male students as compared to the female. The gender, was showing among adolescents that, the mean PA ($m=2.1117$) with ($SD=1.020275$) was higher in male school adolescents than the mean level of PA ($m=2.0666$) with ($SD= 1.05998$) among females in the present investigation. In another study also school student from class sixth and ninth boys generally reported higher levels of PA than girls (46). 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 (47, 48).

Socioeconomic and housing status for PWB wasn't found important but one other study says, male children, adolescents and those who were in less wealthy families were significantly associated with mental health problems (49). Even the association was found significant for PWB of adolescents to their classes and parents education, students with educated father were 4.8 units more than the students with non-educated fathers.

The reason for the non-significant result found in this study maybe due to none inclusion of home based physical activity and some local sports, so in order to preserve a PWB responses may be influenced by the other social factor which not included in the study (they may not well tell about their true attitudes, but answer in a way that they feel socially acceptable), this is known as the social desirability theory.

In conclusion, this study is first cross sectional (WHO-five) PWB assessment framework for the evaluation of unmet levels of PWB and PA of school adolescent both boys and girls in Gilgit city, Pakistan. Its findings may facilitate innovative efforts by all stakeholders, to improve self-management and psychosocial support to this age group of people, thus improving acceptance of change, reducing the psychological problems like feeling of being overwhelmed, through increasing the opportunities to sports in adolescent population as well as health education and promotion programs in community.

Conclusion

According to (WHO-five) WB index applied in general, a majority of school adolescents aged 12 to 18 in Gilgit, Pakistan were perceived moderate level of PWB, while PA level was decreasing with the increasing of age, class and family members. Some school students found with low PWB which indicates low mood or depression and 23.6 elevated prevalence of low PWB including low mood, depression. Male adolescents are more physically inactive and having a high WB in comparison to the female students.

The results of present study are invaluable in addressing low, moderate and high levels of PWB, inadequate PA with some of demographic factors as a crucial health issue, especially among female adolescents in Pakistani society.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Acknowledgement

Thanks are spoken to team members and heartily thanks were expressed to every student who willingly participated. The research was funded by Tehran University of Medical Sciences.

References

1. Rodgers WL, Bachman JG (1988). The subjective well-being of young adults, trends and relationships. In: *Research Report Series*. Ann Arbor, University of Michigan, United State, pp.: 49-73.
2. Goldbeck L, Schmitz TG, Besier T, Herschbach P, Henrich G (2007). Life satisfaction decreases during adolescence. *Quality of Life Research*, 16(6): 969-979.
3. UNICEF (2002). Adolescence. A Time that Matters. In: *The State of the World's Children*. Washington DC. The United Nations Children's Fund. New York, pp. 75-77.

4. UNFPA (2007). UNFPA framework for action on adolescents and youth. Opening doors with young people. Available from: <https://www.unfpa.org/public/global/publications/pid/396>.
5. Currie C, Zanotti C, Morgan A, Currie D, Looze MD, Roberts C, Samdal O, Smith ORF, Barnekow V (2009/2010). Social Determinants of health and well-being among young people, health behaviour in school-aged children (HSBC) study. Available from: http://www.euro.who.int/__data/assets/pdf_file/0007/167281/E96444_part1.pdf
6. Brettschneider WD, Naul R (2007). *Obesity in Europe: young people's physical activity and sedentary lifestyles*. In: Sport Sciences International, obesity in Europe, young people's physical activity and sedentary lifestyles. Peter Lang, Germany, pp.: 7–26.
7. Knuth AG, Hallal PC (2009). Temporal trends in physical activity: a systematic review. *J Phys Act Health*, (6): 548–559.
8. Ghaffari M, Sharifirad G, Malekmakan E, Hassanzadeh A (2013). Effect of educational intervention on physical activity-related knowledge, attitude and behavior of among first-grade students of male high schools. *Educ Health Promot*, 2 (1): 4.
9. World Health Organization (2010). Physical Inactivity: A Global Public Health Problem. Available from: http://www.who.int/dietphysicalactivity/factsheet_inactivity/en/index.html
10. USDHHS (2013). Healthy People 2020. Public health infrastructure. Washington, DC. Available from: www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=35
11. Biddle SJH, Mutrie N (2008). *Psychology of physical activity: Determinants, well-being and interventions*. 2nd ed. Routledge, London and New York, pp.: 18-74.
12. Viner R., Booy R (2005). ABC of adolescence: Epidemiology of health and illness. *British Med J*, 330 (7488), 411-414.
13. Ayub M, Irfan M, Naeem F, Blackwood D (2012). Major depression in a large family in Pakistan: no relationship to inbreeding, economic status or rural living. *J Pak Psychiatr Soc*, 9 (1): 37-43.
14. Diener, Lucas, Schimmack & Helliwell J (2009). Well-being for public policy Oxford. *Oxford University Press*, 39 (4): 391-406.
15. Van OSJ, Park SBG, Jones PB (2001). Neuroticism, life events and mental health. Evidence for person–environment correlation. *British J Psychiatr*, 178 (40): 72-77.
16. Jessica A, Savage. Increasing adolescents' subjective well-being: Effects of a positive psychology intervention in comparison to the effects of therapeutic alliance, youth factors, and expectancy for change [Graduate thesis]. University of South Florida, USA: 2011.
17. Berman SL, Weems CF, Stickle TR (2006). Existential anxiety in adolescents. Prevalence, structure, association with psychological symptoms and identity. *J Youth Adol*, 35 (3): 303-310
18. Helen R, Tiffany K, Gill A, Taylor W, Rhiannon MP (2012). Psychological well-being and psychological distress, is it necessary to measure both? *Psychology of Well-Being: Theory, Research and Practice*, 2 (3): 2211-1522.
19. Lahey BB (2009). Public health significance of neuroticism. *American Psychologist*, 64 (4): 241–256.
20. Conn VS, Valentine JC, Cooper HM (2002). Interventions to increase physical activity among aging adults: a meta-analysis. *Ann Behav Med*, 24 (3): 190-200.
21. Kroeze W, Werkman A, Brug J (2006). A systematic review of randomized trials on the effectiveness of computer-tailored education on physical activity and dietary behaviors. *Ann Behav Med*, 44 (2): 259–286.
22. Warburton DE, Nicol CW, Bredin SS (2006). Health benefits of physical activity, the evidence. *CMAJ*, 174 (6): 801-809.
23. Janssen I, Leblanc AG (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *Int J Behav Nutr Phys Act*, 7 (40): 1–16.
24. Hamer M, Stamatakis E, Steptoe A (2009). Dose-response relationship between physical activity and mental health: the Scottish Health Survey. *Br J Sports Med*, 43 (14): 1111-1114.
25. Storberget IDA. Experiencing physical education in the upper secondary school setting: a grounded theory study of young people's mental health development [Master thesis]. Faculty of Public Health Sciences, Høgskolen I Hedmark, Norway: 2013.
26. Population Association (2009). Adolescent Statistics. Available from: <http://www.pap.org.pk/statistics/adolescent.htm>
27. Marco B, Beti T, Gloria C (2005). Improving physical fitness and emotional well-being in adolescents of low socioeconomic status in Chile. Results of a school-based controlled trial. *Health Promot Int*, 20 (2): 113-22.

28. De Wit M, Pouwer F, Gemke RJ, Snoek FJ (2007). Validation of the WHO-5 Well-Being Index in adolescents with type 1 diabetes. *Diabetes Care*, 30 (8): 2003-2006.
29. Lowe B, Spitzer RL, Grafe K, Kroenke K, Quenter A, Zipfel S, Buchholz C, Witte S, & Herzog W (2004). Comparative validity of three screening questionnaires for DSM-IV J depressive disorders and physicians' diagnoses. *Affect Disord*, 78 (2): 131-40.
30. Kowalski KC, Crocker PRE, Kowalski NP (1997). Convergent validity of the Physical Activity Questionnaire for Adolescents. *Pediatr Exercise Sci*, 5 (9): 342-352.
31. Dodani S, Mistry R, Farooqi M (2004). Prevalence and awareness of risk factors and behaviours of coronary heart disease in an urban population of Karachi, the largest city of Pakistan. *J Public Health*, 26 (3): 245-249.
32. Khuwaja AK, Qureshi R (2004). Prevalence and factors associated with anxiety and depression among family practitioners in Karachi, Pakistan. *J Pak Med Ass*, 59 (8): 550-4.
33. Jadoon NA, Munir W, Shahzad MA, Choudhry ZS (2010). Assessment of depression and anxiety in adult cancer outpatients. A cross-sectional study. *BMC Cancer*, 10 (594): 1471-2407.
34. Shah M, Hasan S, Malik S, Sceeramareddy C T (2010). Perceived stress, sources and severity of stress among medical graduates in a Pakistani medical school. *BMC Medical Education*, 10 (2): 1472-6920.
35. Ahmed U, Riaz A, Ramzan M (2013). Assessment of stress and stressors. A study on management students. *Int J Contemp Res Business*, 4 (9): 687-699.
36. Bazila AK. Interaction of Physical activity, mental health, health locus of control and quality of life: A study on university students in Pakistan. Department of sport sciences [Master Thesis] Department of Sport Sciences, University of Jyväskylä. 2013.
37. Hassmen P, Koivula N, Uutela A (2000). Physical exercise and psychological well-being. A population study in Finland. *Preven Med*, 30 (1): 17-25.
38. Biddle SJH, Asare M (2011). Physical activity and mental health in children and adolescents. A review of reviews. *British J Sports Med*, 10 (45): 886-895.
39. Augestad LB, Slettemoen, RP, Flanders WD (2008). Physical activity and depressive symptoms among Norwegian adults aged 20-50. *Public Health Nurse*, 25 (6): 536-45.
40. Rethon C, Edwards P, Bhui K, Viner RM, Taylor S, Stansfeld SA (2010). Physical activity and depressive symptoms in adolescents. *A Prospective Study*, 8 (10): 32-28.
41. Perri S, Templer D (1985). The effects of an aerobic exercise program on psychological variables in older adults. *Int J Aging Human Develop*, 20 (3): 162-172.
42. Calfas KJ, Taylor WC (1994). Effects of physical activity on psychological variables in adolescents. *Paediatric Exercise Science*, 6 (4): 406-23.
43. Petruzzello SJ, Landers DM, Hatfield BO, Kubitz KA, Salazar W (1991). A meta-analysis on the anxiety-reducing effects of acute and chronic exercise. *Sports Med*, 11 (3): 143-182.
44. Netz Y, Wu MJ, Becker BJ, Tenenbaum G (2005). Physical activity and psychological wellbeing in an advanced age. A meta-analysis of intervention studies. *Psychol Ageing*, 20 (2): 272-284.
45. Rab F, Mamdou R, Nasir S (2008). Rates of depression and anxiety among female medical students in Pakistan. *East Mediterr Health J*, 14 (1): 126-33.
46. Heather H, Agazzi AK, Bradley-Klug KL (2010). BMI and Physical Activity Among at-Risk Sixth- and Ninth-Grade Students, Hillsborough County, Florida, 2005-2006. *Prev Chronic Dis*, 7 (3): A48.
47. Hayes L, White M, Unwin N, Bhopal R, Fishbacher C, Harland J, Alberti (2013). Patterns of physical activity and relationship with risk markers for cardiovascular disease and diabetes in Indian, Pakistani, Bangladeshi and European Adults in a UK population. *J Public Health*, 24 (3): 170-178.
48. Hosper K, Deutekom M, Stronks K (2012). The effectiveness of "Exercise of prescription" in stimulating physical activity among women in ethnic minority groups in the Netherlands. Protocol for a randomized controlled trial. *Int J Behav Nutri Physical Activity*, 9 (1): 1479-5868.
49. Ahmada N, Yusoffa FM, Ratnasingamb S, Mohamed F, Nasird NH, (2014). Trends and factors associated with mental health problems among children and adolescents in Malaysia. *Int J Culture Mental Health*, 8 (2): 125-136.