

Association of Lifestyle Factors with Sub-optimal Health Status Among Undergraduate Medical Students: A Cross Sectional Study

Zayed Rashid,¹ Saira Tariq,² Yumna Naeem,³ Zainab Jabeen,⁴ Mariyam Tariq,⁵
Syed Aftab Haider Kamran⁶

Abstract

Sub-optimal health status is a gray state of health interceding between health and disease, causing reduction in vitality and adaptability in absence of any diagnosed illness. It is considered as a precursor to disease state whose prevention will decrease burden on healthcare system.

Objectives: To assess the burden of suboptimal health status and analyze its association with lifestyle factors among undergraduate medical students.

Methods: A cross sectional study conducted at King Edward Medical University, Lahore, Pakistan. Questionnaires based upon "Sub-Health Measurement Scale V1.0 (SHMS V1.0)" and "Health Promoting Lifestyle Profile-II (HPLP-II)" were distributed among medical students of different years and 379 responses were completed. The data was entered in SPSS version 23 using quantitative variables. Chi-square test was employed to determine association of dependent with independent variables.

Results: Frequency of the Sub-optimal health status and Health among individuals of study population was found to be 78.1% (296) and 21.9% (83) respectively. A significant positive association of lifestyle factors with Sub optimal Health Status was found ($p < 0.005$). There was a slightly high frequency of SHS among females than males and day scholars than hostellers. The respondents having SHS had lower mean values for each HPLP-II dimension relative to those who were reported as healthy.

Conclusion: There is a high frequency of SHS among medical students. Poor lifestyle is a risk factor as a significant correlation exists. It can be prevented by adopting a healthy lifestyle.

Key Words: Sub optimal, SHS, Health, Lifestyle, Dimensions.

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Introduction

Sub optimal Health status (SHS) is recognized globally as a pressing public health issue. The term first coined by a Chinese scholar Wang,^{1,2} is defined by WHO as a grey state of health, intervening between health and disease³ which is characterized by decline in vitality, physiological function and the capacity for adaptation with no defined, diagnosed

underlying illness. Individuals with SHS frequently experience symptoms, such as fatigue, headaches, dizziness, depression, anxiety, systemic ailments (e.g., disorders of the digestive system, cardiovascular system, urinary system, etc.) and non-specific pains (e.g., back pain and chest pain).² As a result, SHS subjects often experience compromised quality of life and frequent hospital visits incurring costly medical treatment.^{2,4}

The concept, though relatively contemporary in Western biomedicine, is being widely accepted and under study in other countries such as Japan, Canada and Australia. In a survey in 1998, a group of researchers conducted an examination of 6000 asymptomatic "healthy people" which showed that 72.8% were in the suboptimal health status range.⁵ Despite having high prevalence, the causes of SHS remain obscure. According to a large body of literature, lifestyle beha-

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|------------------|-----------------------------|
| 1. Zayed Rashid | 2. Saira Tariq |
| 3. Yumna Naeem | 4. Zainab Jabeen |
| 5. Mariyam Tariq | 6. Syed Aftab Haider Kamran |

1,3-6. King Edward Medical University

2. Department of Community Medicine, King Edward Medical University, Lahore

Correspondence:

Zayed Rashid, King Edward Medical University
Email: zayedrashid50@gmail.com

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aviors are considered as one of the most crucial elements affecting health^{2,6,7} and poor lifestyle factors such as work-related and study-related stress, sedentary lifestyle, insufficient sleep and unhealthy eating habits may be associated with SHS.^{8,9,10,11} There is substantial empirical evidence which shows that practicing adverse health behaviors increases an individual's susceptibility to negative health outcomes. Conversely, chronic disease prevention through healthy lifestyle behaviors is an accepted approach resulting in health promotion.

Medical University education and training can be a challenging experience for students as they are exposed to various psychosocial stressors that may result in undesired changes in health and lifestyle habits.^{12,13,14} Despite well documented advantages of health promoting behaviors, several studies have shown that university students exhibit behaviors of unhealthy lifestyle, particularly insufficient physical activity and responsibility for health. Various studies have concentrated on assessment of knowledge and practices regarding nutrition, exercise, sleeping habits, smoking and alcohol among medical students. In a cross-sectional survey in United Arab Emirate, a large proportion of medical students were found to be either underweight or plump and most believed that their activity levels were inadequate, with soaring stress levels and diets lacking in essential nutrients.¹⁵ Studies additionally report lack of proper physical activity and predominance of unhealthy habits like smoking and alcohol among a sizeable proportion of medical students.¹⁶

A study conducted on 11,144 medical students in China to assess SHS, found a frequency of 55.9% due to curriculum load and anxiety concluding that a significant positive association exists between poor lifestyle and the risk of SHS.⁹ Another study conducted at Renmin University of China studied association of individual lifestyle dimensions separately with SHS and highlighted that students with good sleep, physical activity and proper nutrition had low frequency of SHS.⁴

The main objective of the present study is to investigate the burden of SHS among medical students in King Edward Medical University, Pakistan and also to analyze its association with lifestyle. This will be laying the ground work for more studies related to the topic.

Methods

The study design was cross sectional and was conducted at King Edward Medical University, Lahore from March 2018 to December 2018.

Taking confidence interval as 95%, margin of error as 4% with SHS frequency anticipated to be 55.9%, a sample size of 379 students was calculated.⁹

Study participants were included by utilizing simple random sampling technique. The list of enrolled MBBS students from all years was entered in SPSS v23.0 which subsequently acquired sampling frame by random selection. The undergraduate MBBS students from first to fifth year, aged between 18 to 24 years were selected while students with any diagnosed disease were excluded. Institutional review board of KEMU reviewed and approved the study. Helsinki Declaration 1964 along with its later amendments were taken into consideration by all researchers.

A standardized questionnaire comprising of two components i.e. Suboptimal Health Measurement Scale V1.0 (SHMS V1.0) and Health Promoting Lifestyle profile-II (HPLP-II) were distributed among participants. The validity and reliability of both instruments had been proven in previous studies.^{9,17,18}

Before collecting the data, written informed consent form was signed by each respondent. Each questionnaire was completed by one student within approximately 30 minutes. The data obtained through questionnaires was analyzed using SPSS v23.0. Categorical variables were reported as frequencies while continuous variables as mean. Chi-square test was employed to determine association of dependent with independent variables considering P value of <0.05 as significant.

SHS was operationally defined by the physiological, psychological and social dimensions which in turn forms the basis of SHMS V1.0; hence health status of individuals was evaluated through this multidimensional questionnaire. It comprised of 39 questions, 4 of which focused on health self-evaluation. The remainder 35 items were divided into physiological, psychological and social dimensions. Physiological dimension was evaluated on the factors such as physical condition, organ function, body movement function and vigour.⁹ The psychological dimension comprised of positive emotion, psychological symptoms and cognitive function while the social dimension was based upon the factors including social

adjustment, social resources and social support. Each dimension was represented by fourteen, twelve and nine questions respectively, divided among these factors.⁹

There were five response elements for each question with their respective scores of one to five i.e., never = 1, occasionally=2, sometimes=3, constantly=4 and always =5. The dimensional scores were graduated with respect to their corresponding factors' score which in turn were based upon summed up score of respective questions. SHS was evaluated by first calculating each dimensional score separately and finally adding them together to get a raw score for a respondent. It was then converted into percentile by using the underlying formula:

$$\text{Converted Dimension in Score} = \frac{\text{original raw score in dimension-theoretically lowest score in dimension}}{\text{theoretically highest score in dimension-theoretically lowest score in dimension}}$$

The converted scores ranged from one to hundred and were utilized to interpret health status. By taking P10 point of each dimension as the standard, the threshold score for physiological, psychological and social dimensions were found to be 41.07, 54.17 and 58.33 respectively. When converted score of any dimension was more than dividing line score for that dimension, it was considered as SHS. If participant had SHS in all three dimensions, only then he/she was considered to be in sub optimal health status.

The second part of questionnaire was designed by Walker et al¹⁹ for lifestyle status evaluation of participant. It consisted of 52 questions that were divided into six dimensions: health responsibility (9 questions), nutrition (9 questions), spiritual growth (9 questions), interpersonal relationship (9 questions), physical activity (8 questions), and stress management (8 questions). There were 4 options to each question and they were scored accordingly (never=1, sometimes=2, often=3 and routinely=4). Keeping in view the original recommendation, mean of all 52 responses was computed to acquire HPLP II score; hence, it was ranked between 52 and 208 scores. Then they were divided into 4 parts: poor lifestyle (52-90), moderate (91-129), good (130-168) and excellent (169-208). (9) Higher scores showed better lifestyle.

Results

Out of a total of 379 medical students, the results indicated that students who were healthy were 21.9%

(83), while those with Sub Optimal Health Status (SHS) were estimated to be 78.1% (296).

When stratified according to gender, more females 79.0% (199) were found to be in the Sub optimal Health Range as compared to males 76.4% (97)

Stratification based upon type of accommodation/residence highlighted that more hostellers 78.5% (194) than day-scholars 77.3% (102) were found to be in SHS. [Table 2]

Based upon lifestyle status, 379 (100%) students were divided among four groups i.e., 'poor', 'moderate', 'good' and 'excellent' with each group comprised of 17 (4.5%), 248 (65.4%), 112 (29.6%), and 2 (0.5%) students respectively.

A significant variation of lifestyle was reported between males and females at good level (31.3% females relative to 26% males) but the differences were insignificant at poor, moderate and excellent level.

While in case of day-scholar and hostellers there was a significant difference of lifestyle at good (26.3% hostellers compared to 35.6% day scholars) as well as at moderate level (68% hostellers compared to 60.6% day scholars) but no significant difference at poor and excellent level. [Table 1]

As elaborated in Table 2, a statistical significance of

Table 1: Variation in Lifestyle based on Gender and Place of Residence

		Lifestyle Groups				
			Poor	Moderate	Good	Excellent
Gender	Male	Count	7	86	33	1
		%	5.50%	67.70%	26.00%	0.80%
	Female	Count	10	162	79	1
		%	4.00%	64.30%	31.30%	0.40%
Total		Count	17	248	112	2
		%	4.50%	65.40%	29.60%	0.50%
Type of Accommodation	Hosteller	Count	12	168	65	2
		%	4.90%	68.00%	26.30%	0.80%
	Day Scholar	Count	5	80	47	0
		%	3.80%	60.60%	35.60%	0.00%
Total		Count	17	248	112	2
		%	4.50%	65.40%	29.60%	0.50%

SHS association with Lifestyle was found by chi-square test. (p value < 0.005)

The physiological, psychological and social dimensions of SHS were also analyzed and their relation to

the lifestyle was found to be statistically significant using chi square test ($p < 0.05$) as described in Table 3.

Discussion

The present study focused on assessment of sub-optimal health status in undergraduate medical

Table 2: Health Status *Lifestyle Group Crosstabulation

		Lifestyle Groups				Total
		Poor	Mode-rate	Good	Exce-llent	
Health Status	Healthy	8	62	13	0	83
	SHS	9	186	99	2	296
Total		17	248	112	2	379
Chi-Square Tests						
		Value	df ^b	Asymptotic Significance (2-sided)		
Pearson Chi-Square	15.183 ^a	3	0.002			
Likelihood Ratio	15.584	3	0.001			
Linear-by-Linear Association	14.599	1	0			
N of Valid Cases		379				
a: 3 cells (37.5%) have expected count less than 5. The minimum expected count is .44.						
b: degree of freedom						

students and how their lifestyle affects their health status. The frequency of SHS was found to be 78.1% (296) in the sample population which is higher than what has been documented so far in other popula-

Table 3: Sub-Health Measurement Scale V1.0 Scores by Health status

		Lifestyle Groups				Total
		Poor	Mode-rate	Good	Exce-llent	
Physiological Group	Healthy	3	21	8	0	32
	SHS	14	227	104	2	347
Total		17	248	112	2	379
Psychological Group	Healthy	4	28	7	0	39
	SHS	13	220	105	2	340
Total		17	248	112	2	379
Social Group	Healthy	4	26	1	0	31
	SHS	13	222	111	2	348
Total		17	248	112	2	379
Pearson Chi square test						
		Value	df ^b	Asymptomatic Significance (2-sided)		
Physiological Group	2.293 ^a	3	0.005			
Psychological Group	5.706 ^a	3	0.013			
Social Group	15.183 ^a	3	0.002			
a: 3 cells (37.5%) have expected count less than 5. The minimum expected count is 0.16						
b: degree of freedom						

tions. Unavailability of objective clinical diagnostic tools for SHS could be also a contributing factor. Though the study instruments were standardized and had been used ubiquitously in other settings apart from China, this was a pioneer study employing the instrument in Pakistan. The result is supported by the studies conducted in China by Jianlu et al in which a high frequency of 55.9% was found.⁹ In contrast another study conducted in eastern and western areas of China showed a low frequency of 21%.²⁰

This study results were in consonance with other studies where SHS was positively associated with poor lifestyles in students but among social, physiological and psychological groups, the former two were more strongly associated than the latter which is inconsistent with the results of the study conducted by Bi j et al.⁹ This is a novel emerging finding and requires further studies in our population.

This study emphasized the difference of lifestyle and SHS frequency based upon gender as well as type of accommodation among medical students concurrently which was lacking in previous studies as only one aspect of the above two factors was focused.^{9,10} According to Chenjin et al, on the basis of Electronic device usage, smoking, drinking and nutrition, the SHS frequency was more among males than females which is differing from our result as score among females was established higher than males.²¹ This difference might be due to low physical activities among females according to our society.²²

The results of our study are supported by Hou H et al. who explained the increased susceptibility of females towards depression, anxiety and other neuropsychiatric disturbance due to psychological and physiological differences causing higher SHS frequency among them relative to males.²⁰

In view of association of SHS with type of accommodation i.e., day scholars and hostellers, not enough data is present. A study performed in New Delhi assessed health status specifically based upon type of accommodation and concluded that hostellers have a poor health relative to day scholars due to poor lifestyle factors like inadequate nutrition, sleep deprivation and lack of parental care but a proper association with the Sub-optimal Health Status was not assessed. In addition to assessment of lifestyle in view of type of accommodation our study also highlights its association with suboptimal health status. Hostellers had a higher frequency of SHS due to poor lifestyle

factors like deprivation of proper nutrition and increased psychological stress.²³ In contrast a research conducted in Turkey found no significant difference in mean score of HPLP II with respect to place of residence.²⁴

The statistically remarkable relationship between SHS and lifestyle factors highlighted in this study shows that a modification of lifestyle shall result in improved health outcomes. Early diagnosis of SHS will help to prevent the diseased state of individuals and forestall the progression of chronic diseases like hypertension, diabetes and coronary artery disease.²⁵

The results indicate physical and psychosocial instability among medical students which can be improved based upon the principles of HPLP-II. This can be achieved at community level through primary prevention with proper awareness and education. Improvement of eating habits, interpersonal relationship, spiritual growth, physical activity and stress management will cause decline in frequency of Sub-optimal Health Status.

The simple random selection of sample strengthened the study as it provided equal chance of selection to all the individuals within the target population therefore reducing sampling bias.

This research serves as an introductory study on the concept of Sub optimal health in Pakistan which focused on a niche population i.e., the undergraduate medical students. Other population domains should be undertaken in future studies for better understanding and comparison. Moreover, due to insufficient data, this study does not undertake the development of a SHS measurement scale specifically dedicated towards the population of Pakistan so further studies are required which exclusively take part in formulating such scale.

Limitations

As the study design was cross-sectional it does not provide an evidence of temporal relationship between exposure and outcome. The self-reported questionnaires by respondents could have led to information bias.

Conclusion

There is a high burden of Sub Optimal Health Status among medical students of King Edward Medical University. Moreover, a statistically significant relationship exists between life style factors and Health status

of the study population. Poor lifestyle is a risk factor for developing Sub-optimal Health Status which can subsequently be prevented by adopting a healthy lifestyle.

Conflict of Interest: None

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Authors Contribution

RZ, TS: Conceptionlization of Project

NY,JZ,TM,KHAS : Data Collection

RZ,JZ,TM: Literature Search

TS,NY,TM: Statistical Analysis

RZ,TS: Drafting, Revision

RZ,TS,JZ: Writing of Manuscript