HEALTH-RELATED QUALITY OF LIFE AMONG INDIAN STUDENTS AT YEREVAN STATE MEDICAL UNIVERSITY, ARMENIA: A CROSS-SECTIONAL SURVEY

Master of Public Health Integrating Experience Project

Professional Publication Framework

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List of abbreviations

BMI: Body Mass Index

GPA: Grade Point Average

HRQoL: Health-Related Quality of Life

MCS: Mental Component Summary

MPH: Master of Public Health

MSPSS: Multidimensional Scale of Perceived Social Support

PCS: Physical Component Summary

Ph.D.: Doctor of Philosophy

QoL: Quality of Life

SD: Standard Deviation

SF-36: Short Form-36

WHO: World Health Organization

WHOQOL-BREF: World Health Organization Quality of Life questionnaire

YSMU: Yerevan State Medical University

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Executive summary

Medical training is a long and emotionally challenging process. During their studies, medical students experience a large volume of lessons, lack of time for social activities, and direct encounter with hospitals, including contact with severe disease and death, all of which might introduce health hazards to students.

Several authors reported that Health-Related Quality of Life (HRQoL) among medical students is lower when compared to the same age non-medical students and the general population.

While the number of studies evaluating health outcomes of medical students has been growing worldwide, there have been no investigations that would include comprehensive measurement of HRQoL among students in Armenia. The present study objective was to assess the level of HRQoL among Indian medical students studying at Yerevan State Medical University (YSMU) in Armenia and explore factors associated with their HRQoL.

The cross-sectional survey with the self-administered questionnaire was conducted. Medical students were selected using convenience sampling. The sample size was 353. To measure the outcome variable SF-36 questionnaire was used. For socio-demographic variables, questionnaires from previous studies were used. Multidimensional Scale of Perceived Social Support (MSPSS) measured the level of social support among students.

The participants' mean age was 21.34 years. Males constituted the majority of the participants (56%). Most of the participants were living at dormitory with their friends (73%). The mean score for HRQoL was 63.25 (SD=15.15), while the mean scores of mental and physical components were 60.22 (SD=19.24) and 66.29 (SD=16.19), respectively. In the adjusted analysis, gender, average academic mark, adequate pocket money, the presence of chronic disease and receiving social support were significantly (p-value < 0.05) associated with a physical component of the HRQoL score. Average academic mark, physical activity, the presence of chronic disease and receiving social support were significantly (p-value < 0.05) associated with a mental component of the HRQoL score.

This study assessed the HRQoL of Indian medical students at YSMU, Armenia and identified several associated risk factors, which could consider when developing strategies to improve the

students' well-being. The interventions should focus on enhancing social support and promoting physical activity among students, with special focus on female students and those with health issues. Future studies should employ qualitative methods to obtain more information about mental and physical challenges faced by the medical students during their study years.

1   Introduction

Medical education aims to produce physicians with a high level of skills and proficiency, able to deliver high-quality care to maintain the health of individuals and societies.[1] Medical training is a long and emotionally challenging process.[2] During the study period, medical students experience a large volume of lessons, lack of time for social activities, and direct encounter with hospitals, including direct contact with diseased patient and death everyday, all of which might introduce health hazards to many students.[1]

The negative health outcomes might include depression, suicidal thoughts, reduced cognitive capacity, deterioration of self-care habits, alcohol consumption, and drug abuse.[1,3–6] Some students might have decreased academic performance and attempt to quit education.[1] Physical and psychological symptoms among medical students were shown to be higher when compared to the group of non-medical students of the same age or the general population.[6,7] A study conducted by Roberts LM et al. among medical students found around ninety percent of them has requested some kind of health care during their education.[6]

1.1   Health-Related Quality of Life (HRQoL)

The World Health Organization (WHO) defines the Quality of Life (QoL) as "individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns".[8] The definition mainly focuses on perceived quality of life.[8] QoL includes key domains such as culture, values, and spirituality.[9] In addition, health is considered as one of the important domains.[9] Quality of Life studies help to investigate health-/non-health related domains from the aspect of individual's perception.[10]

HRQoL concept is a multidimensional with broad approach to assess about the individuals' health from their own perceptive.[3,11] While there are numerous important aspects of HRQOL; physical health, mental health, general health, and social and role functioning perceptions have generally been identified as its core dimensions.[12] Since there is a number of health problems or diseases, both disease-specific or generic instruments can be utilized for measuring HRQoL. Generic tools are developed to assess multiple aspects of HRQOL and can be used in different populations and for a range of conditions, which allows making comparisons between different diseases or populations.[12] QoL is commonly measured using two different generic instruments such as World Health Organization Quality of Life questionnaire (WHOQOL-BREF) and Short Form-36 (SF-36).[1,5,11,13,14] WHOQOL-BREF was developed by WHO, this instrument contains 26 questions which was a short form of the instrument WHOQOL-100 which contain 100 questions to broadly focus on the measurement of health.[15] At Rand Health, SF-36 was developed as a result of medical outcome study.[16]

1.2 HRQoL among medical students

Medical students are believed to have reduced QoL.[17] The studies conducted by Pagnin et al. and Henning et al. showed that the QoL among medical students was lower when compared to the same age-peered non-medical students and also to the general population.[18,19] In Pagnin et al. study, the medical students, found to have low score in psychological and social relationship domains; in psychological domain, general population (mean score 65.90) has high score compared to medical students (mean score 60.98), and in social relationship domain, general population (mean score 76.20) had high score than medical students (mean score 67.48).[18] Several studies show the lower HRQoL score in the social domain.[1,5,11,13] The study conducted among private medical college students in Brazil by Lins et al. showed that students reported

lower score in HRQoL particularly in the mental component in Short-Form 36 (SF-36) Questionnaire.[11]

Students' QoL can be affected by socio-demographic factors, psychological health, year of study, the area of interest during the study, a sign of depression, having any chronic disease, physical activities, and grade point average (GPA).[11,20,13] Also, parental profession, the income of family members, and the level of personal expenditures influence the quality of life.[20] Depression has been shown to have strongly associated with lower QoL.[5,20] QoL was lower among females when compared to males.[3,11,20,13] Factors associated with the QoL can differ in different populations and cultural setting.[20]

The quality of life score decreases with an increase in the years of study.[1] In China 3rd year medical students who enter clinical year tends to have higher impairment in both the Physical Component Summary (PCS) as well as Mental Component Summary (MCS) domain when compared to other students.[13] Medical students who were from the rural area had lower scores when compared to students from urban areas, particularly in social and psychological domains in the study by Zhang et al. in China in 2011.[13] A study conducted in Trichy, India, by R PGA et al. had contradictory findings compared to other studies, with regards to factors such as gender and year of study.[14] The study showed that females have a high percentage of the score in all domains except pain and general health domain.[14] The study did not showed any significant association with HRQoL with the year of study, perhaps due to the inclusion of only second and third-year medical students.[14]

1.3   Health outcomes among Indian medical students in Armenia

Indian students have been studying at Yerevan State Medical University (YSMU) since 1987.[21] During 2017 – 2018 academic year over 1000 Indian students were obtaining a medical degree at YSMU.[21] In addition to the regular concerns experienced by domestic students, international students are exposed to additional stressors in the process of cultural adjustment.[22] They might encounter difficulties with language, as well as academic, interpersonal, financial, and intra-/inter-personal problems, which might contribute to negative health outcomes.[22]

In 2013, a study conducted in Armenia among medical students with the primary objective of the study as evaluating the association of social and cultural factors with the presence of depressive symptoms at YSMU, Armenia.[23] The study showed a higher prevalence of depression among Indian students [34.6%] as compared to Armenian medical students [22.3%].[23] Also, the depression level was higher among females when compared to males.[23] The few factors found in association with depression were lack of financial security, lack of family support and alcohol consumption.[23]

1.4   The rationale of the study

The number of international students, including students from India moving to Armenia to pursue medical degree has been increasing recently.[21,23] While the interest in the evaluation of health outcomes of medical students has been growing internationally, such studies that have explored this topic in Armenia are scarce, with none focusing on the comprehensive measurement of the students' overall HRQoL. The present study will fill that gap and will assess the level of HRQoL among Indian medical students studying at YSMU in Armenia and explore the factors associated with their HRQoL.

The research questions of the proposed study are included below:

1) What is the level of HRQoL among Indian medical students at YSMU?

2) Is there an association between socio-demographic factors (gender, age, relationship status, family monthly expenses, pocket money, place of living, visiting hometown, loan support, and parental profession) and HRQoL?

3) Is there an association between behavioral factors (the level of physical activity, smoking, alcohol use, Body Mass Index, and member of the association) and HRQoL?

4) Is there an association between academic performance (Average Grade) and HRQoL?

5) Is there an association between receiving social support and HRQoL?

6) Is there an association between the presence of chronic diseases and HRQoL?

2 Methods

2.1 Study design

The design used in the study is a cross-sectional survey with a self-administrated questionnaire. The design is chosen because it is cost effective and less time consuming when compared to other designs.[24]

2.2 Study population

The study population included Indian medical students of all grades/stages of education (year 1 to year 6) studying in Yerevan State Medical University, Armenia. The inclusion criteria were citizens of India, 18 years of age or above, studying for the undergraduate degree in General Medicine faculty in Yerevan State Medical University, speaking and writing in the English language. The exclusion criteria were studying in other universities simultaneously.

2.3   Sampling size and sampling strategy

The sample size calculation was done using the comparison of two means with a standard deviation of HRQoL score as 15, 95% of the confidence interval and power of 80%.[14]

$$n = \frac{(Z_{\frac{\alpha}{2}} + Z_\beta)^2 * 2 * \sigma^2}{d^2}$$

n= (1.96+0.84)² *2 * (15)² / (5)²

n=141

N= 2 * n = 282

Since the previous study in the same setting had a response rate of 83.4%, we factored 80 % response rate during the calculation of the sample size.[23] Final required sample size is 353.

The study participant were selected to the study using convenience sample method. The number of Indian students studying in years 1-6 in the YSMU is around 800.[21] Before the data collection the total number of students in each batch, time and place of the classes of each batch were identified by the student investigator. The students were approached before their class/lecture for a prior announcement about the study and for the invitation to take part in the study. The student investigator approached the students after class. Willing and eligible participants were included in the study. The attempt was made to contact an even number of students from each cohort.

2.4   Variables

The independent variables included year of study (ordinal), physical activities (ordinal), smoking status (ordinal), alcohol consumption (ordinal), relationship status (dichotomous),

member of associations (dichotomous), BMI (continuous), receiving social support (continuous), monthly household expenses (ordinal), pocket money (ordinal), place of living (dichotomous), visiting home town (dichotomous), loan support (dichotomous), age (continuous), gender (dichotomous), parents profession (dichotomous), Grade Point Average (continuous) and chronic disease (dichotomous). The Health-Related Quality of Life score (continuous) was the outcome variable (dependent).

The data on HRQoL was collected with the help of SF-36, which is a self-administered questionnaire. US Rand Corporation developed SF-36 questionnaire between 1980 to 1990. It is broadly used today to evaluate the HRQoL.[25,26] The questionnaire assesses 36 items with different eight health concept:1) physical functioning - 10 items, 2) role limitation due to physical health problems - 4 items, 3) role limitations due to emotional problem - 3 items, 4) social functioning - 2 items, 5) emotional well-being - 5 items, 6) vitality - 4 items, 7) pain - 2 items, 8) general health - 5 items to assess HRQoL and to assess the perceived health change in last twelve months (1 item).[27] The items are scored and transformed to describe the health with the score range of 0 to 100.[27] Higher score in SF-36 indicate that the individual has better health and vice versa.[27] The score from eight scales was used to calculate two subscale scores with physical and mental health domains, which are PCS and MCS scores, respectively. The PCS includes physical function, role limitation due to physical health problems, pain, and general health domains. The MCS includes social functioning, vitality, role limitation due to the emotional problem and emotional well-being domains.

Receiving social support information was collected using Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet et al.[28] It consists of 12 items rate on seven Likert scales.[28] This scale with three different sources (three subscales) were used to

measures receiving social support, those sources are family, friends and significantly others.[28] The final score for perceived social support is the sum of all twelve items (each item scored 1-7).[29] The maximum score is 84. Higher score in MSPSS indicating of receiving high level of social support.[29]

For other independent variables, the questions from similar studies conducted previously in Armenia and internationally were adopted.[3,5,11,23,30]

2.5 Data collection

The student investigator and three trained interviewers collected the data using the pretested questionnaire. The information about time and place of the classes was collected, because each batch had classes at different places (university or hospital) during a week. On the data collection day, the students received an announcement by the student investigator before the start of their classes with the short description about the study and the invitation asking the students to participate in the survey. The student investigator approached all students after the class. The students from year one to three were approached for an announcement before the lecture/class and data was collected outside the university (mainly in the chairs located in front of the university and the free space in front of the university library) after the lecture finished. The students from year four to six were approached for an announcement before their classes in their respective hospitals by the student investigator, and data was collected in the free space of the hospital after the class was over. The questionnaire was administered and collected immediately upon completion.

2.6   Data Analysis

The student investigator did single data entry. To be accuracate with entered data, ten percent of the total questionnaires were randomly selected and compared to the database. Range check helped to check outliers and missing values. Descriptive analysis was performed, means, standard deviations and the frequencies were reported for all the variables. Simple and multiple linear regression were run to find whether HRQoL have significant association with any of the independent variables.

2.7   Ethical considerations

Institutional Review Board (IRB) of the American University of Armenia approved the study protocol. All participants provided oral consent before completing the survey.

3   Results

In the study, a total of 353 medical students participated out of 428 approached by the student investigator and the interviewers. The response rate was 82.5%. The main reason for refusals was lack of time.

3.1   Descriptive characteristics

Table 1 presents socio-demographic characteristics of the study participants. The mean age of the respondents was 21.34 years (SD=1.98), ranging from 18 to 26 years. Males constituted majority of the study sample (56.70%). About 83% of study participants were single. Majority of the participants came from urban places in India (70.50%). About 73% of the respondents were staying in a dormitory with friends, while the rest of the students were staying in rented homes with friends or with family, or were living alone. Thirty-eight percent had

complete or partial coverage of their tuition fees with the help of bank loan or from other sources. Nearly 90% of participants' parents had non-medical professions.

Around 33% of participants were defined as physically active, while the others were insufficiently or not physically active. About 67.75% of the participants reported not drinking alcohol, while the remaining participants reported drinking alcohol occasionally or frequently. About 60% of the students self-reported normal BMI, while 28% were overweight or obese. A total of 20% of the participants were involved in extra-curricular activities such as participation in research teams, different associations, or sports teams at the university.

The mean score of receiving social support was 65.35 (SD 14.50) with the range of 12 to 84. The mean subscale score of family support was 23.58 (SD =5.11), friends support was 20.62 (SD =5.73) and special person support was 21.14 (SD =6.62), with the range of 4 to 28.

3.2 Health-related Quality of Life (HRQoL)

Table 2 presents HRQoL score of Indian medical students studying at YSMU in Armenia. The mean score for HRQoL was 63.25 (SD=15.15), while the mean scores of mental and physical components were 60.22 (SD=19.24) and 66.29 (SD=16.19), respectively.

3.3 Simple and Multivariate Linear Regression Analysis:

3.3.1 Physical Component of HRQoL Score (PCS)

The results of simple linear regression analysis of the associations between the independent variables and the PCS of HRQoL (table 3). Gender, average academic mark, alcohol drinking, family monthly expense, adequate pocket money, presence of chronic disease and receiving social support were significantly (p-value <0.05) associated with PCS in unadjusted analysis.

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The variables in the simple linear regression which had associated with HRQoL at the level of significance <0.05 were included in the multiple linear regression analysis (Table 4). Gender, average academic mark, adequate pocket money, the presence of chronic disease and receiving social support were significantly (p-value < 0.05) associated with the PCS of HRQoL in the adjusted analysis. In the adjusted model, being a male increased the mean PCS score by 5.00 compared to being a female (β=5.00; 95% CI: 0.85, 9.15). The adjusted mean score of PCS increased by 2.55 times with one unit increase in the average academic mark (β=2.55; 95% CI: 0.50, 4.61). The adjusted mean score of PCS increased by 9.86 among those who felt "good" about their pocket money compared to those who felt that the pocket money was "poor" (β=9.86; 95% CI: 0.74,18.97). The participants who reported not having any chronic disease had increased adjusted mean score of PCS compared to those who had at least one chronic disease (β=6.92; 95% CI: 1.37,12.48). The adjusted mean score of PCS increased by 0.17 with one unit increase of receiving social support score (β=0.17; 95% CI: 0.04, 0.31).

3.3.2   Mental component of HRQoL score (MCS)

The results of simple linear regression analysis of the associations between the independent variables and the MCS of HRQoL (table 3). Average academic mark, religion, family monthly expense, co-heritance pattern, having loan support from banks or other sources for their tuition payment, the presence of chronic disease, and receiving social support were associated with MCS in simple linear regression analysis (Table 3). Those variables in the simple linear regression which had an association with HRQoL at the level of significance <0.05 were included in the multiple linear regression analysis (Table 5). Average academic mark, physical activity, the presence of chronic disease and receiving social support were significantly associated with a MCS of HRQoL in the adjusted model.

The adjusted mean score of MCS increased by 3.78 with one unit increase in the average academic mark (β=3.78; 95%CI: 1.20, 6.37). In adjusted analysis, being physically active will higher MCS score when compared to those who are insufficiently active or physically inactive (β=6.62; 95%CI: 1.40, 11.84). Not having chronic diseases increased the mean MCS score by 14.00 as compared to those who reported at least one chronic disease (β=14.00; 95% CI: 7.08,20.92). The adjusted MCS score increased by 0.37 with every unit increase in receiving social support score (β=0.37; 95% CI: 0.20, 0.54).

4   Discussion

Our study explored HRQoL among Indian medical students studying in Armenia and factors associated with it.

Our study found the overall mean HRQoL score was 63.25 (SD 15.15) among Indian medical students studying in YSMU in Armenia, which is lower than the score found among medical students in India (mean score=67.45; SD=15.20).[14] In our study, the mean physical component score (66.29; SD=16.19) was higher compared to mental component score (60.22; SD=19.24). A study conducted in Trichy, India reported slightly higher mean scores for physical (70.27; SD=16.61) and mental (64.59; SD=18.07) components, but the similar difference between the component scores.[14]

The variables which were significantly associated with both PCS and MCS of HRQoL in our study included receiving social support, the presence of chronic diseases, and the average academic mark.

Receiving social support was positive significant association with HRQoL in both PCS (β=0.17; 95% CI: 0.04, 0.31) and MCS (β=0.37; 95% CI: 0.20, 0.54). A study by Cobb noted

that effective supportive interaction and social support help to protect people from the adverse health outcomes.[31] A 6-month follow-up longitudinal study conducted in Korea to explore the quality of life, revealed that receiving a high level of social support might increase students' quality of life.[32] A study conducted by Hefner J et al. in the United States of America found lower odds of having depression, anxiety, and disturbances in eating behavior among students with high level of perceived social support.[33]

In our study, there was a significant association between HRQoL and the academic mark in both physical (β=2.55; 95% CI: 0.50, 4.61) and mental domains (β=3.78; 95%CI: 1.20, 6.37). A study conducted by Angkurawaranon C et al. in Thailand, found that students with higher academic marks had higher HRQoL.[20] Since our study was cross-sectional, we could not establish the causative link between these variables. A study conducted by Hettiarachchi M et al. suggested that the students with better HRQoL can achieve better grades in their academic performance.[34] A study conducted by Chazan A et al. in Brazil identified that the student experience burn-out which is also expressed as work-related stress which has an influence on academic performance and also on QoL.[35]

Having no chronic disease significantly increased HRQoL score as compared to having at least one chronic disease in both domains in our sample (for PCS, β=6.92; 95% CI: 1.37,12.48), while for MCS, β=14.00; 95% CI: 7.08,20.92). A study conducted in Thailand by Angkurawaranon C et al. supports our findings.[20] A study conducted by Wang H et al. in Germany among general practice patients, found the impairment of quality of life among patients having any type of chronic disease.[36]

The participants who evaluated their pocket money as "good" had a higher HRQoL score in PCS when compared to those who assessed it as "poor" (β=9.86; 95% CI: 0.74,18.97). A study by Nur et al. conducted in Turkey among university students found that the HRQoL was higher in mental health domain among those who were receiving adequate pocket money.[37] However, no associations with physical domain were reported in the literature. This finding is hard to interpret and warrants further investigation and confirmation.

Physical activity was significantly positively associated with HRQoL in MCS when compared to no or insufficient physical activity (β=6.62; 95%CI: 1.40, 11.84). There were two studies conducted in Brazil and Iran by Lins et al. and Jamali et al., respectively, which also found significant positive association between physical activity and HRQoL.[3,11] Several studies found that physical activity (walking, hiking, skipping, etc.) has a positive influence on maintaining better HRQoL in both physical and mental domains.[38–40] Physical activity shows protective relationship with mental health especially with depression and anxiety, it has a positive effect on mood, sense of well-being, energy and self-esteem.[41,42]

In our study, being a male significantly increased PCS as compared to being a female (β=5.00; 95% CI: 0.85, 9.15). Several studies which assessed HRQoL among medical students in different settings confirm our study findings.[3,11,37]

Study strengths and limitations

Our study was the first on assessing the HRQoL among Indian medical students in Armenia. This study used validated SF-36 questionnaire. The use of a self-administered questionnaire helped to avoid interviewer bias.

The cross-sectional study design did not permit to establish the causality of the found links between the variables. Also, the findings of the study cannot be able to generalize to Indian medical students in other settings. The use of convenience sampling has also limited the generalizability of the study results.

Implications and conclusions

This study explored the level of HRQoL among Indian medical students in Armenia. The HRQoL score for both the PCS and MCS were lower than the scores reported for other student populations in the literature. The study found several factors associated with HRQoL, which could help to improve the well-being of international medical students with developing some specific strategies.

In particular, medical universities in Armenia could develop interventions enhancing social support among international students, and promote and creating a supportive environment for medical students to take part in sports/ physical activities. It is recommended to make special efforts to reach female students and those with present health problems, since the study showed that these student groups have poorer HRQoL.

Future studies could focus on comparing local and international medical students to obtain more information about underlying risk factors. A qualitative study could help to obtain more information about mental and physical challenges faced by the medical students during their study years.

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Table 1: Demographic, Socio-economic, and Behavioral characteristics of the study population

		Measures, % (n)
Gender		
	Male	56.70 (200)
	Female	43.30 (153)
Age, Years		
	Mean (SD)	21.34 (1.98)
Year of study		
	First year	17.00 (60)
	Second year	13.30 (47)
	Third year	17.60 (62)
	Fourth year	13.00 (46)
	Fifth year	14.20 (50)
	Sixth year	24.90 (88)
Relationship status		
	Single	82.60 (290)
	Engaged	12.00 (42)
	Married	0.80 (3)
	In relationship[1]	4.60 (16)
Birth place		
	Urban	70.50 (248)
	Rural	29.50 (104)
Religion		
	Hinduism	61.60 (212)
	Christianity	19.20 (66)
	Islam	14.50 (50)
	Sikhism	1.20 (4)
	Jainism	0.30 (1)
	Buddhism	0.30 (1)
	Others[2]	2.90 (10)
Currently living with		
	Family	2.00 (7)
	Dormitory with friends	72.90 (255)
	Rented home with friends	21.70 (76)
	Alone[3]	3.40 (12)
Visited your family (hometown) past year		
	Once	45.15 (158)
	Twice	11.15 (39)
	More than twice	26.00 (91)
	I haven't been home in the past year	17.70 (62)
Loan from bank or other support for tuition fees payment		
	Yes, complete coverage of amount	8.60 (30)
	Yes, partial coverage of amount	28.80 (101)

	Measures, % (n)
No coverage of amount	62.60 (219)
Parental profession	
Medical profession	9.40 (33)
Non-medical profession	90.60 (318)
Before admission in medical school, what did you want to become?	
Architect	4.10 (14)
Engineer	10.80 (37)
Lawyer	2.35 (8)
Doctor	60.35 (207)
Others[4]	22.40 (77)
Family monthly expense, INR	
Less than Rs. 1,500	0.95 (3)
Rs.1,500 to Rs.5000	2.85 (9)
Rs.5.001 to Rs.10,000	15.60 (50)
Rs.10,001 to Rs.30,000	33.80 (108)
Rs.30,001 to Rs.50,000	21.90 (70)
More than Rs. 50,000	25.00 (80)
Pocket money adequate	
Very poor	2.00 (7)
Poor	3.45 (12)
Moderate	32.00 (111)
Good	42.65 (148)
Very good	19.90 (69)
Physical activity	
Insufficient activity [5]	11.10 (29)
Adequate physically activity[6]	12.60 (33)
High physical activity[7]	20.60 (54)
No physical activity	55.70 (146)
BMI (self–reported)	
Underweight (< 18.5)	11.75 (38)
Normal ($\geq 18.5 - \leq 25$)	60.35 (195)
Overweight or obese (> 25)	27.90 (90)
Smoking	
Never smoker	86.40 (286)
Current smoker	8.80 (29)
Ex-smoker	4.80 (16)
Alcohol drinking	
Non-drinker	67.75 (227)
Occasional drinker	29.85 (100)
Drinker	2.40 (8)
Participating in extra-curricular activity[8]	
No	80.50 (273)
Yes	19.50 (66)

	Measures, % (n)
Chronic disease	
High blood pressure	0.90 (3)
Heart disease	0.35 (1)
Lung disease	0.90 (3)
Stomach/intestine disease	4.15 (13)
Cancer	0.35 (1)
Kidney disease	0.35 (1)
Problems with joints/bones	1.90 (6)
Other problems[9]	5.70 (18)
No chronic disease	85.40 (270)
Academic mark	
Mean (SD)[10]	6.77 (1.00)
Range	5 to 10
Receiving Social support	
Mean (SD)	65.35 (14.50)
Range	12 to 84
Mean scores of subscales[11], Mean (SD)	
Family	23.58 (5.11)
Friends	20.62 (5.73)
Special persons	21.14 (6.62)
Range	4 to 28

1-The participants who selected others in relationship status specified "in relationship", so it was included as one of the category

2- Others are Atheist, Agnostic, Monotheism, and Judaism

3- The participants who selected others in currently living option specified "alone", so it was included as one of the category

4-Sports, art, defense, cinema-related jobs, aeronautics, airhostess, business, bio-technology, defense, dance, economist, entrepreneur, entomologist, journalist, nurse, pilot, politics, professor, psychologist, scientist

5-Absent or less than 150 mins moderate physical activity

6-More than 150 mins moderate physical activity

7-More than 300mins moderate physical activity

8- Are you participating at any extracurricular groups that included amateur sport teams or research teams or undergraduate university association?

9-Obesity, migraine, allergy, back pain, , chronic cough, chronic fatigue, gall stones, low blood pressure, polycystic ovary syndrome sinus, spondilitis, thyroid and tonsillitis.

10- Average mark is out of 10

11- Subscales includes family, friends and special person are those person from whom the support is receiving by the participants

Table 2: HRQoL scores of Indian medical students at Yerevan State Medical University, Armenia

Domain	Number	Score, Mean (SD)
Physical functioning	353	70.12 (27.36)
Role limitation of physical health problem	349	60.24 (33.76)
Role limitation of emotional problem	349	50.53 (40.00)
Social functioning	353	65.05 (22.57)
Emotional well-being	353	63.12 (18.87)
Energy	353	62.18 (17.74)
Pain	353	72.10 (21.54)
General health	353	62.47 (18.38)
Physical component score[1]	353	66.29 (16.19)
Mental component score[2]	353	60.22 (19.24)
Total score	353	63.25 (15.15)

1 – Includes physical functioning, role limitation of physical functioning, pain and general health domains
2- Includes role limitation of emotional problem, social functioning, emotional well-being and energy domains

Table 3: The results of bivariate analysis (physical component and mental component)

Variables	Outcome 1 (Physical Component)			Outcome 2 (Mental Component)		
	β	95% CI	p-value	β	95% CI	p-value
Gender						
Male	5.11	(1.72,8.49)	**0.003**	3.21	(-0.84,7.27)	0.120
Female	1.00 (ref)			1.00 (ref)		
Age, in years	0.12	(-0.75,0.98)	0.794	-0.51	(-1.53,0.51)	0.328
Year of study						
6th year	4.77	(-0.51,10.05)	0.076	-3.64	(-9.95,2.68)	0.258
5th year	-4.25	(-10.29,1.79)	0.168	-0.19	(-7.40,7.03)	0.960
4th year	2.04	(-4.15,8.22)	0.518	0.79	(-6.60,8.17)	0.834
3rd year	3.69	(-2.02,9.41)	0.204	4.57	(-2.26,11.40)	0.189
2nd year	1,78	(-4.37,7.92)	0.570	2.60	(-4.75,9.94)	0.487
1st year	1.00 (ref)			1.00 (ref)		
Birth place						
Urban	-0.35	(-4.08,3.38)	0.855	1.55	(-2.86,5.97)	0.489
Rural	1.00 (ref)			1.00 (ref)		
Average academic mark out of 10	2.43	(0.63,4.23)	**0.008**	2.55	(0.45,4.64)	**0.017**
Relationship status						
Single	2.32	(-2.17,6.81)	0.311	0.69	(-4.64,6.02)	0.799
Engaged/married/In relationship	1.00 (ref)			1.00 (ref)		
Physical activity						
Physically active	1.93	(-2.33,6.18)	0.373	6.55	(1.61,11.48)	**0.010**
No or insufficiently active	1.00 (ref)			1.00 (ref)		
BMI						
Normal	5.17	(-0.50,10.82)	0.074	1.37	(-5.38,8.11)	0.691

Variables	Outcome 1 (Physical Component)			Outcome 2 (Mental Component)		
	β	95% CI	p-value	β	95% CI	p-value
Overweight or obese	2.88	(-3.30,9.05)	0.360	0.78	(-6.58,8.14)	0.835
Underweight	1.00 (ref)			1.00 (ref)		
Smoking Status						
Ex-smoker	-6.15	(-14.38,2.08)	0.143	-4.86	(-14.59,4.87)	0.327
Smoker	-0.47	(-6.72,5.77)	0.882	-6.01	(-13.39,1.37)	0.110
Never	1.00 (ref)			1.00 (ref)		
Alcohol drinking						
Occasional drinker	-1.30	(-5.11,2.51)	0.503	-3.02	(-7.54,1.50)	0.190
Drinker	-13.72	(-25.14,-2.31)	**0.019**	-7.66	(-21.20,5.89)	0.267
Non-drinker	1.00 (ref)			1.00 (ref)		
Participating in extra-curricular activity[2]						
No	1.96	(-2.42,6.35)	0.380	1.14	(-4.04,6.31)	0.666
Yes	1.00 (ref)			1.00 (ref)		
Family monthly expense, INR						
> 30,000 INR	5.23	(0.40,10.06)	**0.034**	7.05	(1.06,13.04)	**0.021**
10,000-30,000 INR	3.27	(-1.83,8.37)	0.207	4.96	(-0.72,10.64)	**0.087**
< 10,000 INR	1.00 (ref)			1.00 (ref)		
Is pocket money adequate?						
Good	11.52	(3.99,9.06)	**0.003**	7.93	(-1.10,16.97)	0.085
Moderate	7.63	(-0.20,15.45)	**0.056**	6.37	(-3.00,15.74)	0.182
Poor	1.00 (ref)			1.00 (ref)		
Currently living with?						

Variables	Outcome 1 (Physical Component)			Outcome 2 (Mental Component)		
	β	95% CI	p-value	β	95% CI	p-value
Dormitory with friends	2.01	(-5.58,9.60)	0.602	9.86	(0.89,18.84)	**0.031**
Rented home with friends	2.66	(-5.52,10.85)	0.523	10.23	(0.55,19.19)	**0.038**
Family /Separate home (alone)	1.00 (ref)			1.00 (ref)		
Visiting home town in past years						
At least once	0.18	(-4.28,4.64)	0.937	-1.46	(-6.77,3.85)	0.589
Haven't	1.00(ref)			1.00 (ref)		
Before admission in medical school, what did you want to become?						
Doctor	2.15	(-1.35,5.64)	0.227	2.17	(-2.02,6.36)	0.310
Other	1.00 (ref)			1.00 (ref)		
Loan from bank or other source to support fees payment						
Yes, complete amount	-1.23	(-7.44,4.98)	0.696	-8.42	(-15.72,-1.12)	**0.024**
Yes, partial amount	1.41	(-2.43,5.24)	0.471	-2.05	(-6.56,2.46)	0.371
No amount	1.00 (ref)			1.00 (ref)		
Parental profession						
Non-medical						

Variables	Outcome 1 (Physical Component)			Outcome 2 (Mental Component)		
	β	95% CI	p-value	β	95% CI	p-value
profession	-0.98	(-6.80,4.84)	0.741	2.59	(-4.33,9.52)	0.462
Medical profession	1.00 (ref)			1.00 (ref)		
Presence of chronic disease						
No	4.81	(-0.31,9.93)	**0.065**	10.09	(4.18,16.01)	**0.001**
Yes	1.00 (ref)			1.00 (ref)		
Social support	0.16	(0.04,0.27)	**0.008**	0.28	(0.14,0.41)	**0.0001**

1- "Others" is category which includes all participants who mentions Sikhism, Jainism, Buddhism, monotheism and atheist because of very minor response in few options

2- Are you participating at any extracurricular groups that included amateur sport teams or research teams or undergraduate university association?

Table 4: The results of multivariate analysis (physical component score)

Variables	β	95% CI	p-value
Gender			
Male	5.00	(0.85,9.15)	**0.018**
Female	1.00		
Average academic mark	2.55	(0.50,4.61)	**0.015**
Alcohol drinking			
Drinker	-9.54	(-22.02,2.95)	0.134
Occasional drinker	-1.94	(-6.36,2.49)	0.389
Non-drinker	1.00		
Family monthly expense, INR			
>Rs.30,000	2.42	(-3.04,7.89)	0.383
Rs.10,000 to Rs.30,000	0.14	(-5.50,5.78)	0.961
<Rs.10,000	1.00		
Is pocket money adequate?			
Good	9.86	(0.74,18.97)	**0.034**
Moderate	7.98	(-1.31,17.27)	0.092
Poor	1.00		
Presence of chronic disease			
No	6.92	(1.37,12.48)	**0.015**
Yes	1.00		
Social support	0.17	(0.04,0.31)	**0.014**

p-value <0.05 were consider as significant

Table 5: The result of multivariate analysis (mental component score)

Variables	β	95% CI	p-value
Average academic mark	3.78	(1.20,6.37)	**0.004**
Physical activity			
Physical active	6.62	(1.40,11.84)	**0.013**
No or insufficient physically active	1.00		
Currently living with?			
Dormitory with friends	7.00	(-5.16,19.12)	0.256
Rented home with friends	2.66	(-10.14,15.45)	0.682
Family /Separate home (alone)	1.00		
Family monthly expense, INR			
>Rs.30,000	0.84	(-5.99,7.67)	0.808
Rs.10,000 to Rs.30,000	3.22	(-3.71,10.16)	0.361
<Rs.10,000	1.00		
Loan from bank or other source to support fees payment			
Yes, complete coverage of amount	-5.94	(-15.45,3.57)	0.220
Yes, partial coverage of amount	2.58	(-2.83,7.99)	0.349
No amount	1.00		
Presence of chronic disease			
No	14.00	(7.08,20.92)	**0.0001**
Yes	1.00		
Social support	0.37	(0.20,0.54)	**0.0001**

p-value <0.05 were consider as significant

HRQoL Questionnaire

HEALTH-RELATED QUALITY OF LIFE OF INDIAN MEDICAL STUDENTS STUDYING AT YEREVAN STATE MEDICAL UNIVERSITY

Participation ID: _____

Date of interview: ___/____/____ (day/month/year)

Interview starting time: ____/____ (hours/minutes)

A.<u>Demographic data</u>

1   What is your age?   _____ years

2   What is your gender?

>   1. Male
>   2. Female

3   What is your course year in medical school?

>   1. First year
>   2. Second year
>   3. Third year
>   4. Fourth year
>   5. Fifth year
>   6. Sixth year

4   What is your relationship status?

>   1. Single
>   2. Engaged
>   3. Married
>   4. Divorced
>   5. Other   (please specify) _____

5   What is your birth place?

        1.   Urban (city)

        2.   Rural (village)

6   To what religion do you belong?

        1.   Hinduism

        2.   Christianity

        3.   Islam

        4.   Sikhism

        5.   Jainism

        6.   Buddhism

        7.   Other   (please specify)_____

B. Health-Related Quality of Life questions (SF-36)

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Thank you for completing this survey! For each of the following questions, please circle the number that best describes your answer.

7   In general, would you say your health is: (Circle one)

        1.   Excellent

        2.   Very good

        3.   Good

        4.   Fair

        5.   Poor

8   Compared to one year ago, how would you rate your health in general now? (Circle one)

        1.   Much better now than one year ago

        2.   Somewhat better now than one year ago

        3.   About the same as one year ago

        4.   Somewhat worse now than one year ago

        5.   Much worse now than one year ago

9 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?

   (Circle One Number on Each Line)

	Yes, Limited a Lot (1)	Yes, Limited a Little (2)	No, Not limited at All (3)
a. **Vigorous activities**, such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b. **Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling or playing golf	1	2	3
c. Lifting or carrying groceries	1	2	3
d. Climbing **several** flights of stairs	1	2	3
e. Climbing **one** flight of stairs	1	2	3
f. Bending, kneeling, or stooping	1	2	3
g. Walking **more than a mile**	1	2	3
h. Walking **several blocks**	1	2	3
i. Walking **one block**	1	2	3
j. Bathing or dressing yourself	1	2	3

10 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? (Circle One Number On Each Line)**

	Yes (1)	No (2)
a. Cut down the amount of time you spent on work or other activities	1	2
b. **Accomplished less** than you would like	1	2
c. Were limited in the **kind** of work or other activities	1	2
d. Had **difficulty** performing the work or other activities (for example, it took extra effort)	1	2

11 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)? **(Circle One Number on Each Line)**

	Yes	No
a. Cut down the amount of time you spent on work or other activities	1	2
b. **Accomplished less** than you would like	1	2
c. Didn't do work or other activities as **carefully** as usual	1	2

12 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?

1. Not at all
2. Slightly
3. Moderately
4. Quite a bit
5. Extremely

13 How much bodily pain have you had during the past 4 weeks?

1. None
2. Very mild
3. Mild
4. Moderate
5. Severe
6. Very severe

14 During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

1. Not at all
2. A little bit
3. Moderately
4. Quite a bit
5. Extremely

These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling. **(Circle One Number on Each Line)**

15 How much of the time during the **past 4 weeks** . . .

	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 pep? (Probe: Did you feel full of energy and high spirits?)	1	2	3	4	5	6
b. Have you been a very nervous person?	1	2	3	4	5	6
c. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
d. Have you felt calm and peaceful?	1	2	3	4	5	6
e. Did you have a lot of energy?	1	2	3	4	5	6
f. Have you felt downhearted and blue? (Probe: Have you felt discouraged or in low spirits?)	1	2	3	4	5	6
g. Did you feel worn out? (Probe: Did you feel like valueless or useless)	1	2	3	4	5	6
h. Have you been a happy person?	1	2	3	4	5	6
i. Did you feel tired?	1	2	3	4	5	6

16 During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)? (Circle One Number)

       1. All of the time

       2. Most of the time

       3. Some of the time

       4. A little of the time

       5. None of the time

17 How TRUE or FALSE is each of the following statements for you. (Circle One Number on Each Line)

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
a. I seem to get sick a little easier than other people	1	2	3	4	5
b. I am as healthy as anybody I know	1	2	3	4	5
c. I expect my health to get worse	1	2	3	4	5
d. My health is excellent	1	2	3	4	5

C. **Social support (Multidimensional Scale of Perceived Social Support)**

We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

	Very strongly disagree	Strongly disagree	Mildly disagree	Neutral	Mildly agree	Strongly agree	Very strongly agree
a) There is a special person who is around when I am in need.	1	2	3	4	5	6	7
b) There is a special person with whom I can share my joys and sorrows.	1	2	3	4	5	6	7
c) My family really tries to help me.	1	2	3	4	5	6	7
d) I get the emotional help and support I need from my family.	1	2	3	4	5	6	7
e) I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7
f) My friends really try to help me.	1	2	3	4	5	6	7
g) I can count on my friends when things go wrong.	1	2	3	4	5	6	7
h) I can talk about my problems with my family.	1	2	3	4	5	6	7
i) I have friends with whom I can share my joys and sorrows.	1	2	3	4	5	6	7
j) There is a special person in my life who cares about my feelings.	1	2	3	4	5	6	7
k) My family is willing to help me make decisions.	1	2	3	4	5	6	7
l) I can talk about my problems with my friends.	1	2	3	4	5	6	7

D. **Behavioral questions**

18 Physical activities

    18.1 During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?

        1. Yes

        2. No   → go to question 19

        3. Don't know/ not sure   → go to question 19

        4. Refusal   → go to question 19

    18.2 How many times per week or per month did you take part in this activity during the past month?

        1. _____ times per week

        2. _____ times per month

        3. Don't know / not sure

        4. Refused

    18.3 And when you took part in this activity, for how many minutes or hours did you usually keep at it?

        1. _____ hours and minutes

        2. Don't know / not sure

        3. Refused

19 Weight in Kilo Grams (KG) _____

20 Height in Meters (M) _____

21 Smoking status

    21.1 Have you ever smoked tobacco daily?

        1. Yes

        2. No → *Go to question 22*

21.2 Do you currently smoke tobacco? (*Choose one response only*)

       3. Yes

       4. No → *Go to question 22*

21.3 How many cigarettes on average do you smoke per day? _____

21.4 How many years that you are regularly smoking? _____

22 Alcohol drinking

22.1 On average, how often do you have 1 or more alcohol drinks on one occasion (glass of wine; cans/bottles of beer; shots of brandy, vodka or liquor)? (*Choose one response only*)

       1. Never → *Go to question 23*

       2. Less than monthly

       3. 1 to 3 times in a month

       4. 1 to 3 times in a week

       5. Almost every day

22.2 Was there ever a time or times in your life when you drank 5 or more portions of any kind of alcoholic beverage almost every day? (*Choose one response only*)

       1. Yes

       2. No

23 Are you participating at any extracurricular groups that included amateur sport teams or research teams or undergraduate university associations?

       1. Yes

       2. No

E. Socio-economic questions

24 Currently are you living with?

    1. Family

    2. Dormitory with friends

    3. Rented home with friends

    4. Other (please specify) _____

25 Since your admission into medical school, how many times have you visited your family in the past year?

    1. Once

    2. Twice

    3. More than twice

    4. I haven't been home in the past year

26 Do you have loan from bank or other source to support the fees payment during your medical education?

    1. Yes, completely amount

    2. Yes, partially amount

    3. No

27 What is your parent's profession?

    1. Medicine profession

    2. Non-medical profession

28 Before your admission into medical school, what did you want to become?

    1. Architect

    2. Engineer

    3. Lawyer

    4. Doctor

    5. Other (please specify)_____

29 What is your monthly family expenditure as of last month?

    1. Less than Rs. 1,500

    2. Rs. 1,500 to Rs. 5,000

    3. Rs. 5,001 to Rs. 10,000

    4. Rs. 10,001 to Rs. 30,000

    5. Rs. 30,001 to Rs. 50,000

    6. More than Rs. 50,000

30 Is your pocket money adequate?

    1. Very poor

    2. Poor

    3. Moderate

    4. Good

    5. Very Good

31 What is your Grade Point Average (GPA)? (average of your academic mark)

    _____ out of 10

32 Please, indicate any chronic health problem(s) that you presently have. (***Mention all that apply***)

    1. High blood pressure

    2. Heart disease

    3. Lung disease (including asthma)

    4. Stomach/intestine disease

    5. Cancer

    6. Kidney problem

    7. Problems with joints/bones

    8. Other problems (describe)_____

    9. No chronic health problems

Interview end time: _____/_____ (hours/minutes)

Thank you for your participation!!

ORAL CONSENT FORM FOR INDIAN MEDICAL STUDENTS

American University of Armenia

Institutional Review Board #1

Title of Research Project: Health-Related Quality of Life of Indian medical students at Yerevan State Medical University, a cross-sectional survey.

Explanation of the Research Project

I am Aswin Kumar Ramalingam, a second-year graduate student of Master of Public Health (MPH) at Gerald and Patricia Turpanjian School of Public Health at American University of Armenia (AUA) and a medical student. The AUA School of Public Health is conducting a research to assess the Health-Related Quality of Life (HRQoL) of Indian medical students at Yerevan State Medical University (YSMU). For this purpose we plan to interview 353 Indian medical students by approaching them before the classes. I would like to invite you to participate in this survey. If you are willing to participate, please fill in the questionnaire after your class. It would take 20-25 minutes to complete it. I appreciate your participation in the study. Your response is very valuable and important for the study. Each participant will be interviewed only once. The questionnaire contains questions regarding quality of life, social support, socio-demographic information and behavior (smoking, alcohol use, etc,).

Voluntariness: Your participation in the study is completely voluntary. You are free to skip any question or withdraw from the study at any time. There is no negative consequence if you refuse to participate in the study.

Risk/Discomfort: Your participation in the study poses no risk for you. Your participation will not affect you or your medical studies.

Benefits: There is no direct benefit from participating in the study. Participation in this study will provide valuable information that will help to assess Health Related Quality of Life of medical students and associating factors.

Confidentiality: We do not collect any identifiable information such as your name, address, etc. None of your university authorities, including the dean, will know about your participation. The information obtained from you will be kept confidential and will not be used outside of the study. Only the research team will have access to this information. The summary report of this survey will be present in AUA as a part of the requirement in MPH degree.

Whom to contact: If you have any questions relevant or about this study, without hesitation you can contact Dean of Gerald and Patricia Turpanjian School of Public Health Dr.Varduhi Petrosyan (+37460) 612592 at American University of Armenia.

If you feel that you have not been treated fairly or offended during the participation, you can contact Varduhi Hayrumyan (email: vhayrumyan@aua,am, phone no. +37460612617), AUA Human Protections Administrator.

<div align="center">Thank you.</div>