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Effect of sociodemographic factors on quality of life of medical students in southern Vietnam: A survey using the WHOQOL-BREF assessment

[Efecto de los factores sociodemográficos en la calidad de vida de los estudiantes de medicina en el sur de Vietnam: Una encuesta que utiliza la evaluación WHOQOL-BREF]

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Abstract

Context: The quality of life (QoL) of medical students can be impacted by multifarious sociodemographic factors, but it remains an important element that powerfully affects medical training and research, as well as the practice of medicine.

Aims: To obtain an in-depth understanding of the quality of life of medical students in southern Vietnam.

Methods: A cross-sectional study was carried out at nine universities and schools in Southern Vietnam. The effect of various sociodemographic factors were examined on the domains of QoL using The World Health Organization Quality of Life-Biomedical Research and Education Facility (WHOQOL-BREF) scale. Data were analyzed using SPSS 20.0.

Results: Factors affecting the QoL of Vietnamese medical students included gender, academic year, ethnicity, having relatives working in the health care sector, frequency of physical activity, financial expenditures, extent of internet usage, sleep duration, use of sleep medication, frequency of social activities, and use of stimulants.

Conclusions: Factors affecting the QoL have been explained to build projects that will support medical students. This will improve communication and health care services for patients in the future.

Keywords: academic year; BMI; gender; physical activity; sleep duration; sleeping medication; social activities.

Resumen

Contexto: La calidad de vida (QoL) de los estudiantes de medicina puede verse afectada por múltiples factores sociodemográficos, pero sigue siendo un elemento importante que afecta poderosamente la capacitación e investigación médica, así como la práctica de la medicina.

Objetivos: Obtener una comprensión profunda de la calidad de vida de los estudiantes de medicina en el sur de Vietnam.

Métodos: Se realizó un estudio transversal en nueve universidades y escuelas del sur de Vietnam. El efecto de varios factores sociodemográficos se examinó en los dominios de la calidad de vida utilizando la escala del Centro de Investigación y Educación Biomédica de Calidad de Vida de la Organización Mundial de la Salud (WHOQOL-BREF). Los datos se analizaron con SPSS 20.0.

Resultados: Los factores que afectan la calidad de vida de los estudiantes de medicina vietnamitas incluyen género, año académico, etnia, tener familiares que trabajan en el sector de la salud, frecuencia de actividad física, gastos financieros, grado de uso de internet, duración del sueño, uso de medicamentos para el sueño, frecuencia de actividades sociales y uso de estimulantes.

Conclusiones: Se han explicado los factores que afectan la calidad de vida para construir proyectos que apoyarán a los estudiantes de medicina. Esto mejorará los servicios de comunicación y atención médica para los pacientes en el futuro.

Palabras Clave: actividad física; actividades sociales; año académico; duración del sueño; género; IMC; medicación para dormir.

INTRODUCTION

The World Health Organization (WHO) has defined quality of life (QoL) as "an individual's perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns" (WHOQOL Group, 1994). A person's QoL can be assessed by measuring the individual's mental feelings toward their satisfaction or disappointment about the different domains of their own life (WHOQOL Group, 1995). Information assembled from evaluating the QoL of medical students can show their standpoint on health, which does not include just having no illness or injury, but rather is a comprehensive comfort state of physical, mental, and social well-being (World Health Organization, 1948) that includes their state of health and other related elements (Zhang et al., 2012). Consequently, promoting medical students' well-being does not only address the self-interest of the individual, but it can also improve medical occupations, further patient care, and benefit the community (Zhang et al., 2012).

Medical students experience significant psychological stress, more so than university students in other fields (Dyrbye, 2006). Other research has demonstrated a Beck Depression Inventory score of the general population of 6.8 ± 5.5 (Mean ± Standard Deviation) (Nyenhuis et al., 1999) and high scores for college students (7.7 ± 5.1) (Kerner and Jacobs, 1983) and for medical students (5.9 ± 5.8) (Hendryx et al., 1991). In addition, numerous authors have suggested a significant frequency of worry and melancholy in medical students and they face greater risk of depression and suicidal ideation (Rotenstein et al., 2016). Some studies have indicated that the medical curriculum could produce negative changes in a student's physical and mental health, thereby decreasing their QoL (Zhang et al., 2012). Many reasons can explain these findings, such as the long duration of medical education (Guthrie et al., 1998), frequent examinations, and constant exposure to patient suffering and death (Dyrbye et al., 2014). The results of a longitudinal study on medical students in the USA indicated that 11.2% of the students thought about suicide during their education (Dyrbye et al., 2008).

The purpose of medical teaching is to train capable and confident physicians who can care for patients to improve health in their society. Today's physicians are expected to take good care of each patient and display powerful communication and cooperation skills in the setting of a modern medical service center. However, the mental distress created by these expectations can have negative effects on their behavior, study, and practice, as well as lead to poor care patient services when these students become physicians.

To the best our knowledge, this is the first study to assess the QoL of medical students in Vietnam using the WHOQOL-BREF questionnaire. This questionnaire, which is recognized as providing an effective analysis of the QoL, has been applied in several studies on the QoL of medical students (Zhang et al., 2012) and has been deemed useful for this purpose. The aim of the present research was to understand how various factors faced by medical students improve or worsen their QoL. The findings indicate that medical schools have to provided suitable changes to their curricula and give medical students the necessary support they need during their studies. These changes have helped medical students avoid negative impacts in their present and future lives.

MATERIAL AND METHODS

Study design

This cross-sectional study featuring the WHO Quality of Life Instrument - Short Form (WHOQOL-BREF) was conducted between March and July 2019 to evaluate the medical students in Southern Vietnam' QoL.

Study setting and geographic location

At the time of our investigation, Southern Vietnam had nine medical universities and schools. The five public medical universities were Pham

Ngoc Thach University of Medicine, Ho Chi Minh City University of Medicine and Pharmacy, Vietnam National University School of Medicine, Can Tho Medical and Pharmaceutical University, and Tra Vinh University, and the four private universities were Nguyen Tat Thanh University, Nam Can Tho University, Tan Tao University, and Vo Truong Toan University.

To be admitted to these medical universities, students must pass the National Entrance Examination. The educational program lasts 6 years and students take classes for at least 8 hours per day, 5 or 6 days a week. The medical curriculum of each university has some slight differences.

Data collection and sample size

Data were collected between March and July 2019. Medical students taking part in this study were contacted through social media and, after filling out a Google consent form, they conducted an online survey, autonomously and incognito, that included 54 questions. In parallel with the collection of data using the WHOQOL questionnaires, we also collected sociological data that were very meaningful and reflected the reality of the QoL of medical students. We defined our sample size (n = 712) by selecting the data of all willing participants who completed the survey.

Study instrument

This study used two instruments to appraise information: a sociodemographic questionnaire and the Vietnamese version of the WHOQOL-BREF. The sociodemographic questionnaire supplied data on gender, academic year, religious beliefs, hometown, ethnicity, part-time job, relatives who work in the healthcare sector, height, weight, frequency of physical activity, financial expenditures, extent of internet usage, sleep duration, use of sleep medication, and frequency of social activities.

The WHOQOL-BREF is the brief version of the WHOQOL-100 questionnaire, comprising 26 items. Two items relate to the self-evaluation about the respondent's QoL and their own health. The rest consist of 24 items divided into four do-

mains: physical, psychological, social, and environmental (WHOQOL Group, 1998). The physical domain involves items regarding daily activities, sleep and rest, working capacity, discomfort and pain, use of medication, energy and fatigue, and mobility. The psychological domain refers to thoughts and learning, self-respect, spirituality, body image and appearance, memory and concentration, and positive and negative feelings. The social domain involves items regarding personal relationships, sexual activity, and social support. The environmental domain encompasses items involving facility conditions, ability to access health care, transportation, accessibility to latest information, joining in recreational activities, safety and security, natural environment, and financial resources (World Health Organization, 1996). Each item has five choices, rated from 1 to 5: items 1 to 2 (1 = very bad to 5 = very good), items 3 to 14 (1 = very dissatisfied to 5 = very satisfied), items 15 to 16 (1 = never to 5 = always), and items 17 to 26 (1 = not at all to 5 = an extreme amount). The score is calculated according to the number of each choice (from 1 to 5, except for items 3, 4, 26, which are ranked from 5 to 1). This raw score is converted to a transformed score (a 0–100 scale). Lower overall scores indicate lower levels of QoL and higher scores indicate a higher QoL (World Health Organization, 1996). This questionnaire assesses subjective life conditions and was translated into Vietnamese to facilitate this investigation.

Study subjects

The research subjects of this study were medical students studying at Southern Vietnam universities. Incomplete questionnaires were considered missing values and were excluded from the data analysis.

Sampling method

A simple random sampling method was used to administer the survey online. Every medical student studying at Southern Vietnam universities had an equal opportunity to become a sample of the study by answering all questions. Complete data were used in this research.

Statistical analysis

The data for quantitative variables were presented as means ± standard deviations (SD). The data for categorical variables were shown as frequencies and percentages. Associations between categorical variables and QoL scores of four domains were expressed as means ± SD. Body mass index (BMI) (kg/m²) was classified as overweight (23–<25), obese (≥ 25), normal (18.5–<23), or underweight (<18.5), according to the Western Pacific Regional Office of WHO (World Health Organization, 2000). The reliability was assessed using Cronbach's alpha coefficient, with a value over 0.60 deemed acceptable (Nunnally and Bernstein, 1994) (The Cronbach's alpha coefficient of the complete questionnaire and four domains was 0.639–0.905). Relationships between WHOQOL-BREF scores and sociodemographic factors were evaluated as parametric statistics using independent t-tests. One-way analysis of variance (ANOVA) was used because the data showed a normal distribution. Chi-squared tests and other analytical tests were used whenever applicable. A p<0.05 was considered statistically significant.

Multiple linear regressions were performed with the standardized beta coefficient (β), p-value, and the R². Dependent variables included physical, psychological, social, and environmental domains. Independent variables were gender, BMI, relatives who work in the healthcare sector, frequency of physical activity, use of sleep medication, sleep duration, and frequency of social activities. The IBM SPSS Statistics Version 20.0 software was used to analyze the data.

Ethical considerations

The students voluntarily participated in this research. We ensured the privacy of partakers because all the collected data were kept anonymous serving only research purpose.

RESULTS

Overall, the social domain had the highest mean score of 58.49 ± 16.62 followed by the physical domain at 54.95 ± 13.23, the environmental

domain at 54.58 ± 15.22, and the psychological domain at 51.25 ± 15.39.

Sociodemographic characteristics of the study population

The study population comprised 712 medical students (373 [52.4%] males and 339 [47.6%] females) in their first through sixth academic year with an overall mean age of 21.47 years (SD = 2.152, range: 19-35 years). The age difference between the male and female participants was statistically significant (p = 0.000). The percentages of participants in each year of study (first to sixth) were 19.2, 30.6, 13.9, 16.6, 10, and 9.7%, respectively. The difference in gender between academic years was statistically significant (p = 0.000). An overview of the sociodemographic characteristics of the study population is presented in Table 1.

QoL according to academic year and gender

The difference between males and females with respect to the physical domain was statistically significant (p = 0.000). Significantly higher mean scores were observed in males in three of the four evaluated domains. First-year medical students had higher scores in the physical, psychological, and social relations domains, whereas medical students in Year 3 had lower scores in all four domains. Overall, the number of study years was significantly associated with QoL in the physical domain (p = 0.035) (Table 2); however, after stratifying based on academic year and repeating the test, a gender difference was seen, where males had higher scores than the females in the physical and psychological domains in the fourth year and in the physical domain in the sixth year (p = 0.000, p = 0.006, p = 0.004, respectively) (Table 3). Multiple regression analysis revealed a negative effect of gender in the physical (β -0.142), psychological (β -0.079), and environmental (β -0.078) domains (Table 4).

QoL according to sociodemographic factors

In our study, ethnic Kinh students had higher scores in the social relations and environmental domains (p = 0.050, p = 0.031, respectively). Medical students who had relatives working in the

healthcare sector had higher mean scores in the environmental domain (p = 0.017). Significantly higher mean scores were observed in all four evaluated domains in students who partook of physical activity 3 to 4 and 4 or more times a week, whereas, participants with no physical activity (except for third-year students) had lower scores in all four domains (physical, p = 0.000; psychological, p = 0.000; social, p = 0.133; and environmental, p = 0.001). Comparison of the individual's social relations in terms of their financial expenditures showed a significant difference (p = 0.022). Medical students whose duration of internet usage per day was less than two hours had higher scores in the psychological domain (p = 0.003). In the physical domain, participants who slept less than three hours per day had lower scores, whereas

those who slept more than 8 hours per day had higher scores (p = 0.000). Students who routinely used sleep medications had higher scores in the psychological, social, and environmental domains (psychological, p = 0.006; social, p = 0.024; and environmental, p = 0.011). Significantly, students who routinely participated in social activities had higher mean scores for all four domains, whereas participants with no social activities had the lowest mean scores for all four domains (physical, p = 0.000; psychological, p = 0.000; social, p = 0.000; and environmental, p = 0.000) (Table 2). Separate multiple linear regression analyses were performed to identify predictor variables for the physical, psychological, social, and environmental QoL (Table 4).

Table 1. Sociodemographic characteristics (n = 712).

Characteristics	Frequency (%)
Gender	
Male	373 (52.39)
Female	339 (47.61)
Academic year	
First	137 (19.24)
Second	218 (30.62)
Third	99 (13.90)
Fourth	118 (16.57)
Fifth	71 (9.97)
Sixth	69 (9.69)
Religion beliefs	
Yes	514 (72.19)
No	198 (27.81)
Hometown	
Urban	188 (26.40)
Rural	524 (73.60)
Ethnic	
Kinh[a]	670 (94.10)
Others[b]	42 (5.90)
Part-time job	
Yes	150 (21.07)
No	562 (78.93)
Relatives work at healthcare sector	
Yes	339 (47.61)
No	373 (52.39)
BMI[c]	
Underweight	104 (14.61)
Normal	412 (57.87)
Overweight	103 (14.47)
Obese	93 (13.06)
Frequency of physical activity (times per week)	
Never	267 (37.50)

Characteristics	Frequency (%)
Expenditure (million VND [d])	
<3	347 (48.74)
3-<5	279 (39.19)
5-<7	58 (8.15)
7-<10	14 (1.97)
10-<15	8 (1.12)
≥15	6 (0.84)
Duration of internet usage (hours per day)	
<2	111 (15.59)
2-<4	333 (46.77)
4-<8	197 (27.67)
≥8	71 (9.97)
Sleep duration (hours per day)	
<3	11 (1.54)
3-<5	86 (12.08)
5-<8	530 (74.44)
≥8	85 (11.94)
Use of sleeping medications	
Never	652 (91.57)
Rarely	36 (5.06)
Often	21 (2.95)
Routinely	3 (0.42)
Frequency of social activities	
Never	44 (6.18)
Rarely	227 (31.88)
Often	369 (51.83)
Routinely	72 (10.11)
Use stimulants	
Never	480 (67.42)
Using	83 (11.66)
Used	149 (20.93)

[a] The largest ethnic group in Vietnam. [b] Hoa, Khmer, Cham and other minority people. [c] Body mass index (kg/m^2) with under-weight :<18.5, normal: 18.5-<23, overweight: 23-<25, obese: ≥25 (World Health Organization, 2000). [d] 1 USD = 23,138 VND (*Source*: Vietnamese Ministry of Finance-exchange rate for foreign currencies in March 2019, number: 1007/TB-KBNN).

Table 2. WHOQOL-BREF scores according to sociodemographic characteristics.

Characteristics	Physical (Mean ± SD)	p-value	Psychological (Mean ± SD)	p-value	Social (Mean ± SD)	p-value	Environmental (Mean ± SD)	p-value
Gender								
Male	57.06 ± 13.02	0.000	52.08 ± 15.84	0.132	57.47 ± 17.57	0.086	55.48 ± 15.82	0.098
Female	52.62 ± 13.09		50.34 ± 14.85		59.61 ± 15.45		53.59 ± 14.49	
Academic year								
First	56.32 ± 11.79		53.39 ± 15.70		60.88 ± 15.70		55.37 ± 15.32	
Second	56.03 ± 12.26		51.18 ± 14.40		59.86 ± 15.68		55.59 ± 13.67	
Third	51.20 ± 11.92	0.035*	48.28 ± 14.65	0.174	55.67 ± 16.48	0.081	51.04 ± 15.12	0.225
Fourth	54.08 ± 15.14		51.30 ± 16.10		58.23 ± 15.91		54.14 ± 14.48	
Fifth	55.85 ± 14.86		52.85 ± 17.09		56.32 ± 19.62		55.10 ± 19.37	
Sixth	54.72 ± 14.71		49.81 ± 15.48		56.14 ± 18.61		55.09 ± 15.98	
Religion beliefs								
Yes	55.39 ± 13.08	0.147	51.23 ± 15.31	0.937	58.77 ± 16.33	0.463	55.11 ± 14.86	0.131
No	53.79 ± 13.60		51.33 ± 15.64		57.75 ± 17.34		53.19 ± 16.08	
Hometown								
Urban	54.82 ± 13.69	0.878	52.14 ± 15.82	0.356	56.90 ± 18.69	0.126	53.85 ± 16.84	0.466
Rural	54.99 ± 13.08		50.94 ± 15.24		59.06 ± 15.78		54.85 ± 14.60	
Ethnic								
Kinh[a]	55.15 ± 13.32	0.108	51.29 ± 15.46	0.791	58.80 ± 16.54	0.050	54.89 ± 15.26	0.031
Others[b]	51.76 ± 11.38		50.64 ± 14.47		53.62 ± 17.19		49.67 ± 13.78	
Part-time job								
Yes	54.53 ± 14.63	0.685	50.73 ± 16.21	0.641	57.25 ± 18.81	0.349	53.73 ± 18.40	0.509
No	55.06 ± 12.84		51.39 ± 15.18		58.82 ± 15.98		54.80 ± 14.26	
Relatives work at healthcare sector								
Yes	55.63 ± 13.10	0.190	51.88 ± 15.19	0.302	59.53 ± 16.34	0.110	56.00 ± 15.16	0.017
No	54.33 ± 13.34		50.69 ± 15.57		57.54 ± 16.83		53.29 ± 15.17	
BMI[c]								
Underweight	53.34 ± 12.76		51.58 ± 14.70		60.55 ± 15.01		56.45 ± 12.28	
Normal	54.57 ± 12.46	0.175	51.60 ± 15.06	0.393	58.46 ± 15.97	0.232	54.03 ± 14.84	0.507*
Overweight	56.68 ± 14.73		51.85 ± 17.27		59.04 ± 18.21		54.31 ± 17.68	
Obese	56.52 ± 15.07		48.69 ± 15.38		55.72 ± 19.01		55.20 ± 16.88	
Frequency of physical activities (times per week)								
Never	51.59 ± 13.54		47.95 ± 15.44		57.83 ± 16.72		52.50 ± 15.56	
1-2	55.04 ± 11.94	0.000*	52.09 ± 14.47	0.000	58.33 ± 16.50	0.133	54.42 ± 13.53	0.001*
3-4	59.65 ± 11.97		55.07 ± 14.10		57.28 ± 15.61		56.68 ± 13.84	
≥4	58.71 ± 14.28		54.03 ± 17.19		62.11 ± 17.45		58.39 ± 18.58	

*Results of Kruskal-Wallis test. Test-used: t-student and Kruskal-Wallis test. SD: Standard Deviation. [a] Kinh is the largest ethnic group in Vietnam; [b]Hoa, Khmer, Cham, and other minority ethnicity people; [c] Body mass index (kg/m²) with under-weight :<18.5, normal:18.5-<23, overweight:23-<25, obese: ≥ 25 (World Health Organization, 2000)

Table 2. WHOQOL-BREF scores according to sociodemographic characteristics (*continued...*).

Characteristics	Physical (Mean ± SD)	p-value	Psychological (Mean ± SD)	p-value	Social Mean ± SD	p-value	Environmental Mean ± SD	p-value
Expenditure (million VND [d])								
<3	55.88 ± 13.19		51.29 ± 15.46		56.71 ± 16.93		54.52 ± 15.73	
3-<5	54.13 ± 12.42		51.46 ± 14.74		60.61 ± 15.13		54.77 ± 13.67	
5-<7	53.95 ± 13.29	0.374	50.03 ± 15.46	0.619	58.91 ± 17.14	0.022	54.71 ± 15.26	0.174*
7-<10	52.71 ± 19.67		49.14 ± 21.05		58.07 ± 18.25		49.57 ± 15.02	
10-<15	58.63 ± 20.37		59.25 ± 17.04		67.25 ± 27.42		68.75 ± 25.24	
≥15	49.00 ± 22.12		46.00 ± 24.75		48.00 ± 26.45		40.67 ± 25.55	
Duration of internet usage (hours per day)								
<2	56.05 ± 12.73		54.78 ± 14.36		59.23 ± 15.71		54.61 ± 15.45	
2-<4	55.72 ± 13.40	0.169	52.07 ± 15.27	0.003	59.13 ± 15.75	0.662*	55.05 ± 14.86	0.611*
4-<8	53.60 ± 11.91		48.88 ± 15.21		57.83 ± 16.05		54.45 ± 13.92	
≥8	53.31 ± 16.22		48.51 ± 16.78		56.17 ± 22.56		52.68 ± 19.57	
Sleep duration (hours per day)								
<3	45.55 ± 15.35		43.27 ± 13.23		55.09 ± 18.09		45.64 ± 16.93	
3-<5	50.36 ± 13.97	0.000	48.24 ± 18.17	0.068	54.44 ± 19.28	0.068	51.79 ± 18.43	0.056
5-<8	55.46 ± 12.74		51.86 ± 14.86		58.90 ± 16.02		55.08 ± 14.28	
≥8	57.60 ± 13.86		51.56 ± 15.45		60.49 ± 16.76		55.45 ± 16.68	
Use of sleeping medications								
Never	55.46 ± 13.25		51.62 ± 15.29		58.79 ± 16.57		55.01 ± 14.93	
Rarely	52.22 ± 10.37	0.001	50.22 ± 15.46	0.006	58.17 ± 16.37	0.024	51.39 ± 16.54	0.011
Often	44.81 ± 13.02		40.29 ± 15.70		48.19 ± 15.68		45.33 ± 18.90	
Usually	46.00 ± 9.17		60.33 ± 7.51		68.67 ± 16.44		64.67 ± 13.05	
Frequency of social activities								
Never	48.41 ± 12.84		42.80 ± 15.64		48.39 ± 18.26		44.80 ± 15.78	
Rarely	53.05 ± 13.34	0.000*	47.67 ± 15.00	0.000	56.36 ± 16.60	0.000	51.85 ± 15.92	0.000*
Often	56.24 ± 12.26		53.36 ± 14.50		60.02 ± 15.34		55.95 ± 13.08	
Usually	58.28 ± 15.82		56.96 ± 16.63		63.54 ± 18.74		62.17 ± 17.98	
Use stimulants								
Never	55.38 ± 12.81		51.72 ± 15.35		58.53 ± 16.30		54.51 ± 14.80	
Using	56.20 ± 14.32	0.083	51.19 ± 16.45	0.404	59.49 ± 20.31	0.648*	55.02 ± 18.95	0.741*
Used	52.86 ± 13.81		49.78 ± 14.93		57.80 ± 15.38		54.55 ± 14.31	
TOTAL	**54.95 ± 13.23**		**51.25 ± 15.39**		**58.49 ± 16.62**		**54.58 ± 15.22**	

*Results of Kruskal-Wallis test. Test-used: t-student and Kruskal-Wallis test. SD: Standard Deviation. [d] 1 USD = 23,138.00VND (*Source*: Vietnamese Ministry of Finance-exchange rate for foreign currencies in March 2019, number: 1007/TB-KBNN)

DISCUSSION

This study was conducted to identify and assess the most significant sociodemographic factors, as noted by medical students themselves, that possibly affect the QoL of medical students in Southern Vietnam. In agreement with our initial hypothesis, we saw that the sociodemographic factors of gender, academic year, frequency of physical activity, sleep duration, use of sleeping medication, and frequency of social activities had significant effects on the QoL of these medical students.

Table 3. WHOQOL-BREF scores according to gender in different years (n = 712).

Academic year	N (%)	Physical (Mean ± SD)	p-value*	Psychological (Mean ± SD)	p-value*	Social (Mean ± SD)	p-value*	Environmental (Mean ± SD)	p-value*
First	**137 (19.24)**	**56.32 ± 11.79**		**53.39 ± 15.70**		**60.88 ± 15.70**		**55.37 ± 15.32**	
Male	62 (45.26)	57.29 ± 12.44	0.384	53.79 ± 17.18	0.786	59.97 ± 16.54	0.540	56.11 ± 15.76	0.609
Female	75 (54.74)	55.52 ± 11.24		53.05 ± 14.47		61.63 ± 15.04		54.76 ± 15.03	
Second	**218 (30.62)**	**56.03 ± 12.26**		**51.18 ± 14.40**		**59.86 ± 15.68**		**55.59 ± 13.67**	
Male	104 (47.70)	57.66 ± 11.33	0.060	51.13 ± 14.09	0.958	57.92 ± 16.80	0.081	55.71 ± 13.59	0.902
Female	114 (52.30)	54.54 ± 12.92		51.23 ± 14.74		61.63 ± 14.43		55.48 ± 13.81	
Third	**99 (13.90)**	**51.20 ± 11.92**		**48.28 ± 14.65**		**55.67 ± 16.48**		**51.04 ± 15.12**	
Male	42 (42.42)	53.10 ± 11.51	0.176	48.88 ± 17.55	0.743	55.05 ± 16.23	0.750	53.50 ± 15.67	0.166
Female	57 (57.58)	49.81 ± 12.13		47.84 ± 12.23		56.12 ± 16.79		49.23 ± 14.57	
Fourth	**118 (16.57)**	**54.08 ± 15.14**		**51.30 ± 16.10**		**58.23 ± 15.91**		**54.14 ± 14.48**	
Male	62 (52.54)	58.63 ± 14.51	0.000	55.10 ± 15.26	0.006	58.63 ± 16.02	0.775	56.37 ± 15.19	0.079
Female	56 (47.46)	49.05 ±14.33		47.09 ±16.08		57.79 ±15.93		51.68 ±13.36	
Fifth	**71 (9.97)**	**55.85 ± 14.86**		**52.85 ± 17.09**		**56.32 ± 19.62**		**55.10 ± 19.37**	
Male	51 (71.83)	56.35 ± 15.27	**0.649**	52.37 ± 16.24	**0.713**	54.51 ± 20.67	**0.216**	53.65 ± 20.27	**0.317**
Female	20 (28.17)	54.55 ± 14.04		54.05 ± 19.49		60.95 ± 16.21		58.80 ± 16.77	
Sixth	**69 (9.69)**	**54.72 ± 14.71**		**49.81 ± 15.48**		**56.14 ± 18.61**		**55.09 ± 15.98**	
Male	51 (73.91)	57.62 ± 13.68	0.004	50.67 ± 16.24	0.423	57.08 ± 19.81	0.471	56.58 ± 16.45	0.178
Female	20 (26.09)	45.88 ± 14.58		47.18 ± 12.94		53.29 ± 14.45		50.53 ± 13.92	
TOTAL	**712 (100.00)**								
Male	373(52.39)	57.06 ± 13.02		52.08 ± 15.84		57.47 ± 17.57		55.48 ± 15.82	
Female	339(47.61)	52.62 ± 13.09		50.34 ± 14.85		59.61 ± 15.45		53.59 ± 14.49	
p-value#		0.000		0.132		0.086		0.098	

Test used: t-student. SD: Standard Deviation. *Results of t-test between gender by academic year with respect to all four domains of the questionnaire. #Results of t-test between males and females with respect to all four domains of the questionnaire.

Table 4. Linear regression relationship between QoL and variables.

Dependent variables	Physical β	p-value	Psychological β	p-value	Social β	p-value	Environmental β	p-value
Gender	-0.142	0.000	-0.079	0.037	0.039	0.306	-0.078	0.040
Relatives work at healthcare sector	-0.052	0.137	-0.045	0.211	-0.074	0.044	-0.097	0.007
BMI*	0.018	0.622	-0.100	0.008	-0.082	0.031	-0.057	0.126
Frequency of physical activity	0.178	0.000	0.138	0.000	0.056	0.135	0.102	0.005
Sleep duration	0.156	0.000	0.078	0.029	0.099	0.007	0.092	0.010
Use of sleeping medication	-0.125	0.000	-0.065	0.071	-0.049	0.185	-0.064	0.073
Frequency of social activities	0.172	0.000	0.235	0.000	0.190	0.000	0.250	0.000
R²	14.1%		10.4%		6.7%		10.5%	

β: Standardized coefficients. *Body mass index (kg/m²) with under-weight :<18.5, normal: 18.5-<23, overweight: 23-<25, obese: ≥25 (World Health Organization, 2000).

In previous centuries, medical students were predominantly male (Elston, 1993), but recent studies have confirmed that the medical student population is now no longer dominated by men. Specifically, when considering the total medical student populations, females represented 56.9% in China (Zhang et al., 2012), and 55.6% in Pakistan (Naseem et al., 2016). In our study, the number of

male students was slightly more than females, at 52.39 and 47.61%, respectively.

Several authors have reported that female medical students had lower QoL scores in the psychological and physical domains (Dyrbye et al., 2010; Chazan et al., 2015). In our study, we observed lower QoL scores in the psychological, physical, and environmental domains in females. Several possible reasons could explain these observations. Previous studies have described that stress and depression were more common in medical students than in the general population (Bacchi and Licinio, 2017). In the USA, data drawn from the Collaborative Psychiatric Epidemiology Studies suggested that women had a higher prevalence of anxiety disorders when compared with men (McLean et al., 2011). Similarly, another study showed that female medical students were less confident than males with regard to their knowledge (Blanch et al., 2008). The lower scores in female medical students have also been attributed to the high prevalence of dysmenorrhea and premenstrual dysphoric disorder, which affect the QoL (Ibrahim et al., 2015). Another study reported that females had difficulty in managing academic workloads and more problems with time management (Hill et al., 2018). However, in our study, females had higher QoL scores in the social domain. Recent research has shown that women deal better than men with various relationships (Palchykov et al., 2012). Psychological counselling sessions therefore need to be organized to relieve the stresses that male and female medical students experience, as well as to guide them to utilize organizational and time management strategies more effectively.

In our study, the third-year students had the lowest scores in all domains, whereas the first-year students mostly had the highest scores in all domains. This trend in the first year was opposite to that reported by research of Dahlin et al. (2005), who suggested that the stress levels in first-year students are high compared to students in other years due to increased workload, so freshman are prone to be more stressed by their subjects and semester examinations than in other years. Conversely, the trend in the third year in our study

was similar to that reported in other studies (Chazan et al., 2015), although a survey from a Chinese medical university reported higher QoL scores for third-year students for the physical, psychological, social, and environmental domains, at 66.86 ± 13.46, 63.14 ± 14.12, 62.26 ± 13.74, and 54.38 ± 12.59 (Mean ± SD), respectively (Zhang et al., 2012). These differences may have arisen for several reasons. For example, third-year students may not yet have enough knowledge and skills when they are transferred from basic to clinical sciences and are exposed to real patients (Zhang et al., 2012; Chazan et al., 2015). This transition can cause the students to feel overwhelmed, apprehensive, vulnerable, and anxious (Pitkälä and Mäntyranta, 2004). The results from the present study showed that the participants had higher scores in the social domain than in any other domains. This finding signifies an association between developing social relationships and a better QoL for medical students; hence, interventions must be designed to improve the relationships among individuals.

Stratification of males and females by academic year revealed that males had higher scores than females in the physical and psychological domains in the fourth year. In this sense, fourth-year female students were more easily disturbed by physical issues in this period of their medical studies (Chazan et al., 2015). Other studies have also reported significant differences between academic year and QoL in the psychological and physical domains (Paro and de Camargo Bittencourt, 2013). Our results indicated that academic year was significantly associated with QoL in the physical domain (p = 0.035). Medical schools therefore need to adjust their curricula to include integrated courses and early exposure to clinical training.

Some studies have shown that many college/university-aged students get insufficient amounts of sleep (Hershner and Chervin, 2014; Rotenstein et al., 2016). The number of young medical students faced with sleep problems was greater than in the general population (BaHammam et al., 2012). Shah et al. (2010) suggested that from 43 to 88% of students in the medical sciences suffer from poor sleep quality. In our study, we found an association between sleep duration and the physi-

cal domain (p = 0.000, β = 0.156). We also found that medical students who slept less than 3 hours per day had the lowest scores in the physical domain; whereas the QoL scores of participants who slept more than 8 hours per day were the highest. Previous studies have suggested that sleeplessness causes an increase in BMI, daytime napping, persistent sleepiness during the daytime (Veldi et al., 2005), depression (National Institute of Neurological Disorders and Stroke, 2007), blood pressure (Harvard Health Publications, 2004), as well as worsening the learning and memory processes (Lawson et al., 2019). In addition, a study has shown that sleep problems can adversely affect the brain and cognitive system, including an increase in somatic and/or psychiatric disorders (Rocha et al., 2002; Hirkani and Yogi, 2017). Medical students face academic stress from their extensive medical curriculum, frequent examinations, and fear of failure (Shah et al., 2010) that can soar into psychological stress, which in turn is associated with poor sleep quality (Rocha et al., 2002) and can result in a deterioration of the health-care system (Veldi et al., 2005; Rathod et al., 2018). Notably, students with poor sleep used sleeping pills more frequently than the other students and the use of sleeping pills was associated with quality of sleep (Nojomi et al., 2009). In the present study, medical students who routinely used sleeping medications had higher scores in the psychological, social, and environmental domains, whereas medical students who never used sleeping pills had higher scores in the physical domain. In general, the use of sleeping medication supposedly has a negative effect on the QoL of medical students. A better understanding is needed regarding the importance of sleep in medical students, so medical schools should include information about sleep in their academic programs.

In terms of the frequency of physical activity, we found that the largest group of participants (37.5%) consisted of those who had no physical activity. This percentage is lower than the values presented by other studies conducted in Brazil (40%) (Peleias et al., 2017), and Canada (64%) (Ng and Irwin, 2013). In our study, the percentages of students who reported physical activity 3 to 4 times per week *versus* 4 or more times per week declined from 15.3 to 13.5%. This finding correlates with the students having no time or enthusiasm to exercise due to long study times required during the medical training process (Gnanendran et al., 2011). The reduction in physical activity can be hypothesized to affect the QoL. Specifically, we found that medical students who participated in physical activity 3 to 4 times and 4 or more times per week had the highest QoL scores, whereas those with no physical activity had the lowest scores in three domains. Other studies have also shown that physical activity can protect against the development of depression (Mammen and Faulkner, 2013). Some research has indicated that improvements in health habits (including physical activity) by freshmen in medical specializations is a cause of improved behavior and sleep (Ball and Bax, 2002). Previous studies have demonstrated that physical activities enhance QoL (Gill et al., 2013) and that participating in health-improving activities changes conceptions toward preventive medicine and intensifies the frequency of physical activity in medical students, thereby promising better future practice in counseling (Ng and Inwin, 2013). Therefore, meetings should be organized in medical school to enhance students' knowledge about the importance of maintaining their own physical fitness.

Previous studies have shown that participating in social activities increases QoL (Bennett, 2005). The findings of the present study demonstrated that the frequency of social activities positively affected all four domains. Medical students who never or rarely took part in social activities had lower QoL scores than who often or usually joined in social activities. To the best our knowledge, no research has yet demonstrated the influence of social activities on QoL in medical students. However, several studies have shown that social activities are beneficial to health. For example, James et al. (2011) affirmed that a lifestyle that included participating actively in social activities could prevent the elderly from cognitive decline. Medical schools therefore need to promote the benefits of social work participation and encourage social activities among medical students.

In this study, the proportions of medical students who were overweight and obese (defined as BMI 23-<25 and BMI ≥25) were approximate 14.47 and 13.6%, respectively; most students had a normal BMI (57.9%). In 2018, the WHO reported that more than 1.9 billion adults 18 years and older were overweight and that approximately 34% of that total were obese (World Health Organization, 2018). In a Vietnamese study, (Walls et al., 2009) reported the percentages of overweight and obesity, using Asian-specific body mass index cut-offs, as 28.6 and 2.1%, respectively. In urban areas of Ho Chi Minh City, Vietnam, the rates of overweight and obesity were 26.2 and 6.4%, respectively (Cuong et al., 2007). Many other studies have shown that the proportion of medical students who were overweight was about 19.7%, whereas the rate of obesity was around 4.8% in the USA (Phelan et al., 2015). The percentage of medical students who have normal BMI was the same as in our study and in a study conducted at Dow Medical College, at 59% (National Task Force on the Prevention and Treatment of Obesity, 2000). The proportion of obese students was higher in our study than in other studies, and the BMI was negatively associated with the psychological, social, and environmental domains (β -0.100, β -0.082, and β -0.057, respectively). This finding may reflect that the students had poor nutrition habits (Anderson et al., 2013), felt a lack of satiety (Cuong et al., 2007) or skipped breakfast (Gonzalez et al., 2018). A negative impact of obesity on the QoL in medical students has been described previously (Bertsias et al., 2003). The increasing prevalence of obesity in medical students was also associated with a high prevalence of major risk factors for cardiovascular disease, notably high blood pressure and disadvantageous lipid profile (Bertsias et al., 2003). We also found a decline in the QoL scores with respect to three of the four evaluated domains (except for physical) in obese medical students. Our results confirmed our hypothesis of a lower QoL score in obese than in non-obese students.

Limitations of this study

This research had several limitations. One limitation was that the data were restricted to medical schools in Southern Vietnam and that participants were enrolled with a simple random sampling method, so the study population was not a perfect representation of the general population. Consequently, other factors could influence the QoL of medical students. A second limitation was that the study was a cross-sectional design and showed only the status at the time the research was conducted. Despite these limitations, the results of this study can be used to guide other researches. The strategies identified in this study can also be applied to improve poor QoL. For instance, providing psychological and physical counseling services might help medical students surmount negative effects of gender, as well as decrease obesity rates. In addition, promoting social activities and enhancing knowledge about the importance of physical activities and sleep can improve the QoL of medical students.

CONCLUSIONS

This study has provided information of the effects of factors on the QoL in medical students. These findings are very important, because of building projects to essentially provide physical, psychological, and social support for medical students as well as a readjustment to medical training. This improves communication and the quality of care provided to the patients in future.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHOR CONTRIBUTION:

Contribution	Vo TQ	Hieu TTN	Anh PNT
Concepts or ideas	x		
Design	x	x	x
Definition of intellectual content	x	x	x
Literature search	x	x	x
Experimental studies	x	x	x
Data acquisition	x	x	x
Data analysis	x	x	x
Statistical analysis	x	x	x
Manuscript preparation	x	x	x
Manuscript editing	x	x	x
Manuscript review	x	x	x