Prevalence And Associated Factors of Happiness Among Female Rural Medical Students of Haryana, India: A Cross-Sectional Study

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ABSTRACT:

Objective: This study was undertaken to estimate the prevalence of happiness and to explore the factors associated with the level of happiness among female medical students of a rural medical college located in Haryana, India.

Methods: A cross-sectional study was conducted among undergraduate medical students at a rural medical college Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, Sonepat, Haryana. Data were collected via a pre-designed, pre-tested, semi-structured, self-administered questionnaire incorporating the Oxford Happiness Questionnaire. Appropriate descriptive and inferential statistical analyses were performed.

Results: Out of 339 participants, 48% of the students reported to be happy and the mean happiness score was 114.40 ± 22.21. Binary logistic regression found peer support to be significant factor (AOR = 2.06; CI: 1.01–4.20; p = 0.047).

Conclusion: Every second medical student was found to be unhappy, highlighting the need to strengthen peer support systems to improve student happiness. Medical colleges should promote mentorship programs, peer support groups, collaborative learning, and student-led activities to foster a supportive environment and enhance well-being among medical students.

Keywords: Happiness, medical, peer group, social support, questionnaire.

Introduction

Economists are advocating for new measures of national prosperity, recommending a move away from relying solely on GDP toward a "well-being index" that reflects social, emotional, and environmental aspects of success in addition to economic factors[1]. Happiness is understood as a condition of emotional wellness or a favourable assessment of one's life, commonly referred to as subjective well-being [2]. It comprises two primary components: an affective component, characterized by frequent positive emotions and infrequent negative emotions, and a cognitive component, reflected in overall life satisfaction [3,4]. This concept of subjective well being forms the basis for global measures such as the World Happiness Report, first published in 2012 by the United Nations Sustainable Development Solutions Network. In the 2024 edition, India ranked 126th out of 143 countries [5]. Previous research highlights the positive effects of happiness on human life, including improved physical and mental health, better sleep quality, lower stress hormone levels, enhanced cardiovascular function, and an overall better quality of life[6,7,8,9,10].

The medical profession poses unique challenges to happiness due to its demanding nature. Delivering high-quality patient care frequently requires extended work hours, intensive training, and high-pressure environments. These factors impact both job satisfaction and overall well-being. Studies demonstrate that personal and professional characteristics, such as age, gender, education, income, and marital status, significantly influence happiness levels. Supportive relationships with colleagues, mentors, and family members further contribute to positive emotions and a sense of fulfilment. Together, these elements highlight the complexity of sustaining happiness within the medical field[11,12,13]. The well-being of medical students is crucial as it directly impacts their academic success and future effectiveness as healthcare providers, making it essential to understand the factors influencing their happiness. This is particularly important for rural medical students who face unique challenges such as limited resources, geographic isolation, and socio-cultural pressures, yet remain an underexplored population in research. To address this gap, this cross-sectional study aims to estimate the prevalence of happiness and its associated factors among female medical students of rural medical college located in Haryana.

Material And Methods

This was a cross-sectional study conducted among MBBS students of Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, Sonepat, Haryana. This institution was the first medical college exclusively for women in Haryana and the third government medical college for women in India[14]. The study was conducted from March 2025 to June 2025.The study adopted a census approach, wherein all 600 enrolled MBBS students (first year to interns) were invited to participate. Of these, 339 students consented and completed the questionnaire, yielding a response rate of 56.5%. Although a complete enumeration was attempted, the minimum required sample size was also calculated using a single population proportion formula assuming 42.5% prevalence,[15] 95% confidence level and 5% precision. After applying finite population correction, the required sample was 231. The achieved sample size of 339 exceeded this requirement, ensuring adequate statistical precision.

Prior to data collection, appropriate ethical principle was followed and written permission was obtained from the college authorities and the respective teachers. Data collection took place in lecture theatres after class sessions. The investigator first explained the study objectives in detail and ensured that participants clearly understood the purpose and content of the questionnaire. Any queries raised by the students were clarified to facilitate better comprehension before participation, following which written informed consent was obtained from those who were willing to participate. Participation was entirely voluntary, with no pressure exerted on students, and they were free to decline participation. To ensure maximum response,

participants were assured that all collected information would be kept strictly confidential and anonymity will be maintained. The questionnaire was then distributed, and students were instructed to complete it independently and anonymously. Once completed, the questionnaires were returned to the investigator.

A pre-designed, pre-tested, semi-structured, self-administered questionnaire was used, consisting of two parts; part I focussed on sociodemographic profile and part II included Oxford Happiness Questionnaire [16] available in public domain. The Oxford Happiness Questionnaire is comprised of 29 items. The happiness score was calculated by dividing the total score by 29, resulting in a score range of 1.00 to 6.00 and categorized as follows: 1.00–1.99 (not happy), 2.00–2.99 (somewhat unhappy), 3.00–3.99 (neutral; not particularly happy or unhappy), 4.00–4.49 (somewhat/moderately happy; satisfied), 4.50–4.99 (rather happy; pretty happy), 5.00–5.99 (very happy), and 6.00 (too happy). For analysis purpose, score of 4.00 or above was considered the cut off for happy status. In the Indian context, the tool demonstrated acceptable internal reliability, with a Cronbach's alpha of 0.82. Principal component analysis revealed that the six factors of the tool accounted for 63.7% of the variance. Additionally, the model exhibited good fit indices, with a Tucker–Lewis index of 0.91, a comparative fit index of 0.92, and a root mean square error of approximation of 0.05[17].

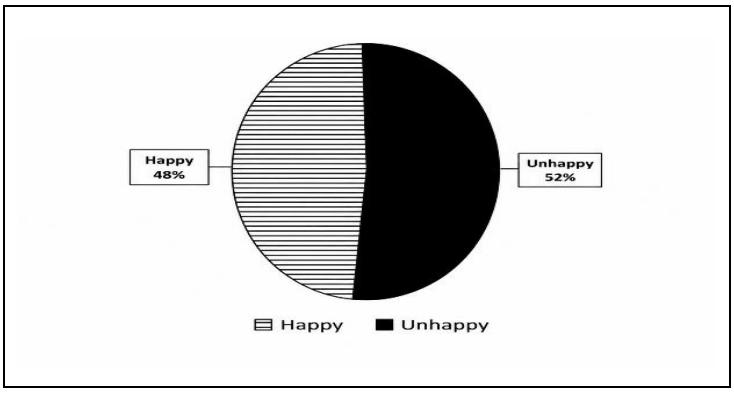
The collected data was imported into Microsoft Excel (version 2021) and analysed using R software version R.4.5.1. Continuous data was presented as Mean ± SD, while categorical data was expressed in frequencies and percentages. The Chi-square test or Fisher's exact test, as appropriate, was applied for statistical analysis. Variables with P value ≤ 0.25 were analysed using Binary Logistic regression and then P value of <0.05 was considered statistically significant.

Results

The highest proportion of respondents (39.8%) were aged 20–22 years, followed by 29.8% in the 23–25 years category, 24.2% below 20 years, and 6.2% above 25 years. With respect to MBBS professional year, 30.1% were in the second year, 26.0% in the fourth year, 23.0% in the first year, 13.9% in the third year, and 7.1% were interns. Socioeconomic status, assessed using the Modified B.G. Prasad Scale (2024), revealed that 61.7% were from the upper class, 21.8% from the upper middle class, 7.1% from the middle class, 5.9% from the lower middle class, and 3.5% from the lower class.

Figure 1 shows that more than half (52%) were unhappy, while the remaining 48% were happy.

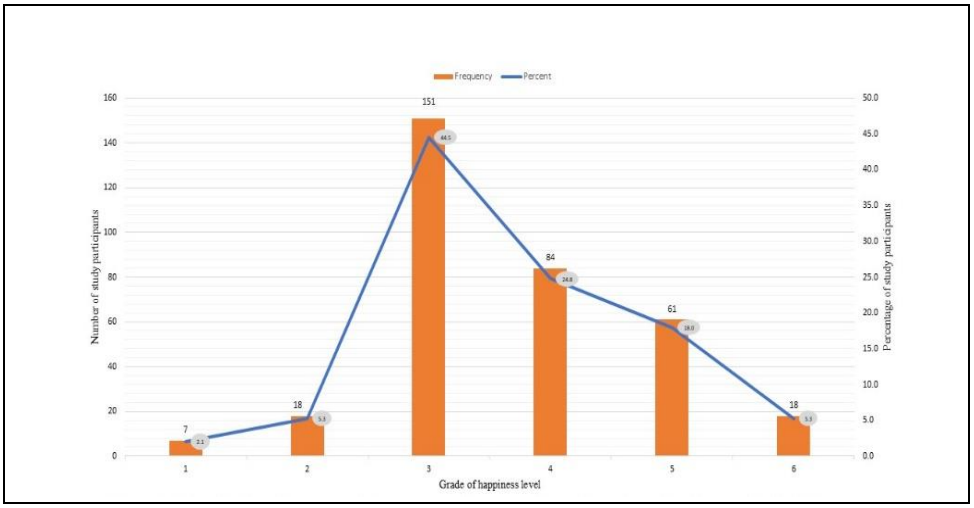
Figure 1: Distribution of study participants according to level of happiness (n=339



The majority of participants (44.5%) fall into grade 3, followed by 24.8% in grade 4 and 18.0% in grade 5. Smaller proportions were observed in grades 1 (2.1%), 2 (5.3%), and 6 (5.3%).

(Figure 2) The mean score on the Oxford Happiness Questionnaire was 114.4 ± 22.210, with a range of 32 to 171.

Figure 2: Distribution of study participants according to grading of happiness level as per Oxford Happiness Questionnaire (n=339)



A statistically significant association was observed between socioeconomic status and happiness, with the highest proportion of happy participants belonging to the upper class (71.8%), followed by the upper middle class (16.0%), middle class (4.9%), lower middle class (4.3%), and lower class (3.1%) (P = 0.008). (Table 1)

Table 1: Association of sociodemographic profile of study participants with happiness level (n=339)

Variable		Happy [n (%)]	Unhappy [n (%)]	Total [n (%)]	P value
Age category (in years)	<20	46(28.2)	36(20.5)	82(24.2)	0.078
	20-22	59(36.2)	76(43.2)	135(39.8)	
	23-25	52(31.9)	49(27.8)	101(29.8)	
	>25	6(3.7)	15(8.5)	21(6.2)	
MBBS professional year	1st	35(21.5)	43(24.4)	78(23)	0.704
	2nd	54(33.1)	48(27.3)	102(30.1)	
	3rd	22(13.5)	25(14.2)	47(13.9)	
	4th	39(23.9)	49(27.8)	88(26)	
	Intern	13(8.0)	11(6.3)	24(7.1)	
Permanent Residence	Urban	84(51.5)	106(60.2)	190(56)	0.107
	Rural	79(48.5)	70(39.8)	149(44)	
Type of Family	Nuclear	122(74.8)	123(69.9)	245(72.3)	0.308
	Joint	41(25.2)	53(30.1)	94(27.7)	
Socioeconomic status (As per mod. B.G. Prasad Scale, 2024)	Upper	117(71.8)	92(52.3)	209(61.7)	0.008
	Upper Middle	26(16)	48(27.3)	74(21.8)	
	Middle	8(4.9)	16(9.1)	24(7.1)	
	Lower Middle	7(4.3)	13(7.4)	20(5.9)	
	Lower	5(3.1)	7(4)	12(3.5)	
	No	143(87.7)	152(86.4)	295(87)	

The highest proportion of happy participants was observed among those who reported 6–8 hours of sleep, and this association was statistically significant(P=0.048). A significant association was also found between physical activity and happiness, with 37.4% of participants engaging in physical activity for more than 30 minutes daily reporting being happy, followed by 33% of those not involved in any physical activity, and 29.4% of those active for less than 30 minutes(P=0.041). Participants without any medical (P=0.001) or psychiatric illness (P=0.010) predominately

belong to the happy group, and this association with happiness status was statistically significant. Additionally, statistically significant association was reported among participants were not taking any medication (P=0.001). (Table 2)

Table 2: Association of personal factors of study participants with happiness level (n=339)

Variable		Happy [n (%)]	Unhappy [n (%)]	Total [n (%)]	P value
Sleep (in hours)	>8	23(14.1)	22(12.5)	45(13.3)	0.048
	6-8	124(76.1)	120(68.2)	244(72)	
	<6	16(9.8)	34(19.3)	50(14.7)	
Physical activity	≥ 30 minutes	61(37.4)	46(26.1)	107(31.6)	0.041
	<30 minutes	48(29.4)	51(29)	99(29.2)	
	None	54(33.1)	79(44.9)	133(39.2)	
Do you smoke?	Yes	4(2.5)	6(3.4)	10(2.9)	0.604
	No	159(97.5)	170(96.6)	329(97.1)	
Do you drink alcohol?	Yes	8(4.9)	10(5.7)	18(5.3)	0.751
	No	155(95.1)	166(94.3)	321(94.7)	
	Committed	21(12.9)	25(14.2)	46(13.6)	
Do you pursue any hobby?	Yes	107(65.6)	102(58)	209(61.7)	0.146
	No	56(34.4)	74(42)	130(38.3)	
Do you suffer from any medical illness?	Yes	14(8.6)	41(23.3)	55(16.2)	0.001
	No	149(91.4)	135(76.7)	284(83.8)	
Do you suffer from any psychiatric illness?	Yes	2(1.2)	12(6.8)	14(4.1)	0.010
	No	161(98.8)	164(93.2)	325(95.9)	
Do you take any medications for any illness?	Yes	10(6.1)	38(21.6)	48(14.2)	0.001
	No	153(93.9)	138(78.4)	291(339)	

A statistically significant association was found between happiness and perceived support from peers/friends, with 90.2% of participants who reported adequate peer support being happy (P=0.001). Similarly, statistically significant association was found among participants (58.9%) who felt adequately supported by teachers and happiness status (P=0.013). Only one-fifth of the happy participants reported that hostel conditions were conducive to their well-being, yet this association was statistically significant(P=0.037). Majority (86.5%) of happy participants reported having adequate pocket money to meet their expenses, and this association was found to be highly significant (P=0.001). (Table 3)

Table 3: Association of self-perceived social support of study participants with happiness level (n=339)

Variable		Happy [n (%)]	Unhappy [n (%)]	Total [n (%)]	P value
Do you feel your family support is adequate?	Yes	154(94.5)	157(89.2)	311(91.7)	0.078
	No	9(5.5)	19(10.8)	28(8.3)	
Is it your first time of staying away from family?	Yes	106(65)	113(64.2)	219(64.6)	0.874
	No	57(35)	63(35.8)	120(35.4)	
Do you feel your peer/friend support is adequate?	Yes	147(90.2)	128(72.7)	275(81.1)	0.001
	No	16(9.8)	48(27.3)	64(18.9)	
Do you feel your teacher support is adequate?	Yes	96(58.9)	80(45.5)	176(51.9)	0.013
	No	67(41.1)	96(54.5)	163(48.1)	
Do you find your current mess facilities conducive to your happiness?	Yes	33(20.2)	28(15.9)	61(18)	0.299
	No	130(79.8)	148(84.1)	278(82)	
	Yes	33(20.2)	21(11.9)	54(15.9)	0.037

Do you find your current hostel conditions conducive to your happiness?	No	130(79.8)	155(88.1)	285(84.1)	
Do you find your current living Recreational facilities availability conducive to your happiness?	Yes	26(16)	22(12.5)	48(14.2)	0.363
	No	137(84)	154(87.5)	291(85.8)	
Do you feel your pocket money is adequate for meeting your expenses?	Yes	141(86.5)	127(72.2)	268(79.1)	0.001
	No	22(13.5)	49(27.8)	71(20.9)	
As per you by modifying which factor will improve your happiness level?	Personal factors	82(50.3)	81(46)	163(48.1)	0.733
	Professional/ academic factors	64(39.3)	75(42.6)	139(41)	
	Both	17(10.4)	20(11.4)	37(10.9)	

Binary logistic regression analysis found peer support was independently associated with happiness, with participants reporting adequate peer support having higher odds of being happy (AOR = 2.06; 95% CI: 1.01–4.20; P = 0.047). Socioeconomic status showed a significant independent association with happiness at the overall variable level (Wald χ^2 = 13.687; P = 0.008); however, none of the individual socioeconomic categories differed significantly from the reference category. (Table 4).

Table 4: Binary logistic regression showing adjusted odds ratios (AOR) for factors associated with happiness level among study participants.

Variable	AOR	95% CI	P-Value
Age category (in years)			
<20	1.963	0.626-6.153	0.247
20-22	1.260	0.426-3.724	0.676
23-25	2.404	0.788-7.331	0.123
>25	1		
Permanent Residence			
Urban	0.725	0.425-1.239	0.240
Rural	1		
Socioeconomic status (As per mod. B.G. Prasad Scale, 2024)			
Upper	1.318	0.330-5.262	0.696
Upper Middle	0.487	0.115-2.059	0.328
Middle	0.505	0.099-2.561	0.409
Lower Middle	0.408	0.077-1.166	0.293
Lower	1		
Sleep (in hours)			
>8	1.691	0.647-4.423	0.284
6-8	2.070	0.970-4.415	0.60
<6	1		
Physical activity			
≥ 30 minutes	1.807	0.988-3.305	0.055
<30 minutes	1.244	0.677-2.287	0.481
None	1		
Do you suffer from any medical illness?			
Yes	0.655	0.244-1.756	0.400
No	1		
Do you suffer from any psychiatric illness?			
Yes	0.404	0.072-2.283	0.305

No	1		
Do you take any medications for any illness?			
Yes	0.371	0.12-1.064	0.065
No	1		
Do you feel your family support is adequate?			
Yes	1.191	0.421-3.366	0.742
No	1		
Do you feel your peer/friend support is adequate?			
Yes	2.059	1.011-4.196	0.047
No	1		
Do you feel your teacher support is adequate?			
Yes	1.117	0.647-1.927	0.691
No	1		
Do you find your current hostel conditions conducive to your happiness?			
Yes	1.527	0.751-3.105	0.243
No	1		
Do you feel your pocket money is adequate for meeting your expenses?			
Yes	1.938	0.988-3.800	0.054
No	1		

Discussion

Aristotle characterized happiness as the highest human goal, which includes four levels: immediate gratification, achievement through success, joy from aiding others, and realization through self-actualization[15]. Grounded in Aristotle's multidimensional view of happiness, it becomes essential to explore happiness level among medical students, whose psychological well-being is increasingly recognized as pivotal to their academic and professional development.

In the present study, 48% of medical students reported being happy. This proportion is comparable to the findings of Deepak Kumar et al. (2023) from the Andaman and Nicobar Islands, where 42.5% of students were classified as happy[15]. In contrast, a lower proportion of happy students (34.6%) was reported in a study conducted by Rajath Rao et al. (2023) in Bihar[17]. These variations in reported happiness levels may reflect regional differences in academic environments, cultural expectations, institutional support systems, or exposure to localized stressors affecting student well-being.

The mean score on the Oxford Happiness Questionnaire in our study was 114.4 ± 22.2, which is considerably higher than the average score reported by Sahraian et al. in Iran (52 ± 9.3)[2]. This marked disparity may be attributed to cross-cultural differences in the conceptualization and expression of happiness, as well as variations in academic pressure, socioeconomic conditions, and student lifestyle across countries.

Students from upper socioeconomic backgrounds and those who considered their pocket money sufficient reported higher happiness levels. These findings are in line with those reported by Kulkarni et al. (2019) in Western Maharashtra and a study conducted in Brazil, both of which reported the role of financial satisfaction in enhancing student happiness.[11,18]. Financial stability may mitigate day-to-day stress, facilitate access to essential academic and leisure resources, and promote a sense of security and autonomy, thereby contributing to overall well-being [19].

In our study students reporting 6–8 hours of sleep per night exhibited higher happiness scores compared to those with insufficient sleep. This is consistent with existing literature, which highlights that sleep significantly influences physical health, psychological well-being, and social functioning; its deprivation disrupts physiological systems and diminishes quality of life. A compromised quality of life due to poor sleep is associated with lower levels of happiness[20,21].

In present study participants engaged in physical activity for more than 30 minutes per day was had higher happiness level, supporting evidence from studies conducted in Bihar, Meerut, Brazil and Cyprus[17,22,18,23]. Physical activity enhances the release of mood-regulating neurotransmitters such as serotonin, dopamine, and norepinephrine, contributing to improved mentalwell-being.This neurochemical effect, along with increased self-esteem and social engagement, may explain the positive association between exercise and happiness[24].

Social support emerged as another key determinant of happiness. Students who reported adequate peer support were significantly happier, consistent with findings from the Andaman and Nicobar Islands[15]. A supportive academic and social environment not only helps buffer the negative effects of stress but also fosters a sense of belonging and motivation, both of which are crucial for maintaining mental health and emotional resilience[25,26].

Strenght And Limitations

Data collection was done by a single investigator, which minimized inter-observer variability and ensured consistency in administration and interpretation of responses. The use of the validated tool increased the reliability. In addition, the adoption of universal sampling reduced selection bias. The present study has certain limitations. The generalizability of the findings is restricted, as the study was conducted in a single district. Cross-sectional design limits the ability to establish temporality and possibility of social desirability bias cannot be ruled out.

Conclusion

The study found that nearly half of female medical students in a rural medical college were unhappy. Among examined factors, peer support was the sole independent determinant of happiness. Students with adequate peer support were significantly more likely to be happy, underscoring the importance of peer relationships in medical training. Medical colleges should therefore strengthen peer support systems through structured mentorship, support groups, and collaborative learning. Encouraging team-based activities, informal interactions, and student-led initiatives can foster a supportive culture, enhancing happiness and well-being among medical students in rural settings

Ethical Consideration

The study was performed in accordance with the Declaration of Helsinki. The ethical clearance for the study was taken from the Institutional Ethics Committee of Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, Sonepat, Haryanavide letter no. BPSGMCW/IEC/2025/RC1123 dated 01.03.2025. Written informed consent was obtained from study participants for participation and publication prior to data collection.

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Declarations

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References

Kováč L. The biology of happiness: chasing pleasure and human destiny. EMBO reports. 2012 Apr 1;13(4):297-302.

Britannica. Happiness. In: Encyclopædia Britannica [cited 2025 October 20]. Available from: https://www.britannica.com/topic/happiness.

Diener E, Suh EM, Lucas RE, Smith HL. Subjective well-being: Three decades of progress. Psychol Bull. 1999;125(2):276-302. doi:10.1037/0033-2909.125.2.276.,

Busseri MA, Sadava SW. A review of the tripartite structure of subjective well-being: Implications for conceptualization, operationalization, analysis, and synthesis. Pers Soc Psychol Rev. 2011;15(3):290-314.

World Happiness Report, 2024: Key Highlights – Civilsdaily [cited 2025 October 20]. Available from: https://www.civilsdaily.com/news/world-happiness-report-2024-key-highlights/

Steptoe A, Wardle J, Marmot M. Positive affect and health-related neuroendocrine, cardiovascular, and inflammatory processes. Proceedings of the National Academy of Sciences. 2005 May 3;102(18):6508-12. doi: 10.1073/pnas.0409174102.

Nanthamongkolchai S, Nanthamongkolchai S, Tuntichaivanit C, Munsawaengsub C, Munsawaengsub C, Charupoonphol P, Charupoonphol P. Factors influencing life happiness among elderly female in Rayong Province, Thailand. J Med Assoc Thai. Vol. 92, 2009.

Ng, YK. (2022). Factors Affecting Happiness. In: Happiness—Concept, Measurement and Promotion. Springer, Singapore. https://doi.org/10.1007/978-981-33-4972-8_10

Li K, Omar Dev RD, Li W. Physical activity and happiness of college students: chain mediating role of exercise attitude and sleep quality. Front Public Health. 2025;13:1544194. doi:10.3389/fpubh.2025.1544194.

Boehm JK, Chen Y, Qureshi F, Soo J, Umukoro P, Hernandez R, Lloyd-Jones D, Kubzansky LD. Positive emotions and favorable cardiovascular health: A 20-year longitudinal study. Prev Med. 2020;136:106103. doi:10.1016/j.ypmed.2020.106103.

Kulkarni S, Sanjeev C. Happiness level among medical students of a medical college. Int J Community Med Public Health. 2019 Jun 28;6(7):3024-8. doi: https://doi.org/10.18203/2394-6040.ijcmph20192846

Sahraian A, Vakili M. Studying the Happiness level among medical students of Shiraz medical Studying the Happiness Level among Medical Students of Shiraz Medical Sciences University in 2010. In the name of God Shiraz E-Medical Journal.October 2012 Vol. 13(4):179-86. Available from:http://semj.sums.ac.ir/vol13/oct2012/91016.html.

Navaitis G, Labutis G, Kairienė B. The marital status and the happiness. Soc IntegrEduc Proc Int Sci Conf. 2016;1:458-468. doi:10.17770/sie2016vol1.1513..

Director's Message [Internet]. Bhagat Phool Singh Government MedicalCollege for Women. [cited 2025 October15]. Availablefrom:http://www.bpsgmckhanpur.ac.in/directorsmessage.aspx

Kumar D, Yadav P, Joshy VM, Thomas B. Happiness index of medical students and related factors in Andaman and Nicobar Islands, India. Journal of Education and Health Promotion. 2023 Sep 1(1):318. doi: 10.4103/jehp.jehp_1596_22.

Hills P, Argyle M. The Oxford Happiness Questionnaire: a compact scale for the measurement of psychological well-being. Personality and individual differences. 2002 Nov 1;33(7):1073-82.

Rao R, Naik BN, Shekhar S, Nirala SK, Singh CM, Verma M, Ramalingam A. Level of happiness among medical students in Bihar-An online survey. Journal of Education and Health Promotion. 2023 Sep 1(1):305. doi: 10.4103/jehp.jehp_1806_22.

dos Santos Boni RA, Paiva CE, de Oliveira MA, Paiva BS. Factors associated with happiness and satisfaction with life of medical students in their first four years of a Brazilian private medical school. Manuscripta Medica. 2022 Dec 28;5. doi: https://doi.org/10.59255/mmed.2022.69.

Behera DK, Rahut DB, Padmaja M, Dash AK. Socioeconomic determinants of happiness: Empirical evidence from developed and developing countries. J Behav Exp Econ. 2024;109:102187. doi:10.1016/j.socec.2024.102187.

Tufik S, Andersen ML, Bittencourt LR, Mello MT. Paradoxical sleep deprivation: neurochemical, hormonal and behavioral alterations. Evidence from 30 years of research. Anais da Academia Brasileira de Ciências. 2009;81:521-38. doi: 10.1590/s0001-37652009000300016.

Lajunen T, Gaygısız E and Wang W (2023) Sleepand happiness: socio-economic, populationand cultural correlates of sleep duration andsubjective well-being in 52 countries.Front. Sleep 2:1118384.

Kamthan S, Sharma S, Bansal R, Pant B, Saxena P, Chansoria S, Shukla A. Happiness among second year MBBS students and its correlates using Oxford Happiness Questionnaire. Journal of oral biology and craniofacial research. 2019 Apr 1;9(2):190-2. doi: 10.1016/j.jobcr.2018.06.003.

Fisher JJ, Kaitelidou D, Samoutis G. Happiness and physical activity levels of first year medical students studying in Cyprus: a cross-sectional survey. BMC medical education. 2019 Dec 30;19(1):475. doi: 10.1186/s12909-019-1790-9.

News N. Exercise and the Brain: The Neuroscience of Fitness Explored [Internet]. Neuroscience News. 2023. Available from: https://neurosciencenews.com/fitness-neuroscience-23228/.

Lutgendorf SK, Costanzo ES, Siegel SD. Psychosocial influences in oncology: an expanded model of biobehavioral mechanisms. In: Ader R, editor. Psychoneuroimmunology. 4th ed. Burlington (MA): Academic Press; 2007. p. 869-895. doi:10.1016/B978-012088576-3/50048-4.

Kringelbach ML, Berridge KC. The neuroscience of happiness and pleasure. Soc Res (New York). 2010;77(2):659-678.