

## Original Article

# Lifestyle Medicine Assessment Among The General Population Of District Sialkot, Pakistan: A Comparative Study

Rabiah Mahwish<sup>1</sup>, Fariha Liaquat<sup>2</sup>, Imrana Aslam<sup>3</sup>, Tariq Iqbal<sup>4</sup>

## Abstract

**Objective:** To assess the lifestyle medicine among the general population of the district of Sialkot, Pakistan.

**Methods:** A comparative cross-sectional study was conducted in 4 Tehsils of District Sialkot, from April to September 2024. A calculated sample of 400 healthy individuals was selected by a non-probability consecutive sampling technique, and data were collected through a modified version of the lifestyle assessment short form questionnaire

**Results:** The average age of participants was  $33.58 \pm 13.06$  years, with a predominant representation of males (60%). The majority of the respondents were young (93.5%) and graduates or post-graduates (55.4%). The mean lifestyle medicine score was  $38 \pm 4.41$ . Only 40% of the participants had a favourable lifestyle medicine score above the mean. Education of the participants showed a significant association with lifestyle medicine score ( $p=0.027$ ), while age, area of residence and social class revealed a non-significant association.

**Conclusion:** Most of the study participants had unfavourable lifestyle medicine scores below mean indicating poorer adherence to recommended lifestyle medicine practices. Similarly for individual life style medicine domains, score was below the mean except for smoking and substance abuse domain.

**Keywords:** Lifestyle, Diet Therapy, body weight, exercise, mental health, smoking cessation.

## Contributions:

RM, FL, IA, TI - Conception, Design  
RM, FL, IA, TI - Acquisition, Analysis, Interpretation  
RM, FL, IA, TI - Drafting  
RM, FL, IA, TI - Critical Review

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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None to report

## Institutional Review Board

### Approval

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## Introduction

The rise in chronic, non-communicable diseases globally, especially in Pakistan, has spurred an urgent need for medical approaches that go beyond traditional treatments, emphasising preventive and lifestyle-based interventions. Lifestyle medicine is the evidence-based practice of assisting individuals and families to adopt and sustain behaviours that can improve health and quality of life.<sup>1</sup>

Six pillars of lifestyle medicine, i.e. plant-based nutrition, physical activity, stress management, avoidance of risky substances, restorative sleep, and social connections, might delay or prevent the development of cognitive impairment.<sup>2</sup> "Lifestyle medicine involves the merging of lifestyle practices into the modern practice of medicine to decrease the risk factors for chronic disease and/or, if the disease is already there, serve as an adjuvant in its treatment.

According to the World Health Organisation (WHO), non-communicable diseases account for 41 million deaths annually, equivalent to 74% of all deaths globally. Cardiovascular diseases being the leading cause, (account for 17.7 million deaths per year), followed by cancers (9.3 million), chronic respiratory diseases (4.1 million) and diabetes (2 million including kidney disease deaths caused by diabetes), these four groups of diseases account for over 80% of all premature non communicable disease deaths.<sup>3</sup>

A 6-months lifestyle change intervention in obese, sedentary, postmenopausal women showed that women significantly increased their physical activity (+39.6%) cardio-respiratory fitness (+13.5%) and reduced their body weight (-6.5%), fat mass (-7.4%), body fat (-2.4%) BP (SBP - 6.2%, DBP - 9.2%), total cholesterol (-7.4%), triglycerides (-16.5%), and low-density lipoprotein (LDL) cholesterol (9.1%) and improved their diet ( $p < 0.05$ ). A 3-year prospective study showed that adopting a Mediterranean diet reduced the likelihood of overweight people becoming obese.<sup>4</sup> According to a WHO survey of Pakistan, 57% of all deaths in the country occur due to non-communicable diseases.<sup>5</sup> Among these, hypertension is at the top of the list (40%), followed by ischemic heart disease (17%) and diabetes (15%). The prevalence of modifiable risk factors responsible for these diseases is obesity (67%), pre-hypertension (37%), tobacco use (14%) and alcohol use (2%).<sup>6</sup>

To the best of our knowledge, there is limited data available in Pakistan on the awareness and practices of lifestyle medicine among the general population. Therefore, the present study was planned to assess lifestyle medicine among the general population of District Sialkot.

## Materials And Methods

This comparative Cross-Sectional study was carried out in 4 Tehsils of district Sialkot, i.e. Daska, Sialkot, Pasrur and Samrial from April – September 2024. The sample size was calculated using Cochran's formula with an anticipated population proportion  $p = 0.50$  (for maximum variability), a confidence level of 95% ( $Z = 1.96$ ), and a margin of error  $d = 5\%$ , resulting in a required sample size of approximately 384, which was rounded off to 400 taking into account for possible non-responses.<sup>7</sup> After taking approval from the institutional ethical review committee (letter no 05/REC/KMSMC dated 15/5/2024), adults aged 18-64 of both genders were recruited in the study through a non-probability consecutive sampling technique. Those adults having co-morbidities (diabetes, hypertensive disorders, ischemic heart diseases) and congenital anomalies were excluded.

A modified version of the open-access lifestyle assessment short form questionnaire, developed by the American College of Lifestyle Medicine, was used for data collection.<sup>8</sup> It is a closed-ended, standardised questionnaire consisting of 2 parts. 1<sup>st</sup> part had demographic characteristics of the participants (age, gender, marital status, education status, height, weight, employment status, occupation, monthly income and per Capita income). The socioeconomic status of the participants was calculated using the Kuppuswamy socioeconomic scale 2023.<sup>9</sup> The 2<sup>nd</sup> part consisted of a total of 14 questions related to 6 domains of lifestyle medicine (sleep, nutrition, weight management, exercise, mental health, smoking/substance abuse). The questions of the 6 domains were scored according to recommended international guidelines.<sup>10-13</sup> The healthiest practice was given the maximum score, while the unhealthiest practice was given the minimum score. The scores of each domain are given in Table 1. The total score of the lifestyle assessment questionnaire ranged from 8-59. Participants scoring above the mean were interpreted as having relatively healthier lifestyle practices, while those scoring below the mean were considered to have less favourable or suboptimal lifestyle behaviours. This approach is consistent with the use of central tendency measures in quantitative health assessments, where the mean serves as a benchmark to compare individual or group performance.<sup>14</sup>

**Table 1: Score of domains of lifestyle medicine assessment**

S. No.	Domain of lifestyle medicine	No. of items	Maximum score
1-	Sleep	2	6
2-	Weight management	1	3
3-	Nutrition	2	6
4-	Exercise	2	6
5-	Mental health	6	18
6-	Smoking and substance abuse	4	20

The researcher himself collected the data after obtaining informed consent on the lifestyle assessment short proforma. The confidentiality of the study participants was strictly maintained.

Data was entered and analysed by using SPSS version 26. Categorical variables like gender were dealt with in percentages and frequencies, while numerical variables like age, lifestyle medicine score were presented with mean and standard deviation. Chi-square test was applied to see the association between lifestyle medicine and sociodemographic characteristics like age, gender, educational status and social class.  $P\text{-value} \leq 0.05$  was considered significant.

## Results

400 participants were included in this study. The average age of participants was  $33.58 \pm 13.06$  years, with a predominant representation of males (60%). More than half were married (60%), unemployed (55%) and had a healthy weight (56%). The majority of the participants had normal self-reported glucose (82.5%), serum cholesterol (77%) and blood pressure (79%) levels. Regarding socioeconomic status Upper Middle Class was the largest group. (Table 2).

The mean lifestyle score was  $38 \pm 4.41$ . Only 40% of the participants had a life lifestyle score above the mean. For five out of six lifestyle domains, including sleep, physical activity, nutrition, weight management, and stress, a score below the mean indicated poorer adherence to recommended lifestyle practices, suggesting a need for targeted health interventions in these areas. Conversely, for the smoking and substance abuse domain, a higher score reflects lower engagement in harmful behaviours, which is desirable. Therefore, in this specific domain, scoring above the mean indicates favourable behaviour (i.e., less smoking or substance use).

Education of the participants showed a highly significant association with lifestyle score ( $p=0.027$ ), while age, area of residence and social class did not show any significant association.

Our study showed that for five out of six lifestyle medicine domains, the majority of the participants had unfavourable scores below the mean, except for the smoking and substance abuse domain, where the majority of the participants had favourable scores above the mean.

Table 2: sociodemographic profile of the participants

Variables	Frequency	Percentage (%)
Age		
Youth	374	93.5%
Old	26	6.5%
Education		
Illiterate	46	11.3%
High school	133	33.3%
Graduate and Post Graduate	221	55.4%
Social class:		
Upper middle	220	55.0%
Lower middle	111	27.8 %
Upper lower	39	9.8 %
Lower	30	7.5 %
Residence of the person:		
Urban	217	54.3 %
Rural	183	45.8 %

Table 3: Score of domains of lifestyle medicine

Lifestyle Medicine Domain	Mean Score	Participants with Score $\leq$ Mean	Participants with Score $>$ Mean
Sleep	4 $\pm$ 1.5	247(65%)	188(35%)
Weight Management	2 $\pm$ 0.7	205(53%)	140(47.0%)
Exercise	2 $\pm$ 1.8	253(63.2%)	188(36.8%)
Purpose and connection/Mental Health	7 $\pm$ 3.6	211(52.8%)	189(47.3%)
Smoking/substance abuse	19 $\pm$ 1.3	75(18.8%)	325(81.3%)
Nutrition	3 $\pm$ 1.1	307(82.5%)	70 (17.5%)

Table 4: Association of lifestyle medicine and sociodemographic characteristics

Sociodemographic Characteristics	Lifestyle Score $\leq$ Mean (8-38)	Lifestyle Score $>$ Mean (39-59)	P-value
Age			
Youth	212(60.7%)	137(39.3%)	0.207
Old	108(59.0%)	13(52%)	
Education			
Illiterate	22(51.1%)	23(48.9%)	0.027*
High school	41(30.8%)	92(69.2%)	
Graduate and Post Graduate	96(30.8%)	125(56.6%)	
Residence			0.643
Rural	133(61.3%)	84(38.7%)	
Urban	108(59.0%)	75(41.0%)	
Social Classes			
Middle	93(62.0%)	57(38.0%)	0.516
Lower	145(58.7%)	102(41.3%)	

## Discussion

These findings are in line with a study conducted by Mititelu et. al,<sup>15</sup> which demonstrated an increased tendency of youth towards sedentary lifestyle, little or no physical activity and an increased tendency towards high-calorie ultra-processed foods, like potato chips, burgers and chocolates. Magdalena also highlighted that the youth are much more eager to take non-alcoholic sugary beverages like coffee and soft drinks. According to Mititelu, 76.4% of the participants consumed one glass of alcohol 2-3 times per week, which is in contradiction to our study. This difference may be due to underreporting of smoking and substance abuse by our study participants, owing to the stigma attached to it, taking into account the religious and sociocultural context.

According to our study majority of the participants had unfavourable sleep scores below the mean score for the sleep domain. These findings are consistent with a study conducted by Joseph Dzierzewski,<sup>16</sup> which evidenced that most of the youth and middle-aged persons have poor sleep health. Dzierzewski further elaborated that the use of mass and social media negatively influences the sleep health of adults. Similar findings were reported in a study from India, where inadequate sleep patterns were prevalent in the general population and associated with urban stressors and screen use.<sup>17</sup> Moreover, an international systematic review supported that short sleep duration is linked to a range of adverse health outcomes in various age groups.<sup>18</sup>

Our study showed that 63.2% of the participants had unfavourable exercise scores below the mean, which is consistent with a study conducted in India,<sup>19</sup> which revealed that half of the population had a sedentary lifestyle and were obese.

Over the past few decades, a lack of physical activity has emerged as a global pandemic with a worldwide prevalence of above 31%.<sup>20</sup> Our study showed that above two-thirds of the participants (63%) had unfavourable exercise scores below the mean, while a community-wide study conducted by Ramamoorthy and his colleagues,<sup>21</sup> on seventy thousand adults showed that above 40% of adults are physically inactive. This difference may be due to the large difference in the sample size of the two studies.

Regarding the nutrition domain of lifestyle medicine, 82% of our study participants had unfavourable scores, which means most of them are involved in eating fast, packaged or sugary foods or drinks, and they consume very low whole fruits or raw vegetables. These findings are in line with a study conducted by Lee,<sup>22</sup> on American adults. According to which only 8.4-16% of American adults meet the fruit and vegetable consumption recommendations. The high consumption of high-calorie ultra-processed food and low consumption of fruits and raw vegetables is further verified by a study conducted by Syed among university students in Saudi Arabia, which concluded that only 12% of the university students consumed fruits and vegetables daily. Syed further elaborated that the majority of students consumed sugary drinks, junk food and snacks daily.<sup>23</sup> These findings are in line with our study, which showed that only 17% of the participants were involved in healthy eating.

Regarding the purpose, connection and Mental health domain of lifestyle medicine, 52% of the participants had an unfavourable score. These findings are fairly consistent with a meta-analysis conducted by Khan,<sup>24</sup> and colleagues, which showed that about 43% of the university students in Pakistan are suffering from mental health disorders. The slight difference may be due to a difference in study population and study design.


A major limitation of our study is that it is a single-centred study. We recruited participants through a non-probability sampling technique, which is not considered a representative sample. Multi-centred studies with large representative samples are recommended.

## Conclusions

Our study findings suggest that most of the study participants had an unfavourable lifestyle. Similarly, for individual lifestyle medicine domains, the score was unfavourable, i.e. below the mean, except for the smoking and substance abuse domain. Based on these findings, we strongly recommend the implementation of rigorous health education programs for the general public aiming at adequate sleep, plant-based raw nutritious food, maintenance of a healthy weight through adequate physical activity, avoidance of smoking and substance abuse and purposeful and socially well-connected life.

## Author Information

1,4. Associate Professor, KMSMC 2. Assistant Professor, KMSMC 3. Demonstrator, KMSMC.

**Corresponding author:** Dr. Rabiah Mahwish  dr.rabiah5@gmail.com

## References

1. Matranga D, Restivo V, Maniscalco L, Bono F, Pizzo G, Lanza G, Gaglio V, Mazzucco W, Miceli S. Lifestyle Medicine and Psychological Well-Being toward Health Promotion: A Cross-Sectional Study on Palermo (Southern Italy) Undergraduates. *Int J Environ Res Public Health*. 2020;17(15):5444. <https://doi.org/10.3390/ijerph17155444>
2. Jaqua E, Biddy E, Moore C, Browne G. The Impact of the Six Pillars of Lifestyle Medicine on Brain Health. *Cureus* 2023;15(2) e34605. <https://doi.org/10.7759/cureas.34605>,
3. World Health Organisation current stats on non-communicable diseases. <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>
4. Steps-survey-in-pakistan-identifying-the-burden-of-noncommunicable-diseases by WHO <https://www.emro.who.int/noncommunicable-diseases/highlights/step9:survey.in:pakistan-identifying-the-burden.of:noncommunicable-diseases.html>
5. Kazmi T, Nagi ML, Razzaq S, Hussnain S, Shahid N, Athar U. Burden of noncommunicable diseases in Pakistan. *EMHJ*. 2022;28(11):798-804. <https://doi.org/10.26719/emhj.22.083>.
6. Ornish D, Madison C, Kivipelto M, Kemp C, McCulloch CE, Galasko D, et al. Effects of intensive lifestyle changes on the progression of mild cognitive impairment or early dementia due to Alzheimer's disease: a randomized, controlled clinical trial. *Alzheimers Res Ther*. 2024;16(1):122. <https://doi.org/10.1186/s13195-024-01482-z>.
7. Dhandapani S, Afshan K, Shreya S, Krithika V. Dietary Intake, Lifestyle Factors, and Metabolic Risk: Insights from Health Check-Ups at a Private Healthcare Facility in Coimbatore, India. *Int J Health Sci Res*. 2024;14(4):419–27. <https://doi.org/10.20473/amnt.v8i4.2024.632-641>.
8. [https://ihacares.com/assets/pdfs/Lifestyle%20Medicine/ACLM-LLUH\\_short\\_form\\_english\\_2019.pdf](https://ihacares.com/assets/pdfs/Lifestyle%20Medicine/ACLM-LLUH_short_form_english_2019.pdf)
9. Radhakrishnan M, Nagaraja SB. Modified Kuppuswamy socioeconomic scale 2023: stratification and updates. *Int J Community Med Public Health*. 2023 Nov;10(11):4415-4418. <https://dx.doi.org/10.18203/2394-6040.ijcmph20233487>

10. Watson NF, Badr MS, Belenky G, Bliwise DL, Buxton OM, Buysse D, et al. Recommended Amount of Sleep for a Healthy Adult: A Joint Consensus Statement of the American Academy of Sleep Medicine and Sleep Research Society. *Sleep*. 2015;38(6):843-4. <https://doi.org/10.5665/sleep.4716>.
11. Faizan U, Rouster AS. Nutrition and Hydration Requirements In Children and Adults. [Updated 2023 Aug 28]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024-
12. Strain T, Flaxman S, Guthold R, Semanova E, Cowan M, Riley LM, Bull FC, Stevens GA. National, regional, and global trends in insufficient physical activity among adults from 2000 to 2022: a pooled analysis of 507 population-based surveys with 5· 7 million participants. *The Lancet Global Health*. 2024 ;12(8):e1232-43.
13. Ali AM, Alkhamees AA, Hori H, Kim Y, Kunugi H. The depression anxiety stress scale 21: development and validation of the depression anxiety stress scale 8-item in psychiatric patients and the general public for easier mental health measurement in a post COVID-19 world. *International journal of environmental research and public health*. 2021 Sep 27;18(19):10142. <https://doi.org/10.3390/ijerph181910142>
14. Krok-Schoen JL, Luo M, Kelly ML, Fischer B, Bower JK. Health behaviors and lifestyle intervention preferences among adults with multiple chronic conditions: A cross-sectional study. *BMC Public Health*. 2020;20(1):654. <https://doi.org/10.1186/s12889-020-08753-9>
15. Mititelu M, Stanciu G, Licu M, Neacșu SM, Călin MF, Roșca AC, Stanciu TI, Busnatu ȘS, Olteanu G, Boroghină SC, Nicolescu TO. Evaluation of the Consumption of Junk Food Products and Lifestyle among Teenagers and Young Population from Romania. *Nutrients*. 2024 Jun 5;16(11):1769. <https://doi.org/10.3390/nu16111769>
16. Dzierzewski JM, Sabet SM, Ghose SM, Perez E, Soto P, Ravits SG, et al. Lifestyle factors and sleep health across the lifespan. *Int J Environ Res Public Health*. 2021;18(12):6626. <https://doi.org/10.3390/ijerph18126626>
17. Gupta R, Grover S, Basu A, Kulhara P, Avasthi A. Sleep pattern and sleep problems in a general population sample in India: Results from the National Mental Health Survey. *Sleep Health*. 2020;6(1):83–90. <https://doi.org/10.1016/j.sleh.2019.09.008>
18. Robbins R, Weaver MD, Quan SF, Barger LK, Czeisler MÉ, Czeisler CA. Associations between sleep duration and poor health outcomes: A systematic review of longitudinal studies. *Sleep Health*. 2022;8(4):386–393. <https://doi.org/10.1016/j.sleh.2022.04.002>
19. Sivanantham P, Sahoo J, Lakshminarayanan S, Bobby Z, Kar SS. Profile of risk factors for Non-Communicable Diseases (NCDs) in a highly urbanized district of India: Findings from Puducherry district-wide STEPS Survey, 2019–20. *Plos one*. 2021;16(1):e0245254. <https://doi.org/10.1371/journal.pone.0245254>
20. Strain T, Flaxman S, Guthold R, Semanova E, Cowan M, Riley LM, et al. National, regional, and global trends in insufficient physical activity among adults from 2000 to 2022: a pooled analysis of 507 population-based surveys with 5· 7 million participants. *The Lancet Global Health*. 2024;12(8):e1232-43.
21. Ramamoorthy T, Kulothungan V, Mathur P. Prevalence and Correlates of Insufficient Physical Activity Among Adults Aged 18-69 Years in India: Findings From the National Noncommunicable Disease Monitoring Survey. *J Phys Act Health*. 2022 ;19(3):150-159. <https://doi.org/10.1123/jpah.2021-0688>
22. Lee SH, Moore LV, Park S, Harris DM, Blanck HM. Adults meeting fruit and vegetable intake recommendations—United States, 2019. *MMWR Morb Mortal Wkly Rep*. 2022;71(1):1–9. <https://doi.org/10.15585/mmwr.mm7101a1>
23. Syed NK, Syed MH, Meraya AM, Albarraq AA, Al-Kasim MA, Alqahtani S, et al. The association of dietary behaviors and practices with overweight and obesity parameters among Saudi university students. *PLoS One*. 2020;15(9): e0238458. <https://doi.org/10.1371/journal.pone.0238458>
24. Khan MN, Akhtar P, Ijaz S, Waqas A. Prevalence of depressive symptoms among university students in Pakistan: a systematic review and meta-analysis. *Front. Public Health*. 2021;8: 603357. <https://doi.org/10.3389/fpubh.2020.603357>