DOI: https://doi.org/10.54393/pbmj.v8i2.1155

PAKISTAN BIOMEDICAL JOURNAL

https://www.pakistanbmj.com/journal/index.php/pbmj/index

ISSN (E): 2709-2798, (P): 2709-278X

Volume 8, Issue 02 (February 2025)

Original Article

OPEN ACCESS

Knowledge, Attitudes, and Practices Regarding Obesity and Type 2 Diabetes Mellitus among Middle-Aged and Elderly People in District Narowal, Pakistan

Sehar Fatima[1*], Hafiza Sonia Bibi[1], Sana Shahbaz[1], Anbreen Bibi[1], Sadia Afzal[1], Anza Khan[1] and Aniqa Tariq[1]

[1]Lahore Garrison University, Lahore, Pakistan

ARTICLE INFO

Keywords:

Type 2 Diabetes, Obesity, Prevalence, Knowledge, Attitude, Practices, Community-Based Study, Epidemiology

How to Cite:

Fatima, S., Bibi, H. S., Shahbaz, S., Bibi, A., Afzal, S., Khan, A., & Tariq, A. (2025). Knowledge, Attitudes, and Practices Regarding Obesity and Type 2 Diabetes Mellitus among Middle-Aged and Elderly People in District Narowal, Pakistan: Obesity and Type 2 Diabetes in Middle-Aged and Elderly People. Pakistan BioMedical Journal, 8(2), 14-20. https://doi.org/10.54393/ pbmj.v8i2.1155

***Corresponding Author:**

Sehar Fatima

Lahore Garrison University, Lahore, Pakistan

serichseri@gmail.com

Received date: 5th November, 2024

Revised date: 10th January, 2025

Acceptance date: 7th February, 2025

Published date: 28th February, 2025

ABSTRACT

Type 2 diabetes affected 95% of people in Pakistan and rest of the globe. Diabetics increase is approximately to 69.9 million from 40.9 million by 2025 unless preventive measures are taken. **Objective:** To evaluate the knowledge, attitudes, and practices regarding obesity and type 2 Diabetes Mellitus among middle-aged and elderly people in District Narowal, Pakistan. **Methods:** A cross sectional study was conducted from December 2022 to May 2023. Simple random sampling was used for the selection of diabetic patients. Socio-demographic information, diabetes-related knowledge, attitudes, and practices were gathered using semi-structured, pre-tested questionnaire after taking verbal informed consent. Following analysis, appropriate tests were performed on the data using SPSS version 25.0. **Results:** Out of 300 patients, 241(80.33%) were overweight or obese. The mean knowledge score was 21.51 ± 6.13 for men and 20.57 ± 6.29 for women. Attitude scores averaged 35.96 ± 14.33 for men and 33.55 ± 14.03 for women. Practice scores were 17.06 for men and 4.53 ± 4.72 for women. No significant differences were found between weight groups in knowledge (2,297) = 1.72, p-value > 0.18, attitude, or practices. **Conclusion:** The low evaluations for the same suggested that the survey participants' attitudes, knowledge, and practices toward diabetes were deemed inadequate.

INTRODUCTION

Diabetes progress when the body or pancreases cannot utilize the insulin. In type 2 diabetes, the pancreas generated less insulin than normal and the body becomes more insulin-resistant. Over 96% of the diabetes cases are Type 2 Diabetes Mellitus(T2DM), which is the most common form of the disease [1]. Adipose tissue stores energy, secretes hormones, and impacts the endocrine, nervous, and cardiovascular systems. Abnormal fat hormone secretion can lead to insulin resistance, contributing to the development of Type 2 Diabetes Mellitus (T2DM) [2, 3]. Obesity is a chronic, relatable neurobehavioral disease marked by excess body fat, leading to adipose dysfunction and abnormal physical forces. This results in harmful metabolic, biomechanical, and psychosocial health impacts [4]. Obesity, driven by poor diet and sedentary lifestyles, is a rising global epidemic with significant health impacts, including Type 2 diabetes. The World Health Organization classifies both obesity and diabetes as major public health concerns due to their increasing prevalence [5]. Obesity, defined by a BMI of 30 kg/m^2 or higher, increases the risk, with elevated insulin and glucagon levels indicating early risk [6]. Obesity and diabetes rates in China are rising due to changing lifestyles, with projections indicating 140.5 million adults will have diabetes by 2030. This leads to serious health risks and increased economic burdens from related comorbidities [7]. Most of the knowledge on epigenetic dysregulation in human obesity and T2D has developed in the past 10 years [8]. A study revealed that in non-Hispanic Black (NHB) and Hispanic individuals, the risk for the development of Type 2 Diabetes

DOI: https://doi.org/10.54393/pbmj.v8i2.1155

(T2D) is higher as compared to non-Hispanic Whites (NHW); the reason for this prevalence is unknown. Body fat distribution, insulin sensitivity, and β-cell function are the phenotypic risk factors that vary across the racial/ethnic groups [9]. The global prevalence of diabetes is rising according to International Diabetes Federation with 536.6 million people affected in 2021, projected to increase to 783.2 million by 2045. About 239.7 million people were unaware of their diabetes, representing 44.7% of cases. Many individuals experience 5–6 years of undiagnosed pre-diabetes or type 2 diabetes. The rate of undiagnosed diabetes varies significantly between high-income and low-to-middle-income regions [10]. Metabolically unhealthy obesity refers to individuals who are classified as obese based on their BMI and also display characteristics of metabolic syndrome, including hypertension, elevated blood glucose, and dyslipidemia [11]. Between 50% and 75% of individuals with Type 2 Diabetes Mellitus (T2DM) have Non-Alcoholic Fatty Liver Disease (NAFLD) . In the US, the prevalence of overweight and obesity in adults with Type 1 Diabetes Mellitus (T1DM) is similar to the general population, but it is increasing more rapidly, reaching up to 62%. As a result, many individuals with T1DM also exhibit characteristics of Type 2 Diabetes Mellitus (T2DM), including both insulin deficiency and resistance [13].

The goal of this study was to evaluate the knowledge, attitudes, and practices regarding obesity and type 2 Diabetes Mellitus among middle-aged and elderly people in District Narowal, Pakistan, and to explore the factors influencing these health outcomes. Through this research, we seek to provide important insights into the regional health challenges faced by these populations and to propose recommendations for improving health outcomes in this under-studied area.

METHODS

From December 2022 to May 2023, the descriptive cross-sectional study of diabetic and obese middle aged and elderly people (29-65) (above 80 years were excluded from study) who also had other conditions was carried out at several hospitals in the area of Narowal. The study was approved by the ethical committee (Reg. No. Fa2021-M.Phil.-Zoo-008), of Lahore Garrison University, DHA phase VI Lahore. An investigation on Knowledge, Attitudes, and Practices (KAP) related type 2 diabetes, obesity, and other illnesses such as renal, pancreatic, liver, high blood pressure, and heart disease was undertaken in December utilizing a structured questionnaire. To reach the study's objective, we had to finish 300 surveys in total. The commonly used formula for sample size calculation in cross-sectional studies was used: The sample size was estimated using prevalence of Type II Diabetes Mellitus 16.98% at 4.2% margin of error and 95% confidence level using following formula,

$$n = \frac{Z^2 - \frac{\alpha}{2} p(1-p)}{d^2}$$

Where;

p= Prevalence of Type II Diabetes Mellitus = 0.1698 [14]

d= Marginal error set at 8%

α= 0.05

Z= Standard normal deviation for 95% confidence interval

To represent the various subgroups within the population fairly stratified random sampling technique was employed. Population was divided into groups (for example, by age, gender, or socioeconomic status) and then randomly selecting respondents from each stratum. Participants were informed that their information will remain confidential and will solely be used for the purpose of research, and they had the right to withdraw any time without any consequences. They were also told the procedures that were involved, the study purpose, and the potential risks and benefits. Before the survey, a questionnaire was developed to gauge each participant's knowledge, attitude, and behaviors about type 2 diabetes, obesity, and other variables such kidney damage, pancreatic illness, liver problems, high blood pressure, and heart problems. The questionnaire has three sections: Knowledge, Attitude, and Practices, as well as sociodemographic data. Socio-demographic information, such as sex, education, age, place of residence, smoking, drinking, and other factors, made up the first portion of the questionnaire. The second section of the questionnaire asks about information such as the causes of type 2 diabetes, its symptoms, its signs and causes of obesity, as well as diagnosis in order for kidney damage, pancreatic disease, liver problems, hypertension, and heart problems. It also asks about general weight, whether or not you have heard of type 2 diabetes, obesity, and other diseases, as well as the duration of these conditions in middle-aged and elderly people and whether they are curable. The third section of the questionnaire focused on respondents' attitudes and practices. It asked about respondents' practices for preventing middle-aged and elderly people from developing kidney disorder, pancreatic disease, liver problem, high blood pressure, and heart problem, as well as their attitudes and perceptions about the severity of diabetes type 2 and obesity and other problems like kidney damage, pancreatic disease, liver issue, and hypertension. SPSS Version 25.0 of the Statistical Software for Social Sciences was utilized to analyze the data. While quantitative data were displayed using the mean and Standard Deviation (SD), qualitative data were presented using frequency and percentage. To compare the two groups' means, an unpaired t-test was used. One-way ANOVAs were used to compare three or more categories. P-value<0.05 was considered as significant.

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RESULTS

A total of 300 diabetic individuals were interviewed. Sixty-three percent of the 189 participants were female while 111 thirty-seven present were male. Most subjects (29%) had completed secondary school, whereas 27% were illiterate, 25% had just completed elementary school, and 19% had completed high school or beyond. Sixty-five percent of the people were from rural areas. Eighty-two percent of them were married. The participants of the medium socioeconomic group were 41%, and 64% of them had private employment on average. The majority of people (98%), did not smoke or drink alcohol. Sixty-six percent had Type 2 diabetes for at least five years, and nearly all of them (100%) had it. While 64% of the individuals had a negative family history of DM, 36% of the subjects had a favorable family history. The most common co-morbid condition was hypertension (44%), which was followed by liver problems (3%), pancreatic disease (1%), renal disease (5%), and cardiac problems (6%). While the other patients had an obesity rate of 36% (n=109) and 20% (n=59) of BMI 23 to 24 kg/m2, the participants with a BMI of 18 to 23 kg/m2 were considered normal weight. We found that adding fruits to their diet was a positive habit for most people (55.04%) and green leafy vegetables (93.02%). Natural therapies were not used by 94.58% of them. The majority of subjects (79.07%), however, lacked a glucometer. Table 1 displayed the sociodemographic data of the research participants.

Table 1: Sociodemographic Data of the Sample

Variables	Frequency (%)
Gender	
Men	111 (37%)
Women	189 (63%)
Qualification	
Illiterate	80 (27%)
Primary	75 (25%)
Secondary	88 (29%)
Graduate or Above	57 (19%)
Residence	
Urban	104 (35%)
Rural	196 (65%)
Marital Status	
Married	246 (82%)
Unmarried	54 (18%)
Sector of Employment	
Public	108 (35.5%)
Private	194 (63.8%)
Socio Economic Class[1]	
High	84 (28%)
Middle	122 (41%)
Low	94 (31%)
Diabetic Duration	
Upto 5 Years	197 (66%)
More than 5 Years	103 (34%)
Body Mass Index	
Normal (18-23)	59 (20%)
Overweight (23-24)	109 (36%)
Obese (>25)	132 (44%)
Family History of Diabetes	
Yes	107 (36%)
No	193 (64%)
Yes	103 (34%)
No	197 (66%)
Types of Addiction	
Tobacco	96 (32%)
Tobacco and Alcohol	7 (2%)
None	197 (66%)
Complications with Diabetes	
Kidney Disease	14 (5%)
Pancreatic Disease	3 (1%)
Liver Problem	10 (3%)
Hypertension	132 (44%)
Heart Problem	18 (6%)
None	123 (41%)

*Socio economic class was observed using the information of employment, salary and daily wages

For knowledge, attitude, and practice for males and females the mean score was shown in table 2. An excellent knowledge, attitude and practices towards the disease was investigated. An average knowledge score for men was found to be 21.51, with a standard deviation of 6.13, whereas the average knowledge score for women was found to be 20.57, with a standard deviation of 6.29. The findings of the t-test were non-significant since the obtained value was 1.26 and the p-value was more than 0.05. Men's mean scores were 35.96 with a standard deviation of 14.33 in terms of attitude, while women's average scores were 33.55 with a standard deviation of 14.03. Non-significant findings were observed since the results achieved was 1.27 and the p-value was more than 0.05. The mean score for male practices were found to be 17.06 and a standard deviation of 4.53, while female practices had a mean score of 16.66 and a standard deviation of 4.72. These findings were not statistically significant since the t-test's resulting value was 0.71 and the p-value was higher than 0.05.

Table 2: Mean Comparison of Diabetic Patients on the Basis of Gender Among Knowledge, Attitude, and Practice (n=300)

Variables	Gender		t (300)	p-Value
	Female (Mean ± SD)	Male (Mean ± SD)		
Knowledge	20.57 ± 6.29	21.51 ± 6.13	1.26	0.20
Attitude	33.55 ± 14.03	35.96 ± 14.33	1.27	0.15
Practice	16.66 ± 4.72	17.06 ± 4.53	0.71	0.47

*p-value < 0.05, **p-value < 0.01, ***p-value < 0.001

DOI: https://doi.org/10.54393/pbmj.v8i2.1155

The knowledge, attitude, and practices scores for people who are normal weight, overweight, and obese are displayed in Table 3 together with their means, SDs, and F-values. Results indicated non-significant mean differences across weight groups on Knowledge F (2,297) = 1.72, p >0.18. Findings revealed that there were no mean differences or minor differences. Results indicated non-significant mean differences across weight groups on Attitude as F (2,297) = 1.95, p>0.14. Findings revealed that people with normal weight were higher as compared to Overweight and Obese. Results indicated non-significant mean differences across weight groups on practices F (2,297) = 1.62, p > 0.20. Findings revealed that there were no major mean differences or minor differences.

Table 3: Mean Differences Regarding Body Mass Index BMI (Kg/m^2) Using One-Way ANOVA (n=300)

Variables	Normal 18-23 Mean ± SD	Overweight 23-24 Mean ± SD	Obese > 25 Mean ± SD	F (2,297)	p-Value
Knowledge	21.86 ± 6.05	21.27 ± 6.12	20.20 ± 6.38	1.72	0.18
Attitude	36.62 ± 13.05	35.38 ± 13.60	32.69 ± 14.97	1.95	0.14
Practice	17.49 ± 4.33	17.07 ± 4.56	16.29 ± 4.84	1.62	0.20

*p-value < 0.05, **p-value < 0.01, ***p-value < 0.001

An average, standard deviation, and F-values for knowledge, attitude, and practices among age groups were calculated. Significant mean differences across age groups on Knowledge F (3,296) = 6.35, p- value=0.00 were observed. According to these findings, people with age group 25-35 and 36-45 Years, their score was higher on Knowledge as compared to others. Results indicated significant mean differences across age groups on Attitude as F (3,296) = 3.69, p-value=0.01. Findings revealed that people with age group of 25-35 were higher at attitude as compared to other. Results indicated non-significant mean differences across age group on practices F (3,296) = 2.31, p-value=0.07. These findings revealed that there were no major mean differences or minor differences on practices (table 4).

Table 4: Mean Differences Between Age of Diabetic Patients Regarding Knowledge, Attitude and Practice Using One-Way ANOVA

S.No.	Variables	Respondents	Mean ± SD	F (3,296)	p-Value
1	Knowledge	25-35 Years	22.86 ± 5.51	6.35	0.00
		36-45 Years	22.57 ± 5.73		
		46-55 Years	19.11 ± 6.35		
		55 Above	20.64 ± 6.30		
2	Attitude	25-35 Years	38.30 ± 12.59	3.69	0.01
		36-45 Years	37.08 ± 13.50		
		46-55 Years	31.27 ± 14.50		
		55 Above	34.05 ± 14.34		
3	Practices	25-35 Years	18.05 ± 4.01	2.31	0.07
		36-45 Years	17.48 ± 4.35		
		46-55 Years	16.24 ± 4.83		
		55 Above	16.28 ± 4.86		

*p-value < 0.05, **p-value < 0.01, ***p-value < 0.001

The average, standard deviation, and F-values for knowledge, attitude, and behaviours about tobacco, alcohol, and other drug addictions are shown in Table 6. Results indicated non-significant mean differences across addiction on Knowledge F (2,297) = 0.97, p>0.38. Findings revealed that people with addiction of tobacco and alcohol were higher at Knowledge as compared to others. Results indicated non-significant mean differences across addiction on Attitude as F (2,297) = 0.37, p>0.69. Findings revealed that people with addiction of tobacco and 26 alcohols were higher at attitude as compared to others. Results indicated non-significant mean differences across addiction groups on practices F (2,297) =0.51, p>0.60. Findings revealed that people with addiction of tobacco and alcohol were higher at practices as compared to others*(table 5).

Table 5: Mean Differences Regarding Addiction Using One-Way ANOVA (n=270)

Variables	Tobacco Mean ± SD	Tobacco & alcohol Mean ± SD	None Mean ± SD	F (2,297)	p-Value
Knowledge	20.93 ± 6.29	24.14 ± 4.91	20.79 ± 6.25	0.97	0.38
Attitude	34.25 ± 15.33	39.00 ± 13.00	34.38 ± 13.64	0.37	0.69
Practice	16.79 ± 4.67	18.57 ± 3.77	16.76 ± 468	0.51	0.60

*p-value < 0.05, **p-value < 0.01, ***p-value < 0.001

The mean, SD, and F-values for knowledge, attitude, and behaviors across fasting blood sugar level. Results indicated significant mean differences across Fasting blood sugar level on Knowledge F (2,297) = 68.73, p>0.00. Findings revealed that

DOI: https://doi.org/10.54393/pbmj.v8i2.1155

people with fasting blood sugar level of >140 were higher at Knowledge as compared to others (table 6).

Table 6: Mean Differences Regarding Fasting Blood Sugar Level (mg/dl) Using One-Way ANOVA (n =300)

Variables	<110 Mean ± SD	110-140 Mean ± SD	>140 Mean ± SD	F (2,297)	p-Value
Knowledge	14.10 ± 3.22	20.71 ± 6.27	25.34 ± 2.86	68.73	0.00
Attitude	22.07 ± 10.56	33.87 ± 14.63	42.94 ± 7.88	40.54	0.00
Practice	12.67 ± 4.40	16.63 ± 4.73	19.62 ± 1.92	41.55	0.00

p-value < 0.05, **p-value < 0.01, ***p-value < 0.001

The mean, standard deviation, and F-values for Knowledge, attitude, and behaviours throughout Postprandial blood sugar levels are shown in Table 8. There were significant mean differences across postprandial blood sugar level on Knowledge F (2,297)= 40.73, p- value > 0.00. (Table 7).

Table 7: Mean Differences Regarding Post Prandial Blood Sugar Level (mg/dl) using One-Way ANOVA (n = 300)

Variables	<140 Mean ± SD	140-180 Mean ± SD	>180 Mean ± SD	F (2,297)	p-Value
Knowledge	16.35 ± 5.51	20.91 ± 6.23	25.21 ± 3.12	40.73	0.00
Attitude	26.01 ± 13.29	34.00 ± 14.33	43.53 ± 8.05	29.29	0.00
Practice	14.08 ± 4.91	16.69 ± 4.71	19.69 ± 1.72	27.57	0.00

p-value < 0.05, **p-value < 0.01, ***p-value < 0.001

DISCUSSION

Hospitals in the Narowal served as the sites for the current descriptive epidemiological investigation. From December 2022 to May 2023, the experiment had 300 participants with type II diabetes. Sixty-three percent of them (n=189) were female. Most of the subjects completed secondary school (29%) and were illiterate, while 25% had just completed elementary school and 19% had earned a bachelor's degree or more.Sixty-five percent of the participants reside in rural areas. They were married in 82% of cases. About 41 percent of the subjects were middle-class, and 64 percent of the participants worked in the private sector. Most of the participants did not use alcohol (98%) or smoke (66%). The findings of this study, which examined diabetes patients' mean knowledge, attitudes, and practices by gender, were not statistically significant. The study's preponderance of female patients may have resulted from the survey's afternoon timing, when the majority of the community's male residents were at work. Women comprised 63% of the total subjects (n=189) in the current research. Most of the patients were between the ages of 40 and 60.41% of the participants in this study came from the medium socioeconomic group, and around 64% of the participants worked for private enterprises. The mean comparison of diabetes patients' knowledge, attitudes, and practices by gender in this study did not yield statistically significant findings. Moreover, these results align with research conducted in Kuala Muda District, Kedah, Malaysia assessed the Knowledge, Attitude, and Practice (KAP) of type 2 diabetes patients in Malaysia, revealing high KAP levels but emphasizing the need for educational interventions, especially for those with lower education or poor management practices.Key factors such as academic qualification, income, and health status were strongly correlated with KAP levels. Trend in diabetes prevalence increasing with increasing age has been reported [15]. Another study on 149 patients, had a positive attitude toward physical exercise but a less favorable attitude toward dietary changes. While 63.4% (n = 83) reported exercising regularly, two-thirds did not consistently monitor their weight, and the adoption of controlled diets was poor.The mean age of 137 respondents was 56 years, with 69.8% being women. The majority had secondary education (43.2%), and 42.6% were pensioners. A quarter of respondents were current smokers (22.2%) or drinkers (26.3%). Despite good knowledge, with 94.6% learning from healthcare professionals, the majority (87.3%) understood that lifestyle modification involves diet and exercise. However, many still struggled to implement these practices. However, the study highlights the gap between knowledge and practice, with respondents showing poor attitudes toward dietary changes and inconsistent exercise routines [16]. A study done in Palestine on T2DM patients showed KAP as the key predictors that contribute to higher levels of knowledge, positive attitudes, and effective disease management practices among patients [17]. The use of Complementary Medicine (CAM) products is prevalent among the Pakistani diabetic population. Common CAM practices include the use of herbs and specific diets. The adoption of CAM is notably associated with factors such as female gender, older age, lower education levels, unemployment, prolonged diabetes duration, diabetes-related complications, and poor glycemic control [18]. Another finding explains that Knowledge is the most important factor in managing diabetes, serving as the foundation for control. In developing countries, awareness is influenced

DOI: https://doi.org/10.54393/pbmj.v8i2.1155

by age, socio-economic status, and education. Previous studies highlight the importance of education in dispelling myths and misinformation about the disease [19]. In contrast to these findings, a cross-sectional household survey was conducted from 31st January to 3rd February 2019 to assess diabetes-related knowledge, attitudes, and practices among Singaporeans aged 30-64 years without diabetes. Results from 806 participants showed that 72.2% did not meet physical activity recommendations. Physical activity was linked to better diabetes knowledge, stronger beliefs in prevention, and lower worry about diabetes. However, knowledge and attitudes were not associated with dietary habits. The findings suggested the need to emphasize physical activity and healthy diets in diabetes prevention, with behavior change interventions likely required for improving dietary choices [20]. In inverse relation to these research studies a survey revealed a lack of knowledge, poor attitudes, and inadequate practices within the community, highlighting the need for structured educational programs for diabetic patients. Education should particularly target males, newly diagnosed individuals, and those with low education levels [21]. It was found that most patients had no idea what DM was. This is consistent with a study done on 163 patients and revealed a lack of diabetes-related knowledge regarding exercise ($p < 0.001$). Most participants with T2DM 163, (81.9%) were unaware that physical activity and exercise are distinct. About 158 participants (70.4%) believed their daily work was sufficient as a substitute for exercise. Over 50% exhibited positive attitudes and practices toward reap the advantages for T2DM ($p < 0.001$). Despite poor knowledge and negative attitudes toward diabetes, participants demonstrated satisfactory diabetes-related practices [22]. It was also found that several of the participants knew that kidney impairment might occur from untreated diabetes mellitus. In a research conducted at six educational academy in Beharampur, Orissa, Malini DS *et al.*, found that 18.75% of patients with diabetes also had high blood pressure [23]. Blood sugar levels and diabetes-related practice scores were shown to be substantially correlated among those with low practice scores who also had insufficient glycemic. Over half of the patients with low ratings did not take their prescription drugs on time, did not follow a diabetic diet, or did not practice other healthy lifestyle practices including regular exercise and checkups. According to current knowledge skipping doses of diabetic medications would negatively affect the ability to regulate patient's condition.

CONCLUSIONS

The survey participants' knowledge, attitudes, and behaviors about diabetes were deemed inadequate, as seen by the low evaluations for the sample. Sample size was small with approximately one-third of people having a background of diabetes. An interrelation between practice score and patient glycemic control was observed along with a strong correlation between diabetes and obesity.

Authors Contribution

Conceptualization: SS
Methodology: SF, HSB, AB, SA, AT
Formal analysis: SA, AK
Writing, review and editing: SF, HSB, AT

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

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