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Is a sedentary lifestyle a leading causal factor of obesity and distress in type 2 diabetes? A cross-sectional study in low-socioeconomic areas of Karachi, Pakistan

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ABSTRACT

Background Worldwide, the burden of diabetes with obesity as comorbidity has intensely increased. Even though sedentary behaviour is not favourable for a healthy lifestyle, some people still live a sedentary lifestyle. There is a dire need to report cases of sedentary behaviour in people with diabetes and obesity in the slums of Karachi, Pakistan.

Objectives To assess the association of obesity and distress with sedentary behaviour among individuals with diabetes in slums and the associated factors.

Methods This institutional-based cross-sectional study was conducted in 38 slums in Karachi, Pakistan, to determine the association of sedentary behaviour with poor glycaemic control and demographic factors. Data from August to September 2022 were analysed, and inferences were drawn.

Results Among the studied population, out of 493 participants, 273 (55%) were female of age range 46–55 years 109 (22%) belonged to body mass index class-1 obesity 110 (22%), with hypertension 205 (42%), showed sedentary behaviour with low-socioeconomic settlements 299 (61%), and belong to Pathan ethnicity 153 (31%). More participants were married 337 (68%), had low-socioeconomic status 299 (61%) and had a positive family history of diabetes 242 (49%).

Conclusions This study found that sedentary behaviour is significantly associated with the sociodemographic and clinical profile of patients with type 2 diabetes. It causes a long turn effect that can only result in uncontrolled and poor glycaemic control in diabetes and metabolic imbalance. The study can promote a physical-induced work setup and spread awareness among illiterate people for awareness of disease complications.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Previous and present reported studies have established that a sedentary lifestyle may contribute to different chronic illnesses compared with any physically active lifestyle, including walking and cycling.

WHAT THIS STUDY ADDS

⇒ The study in slums gives us new directions because the burdens of different diseases are increasing, and public health has done very limited work in these areas for disease management and mental health well-being. This study concluded by associating different socioeconomic determinants on sedentary behaviour among the vulnerable populations of diabetes.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ As part of national and international programmes to avoid these unfavourable health outcomes, health experts, stakeholders and policy planners are urged to enhance systems that support a healthy way of life and encourage active commuting by advocating.

INTRODUCTION

Obesity and overweight have become global problems. High-income and low/middle-income countries face the difficulty of resistance in many chronic illnesses from the standard treatment due to the high incidence of obesity among people. According to WHO global disease burden report 2017, over 4 million people die yearly from being overweight or obese. In 2016, over 1.9 billion adults, 18 years and older, were overweight, and 650 million were obese. 39% of adults aged 18 years and over were overweight in 2016, and 13% were obese, per the WHO fact sheet in June 2021.[1] Overweight and obesity kill more people than underweight in the majority of the world's population's respective regions.[1]

Pakistan is facing a substantial rise in the obesity burden, which incurs an increase in the economic burden. As per the survey by Forbes, Pakistan stands 165 positions (out of 194 countries) in terms of its overweight population, with 22.2% of individuals over the age of 15 crossing the onset of obesity, which is comparatively increases from its neighbouring countries such as India stands on 176

positions (16.2%). In contrast, Afghanistan ranked 179 (15.1%) among the marathon of obesity.[2]

Associated non-communicable diseases with obesity are substantially rising diseases[3 4] and economic burden not only to the healthcare sector but also impact on society as well.[5 6] It includes mainly cardiovascular problems, that is, heart disease and heart stroke, the leading cause of death in 2012, and diabetes mellitus, which has become the largest growing epidemic and is considered a public health emergency by most countries. Several factors contribute to the increase in body mass index (BMI), including increased consumption of high-fat and sugars-containing processed food, an adaptation to a sedentary lifestyle due to the many forms of work, changing modes of transportation and increasing urbanisation.[7] Globally, adolescents and adults spend a significant amount of time in their routine inactive, including workplace sitting, watching television, or playing computer and video games.[8] Physical inactivity and sedentary lifestyle choices can be an acquiring risk factor for developing chronic diseases,[9] such as obesity,[10] type 2 diabetes (T2D),[10] hypertension,[11] dyslipidaemia,[12] rheumatoid arthritis and other chronic illness.[13] Recent studies recommend that high sedentary behaviour negatively influences health independent of other factors, including body weight, diet and physical activity. In addition to this, physical inactivity may also develop anxiety and depression among older people.[14] Many studies have been done in the past related to chronic illness and its impact on mental health well-being.[15–18] However, there are very limited studies published on the association of obesity with mental health illness[19] and also limited reported evidence of the direct relationship between sedentary behaviour and mental illness or stress among such patients.[14] This sedentary and inactive lifestyle causes further contribution or even worsen diabetes condition, especially in the adult population of Pakistan.

Study rationale

Pakistan comprises 60% of the rural and 40% of the urban population.[20] The population growth has drastically risen in urban areas, aggravating the situation in such shack areas of Karachi, one of the biggest metropolitan cities of Pakistan; their suburbs contain mixed populations of economic and political immigrants and refugees from different national and regional, philological and religious backgrounds. Rural-to-urban migration, industrialisation and rapid population growth associated with economic crises have forced people to live in slums.[21 22] The occurrence of overweight and obesity are promptly mounting among the Pakistani population, despite the current high level of undernutrition in children and adolescents.[23] Obesity and diabetes mellitus are two public health challenges that double the burden of malnutrition.[23] Today, more people are obese than underweight in every region except sub-Saharan Africa and Asia.[24] Overweight and obesity, formerly thought to be a problem exclusively in high-income nations, are now rapidly increasing in low-income and middle-income nations, particularly in metropolitan areas. This information promotes and implies that the estimations of individuals with T2D who are overweight and obese need to be revised. As a result, we decided to conduct the research in slum areas of Karachi, Pakistan. The primary goal of the research is to determine the current prevalence of overweight and obesity among Pakistan's adult population. We also pinpoint the sociodemographic traits that may be linked to sedentary or physically active lives in slum residents with T2D.

Aim of the study

To estimate the association of sedentary behaviour with selected sociodemographic predictors and clinical factors in patients with diabetes.

Objectives

To evaluate the impact of a sedentary lifestyle on poor glycaemic control, hypertension and obesity of adults with T2D in the slum area of Karachi, Pakistan.

What this study adds

The effective confrontation of this epidemic in Pakistan warrants a dire need to implement primary preventive care. This study will enlighten different factors of sedentary lifestyle adaptation and its impact on T2D and obesity. In addition, published data on the causes of obesity and its management approaches due to a sedentary lifestyle are available mostly from developed countries.[24] Further research on these avenues is required by low/middle-income countries, as well. For this reason, we need to highlight the burden of the cause by reporting numbers of selective slum populations.

METHODOLOGY

Study site

This cross-sectional study was conducted from August to September 2022 at 10 of the 38 clinics selected through a random number table. SINA is a primary healthcare not-for-profit organisation that provides healthcare services to approximately a million people annually located in slum areas where the majority, that is, 80%, are women and children. All the clinics are in slum locations where people are deprived of basic needs and in accessing medical facilities. The accessibility of such people is itself a challenge. SINA clinics at these premises help us access the patients in these areas. The preponderance of people who seek medical services belongs to illiterate—lower socioeconomic communities residing in the slums of Karachi. Karachi is Pakistan's largest city and economic hub, with an estimated population of 14 910 000[25] and people of diverse ethnic and socioeconomic groups as shown in figure 1.[25] The study population comprised patients with T2D with obesity coming to SINA for regular consultation over the last 6 months. In SINA, nearly 250 patients get registered daily. We assumed that about 25 of them have diabetes.

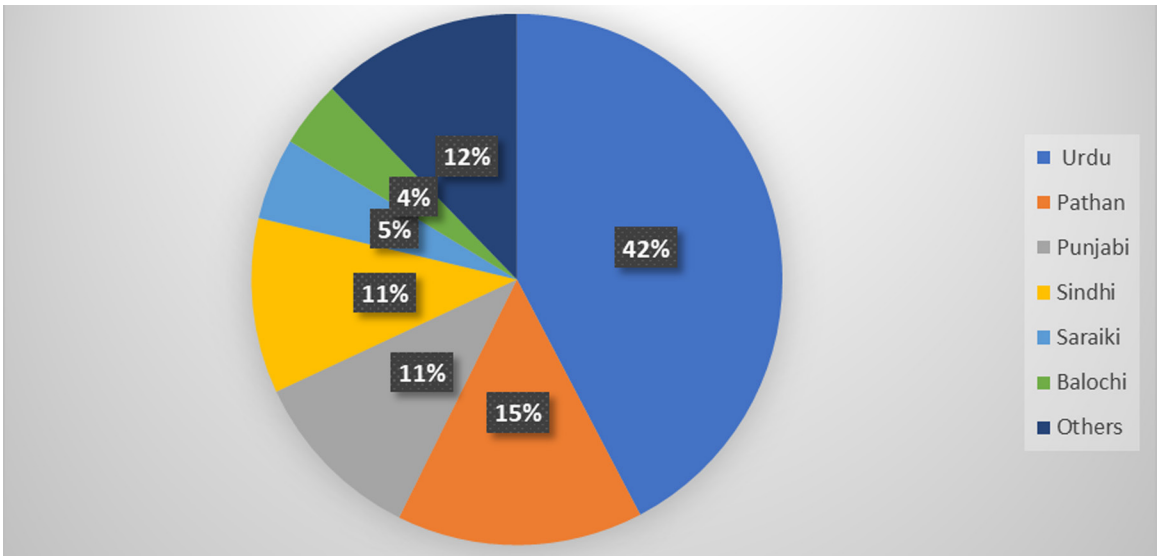

Figure 1 Ethnicity in Karachi.

Data size and duration

Using a 95% CI and a 5% error limit, the sample size was computed to estimate the percentage of physically inactive people among obese attendants. At least 70% of obese people were expected to be inactive.[26] The sample size was estimated to be 323 with a 20% non-response rate (NRR) of 470, which was increased to 504 overall.

Equations for data size

Patient sample size=(4pq/d2)×20% NRR
Where p=anticipated the prevalence, q= (1−p), d=margin of error), d=5%
Patient sample size = ((4×50×(1–50))/(5×5))×20%
Patient sample size=392 ×20%=470+34=504.

Patients' recruitment criteria

Patients with T2D and obesity who had visited SINA for routine consultation during the previous 6 months made up the research population. We estimated that 100 of the almost 250 patients enrolled each day at SINA would have diabetes and/or obesity. Each day of the data collecting period, research colleagues personally delivered self-generated questionnaires to all diabetic patients in the waiting areas of clinics that were chosen. Following the informal permission process, data collectors assessed the participants' height and weight to determine their BMI (in kg/m^2). Patients were evaluated for further qualifying requirements if their BMI was below ≥27.5 kg/m^2 as per WHO BMI cut-off for Asians. The research recruited participants who were 18 years of age or older and had a BMI under 27 kg/m^2. This age range was chosen since the International Physical Activity Questionnaire (IPAQ) (an instrument used in the research to evaluate physical activity) was created exclusively for people between the ages of 20 and 69.[27] The WHO's definition of obesity for the Asian population used a threshold of BMI≥27.5 kg/m^2.[28] The questionnaire was not intended for pregnant women, those who could not comprehend the questions due to a language barrier, people with disabilities or walk-in patients. The research was open to everyone who satisfied the eligibility requirements, and before giving out the questionnaire, verbal informed permission was obtained.

Data collecting instrument or tool

Self-generating questionnaire was administered by research associates through face to face to all patients with diabetes who were in the waiting area of clinics selected each day of the data collection period. One questionnaire tool was used here to measure diabetes distress: the Diabetes Distress Scale (DDS), one questionnaire related to the patient's demographics and one questionnaire used here IPAQ.

Demographics

The first part of the questionnaire covered patients' demographic data and treatment medication-based questions, including age, physical activity, duration of physical activity, gender, education, material status, income, residential area (urban or rural), ethnicity, diabetes history, duration of illness any complication related to diabetes, BMI and smoking or tobacco consumption.

The Diabetes Distress Scale

This 17-item scale evaluates diabetes- related particular psychological problems in patients with T2D. A score of 3 and above is considered elevated stress.[29] The DDS is more insightful on distress relating to diabetes self-management.

International Physical Activity Questionnaire

The level of physical activity was measured using the IPAQ scale.[27] IPAQ categorises physical activity into three categories, such as low, moderate and high. In this study, physical activity was considered as a binary variable; patients with low levels of physical activity were considered as

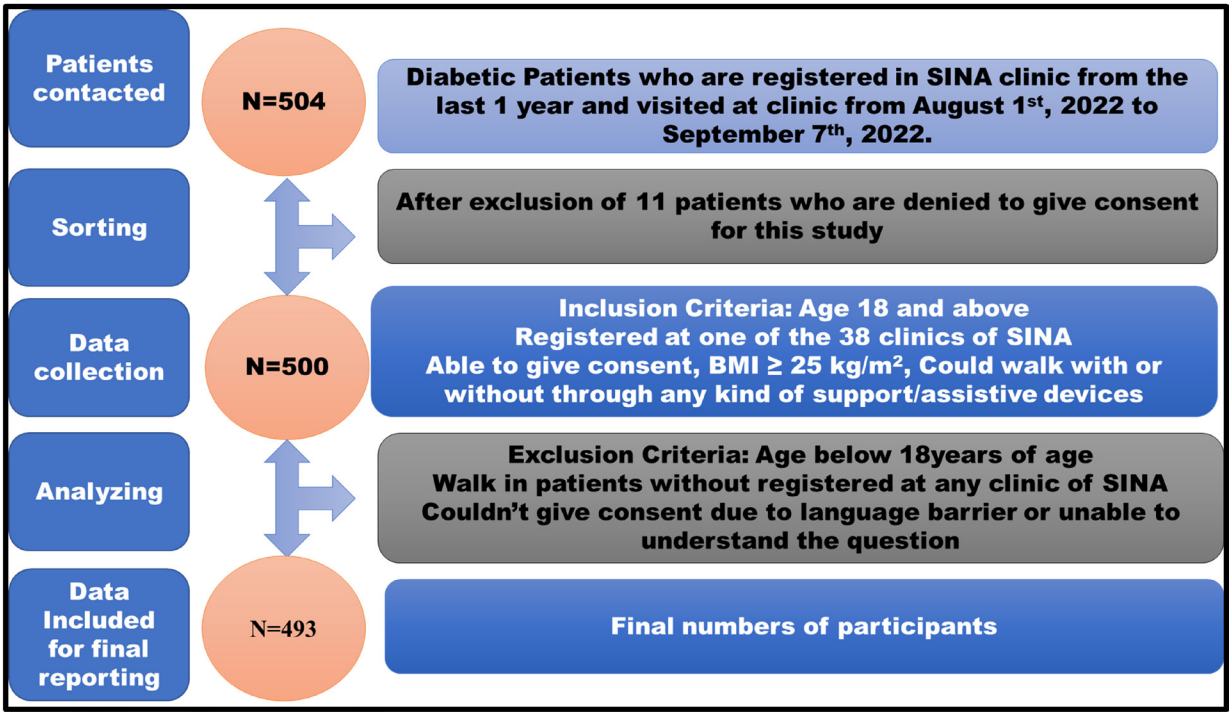

Figure 2 Flow diagram of participant inclusion and exclusion in the study. BMI, body mass index.

physically inactive, and those with moderate or high levels were considered as physically active.

Patient and public involvement

No patients or members of the general public were involved in the planning, execution, reporting or distribution of our study.

Statistical analysis

V.27.0 of IBM SPSS Statistics for Windows. Before being entered into Microsoft Excel 2007 and exported to SPSS V.24 for analysis, all collected data were checked for accuracy and consistency. The data were compiled using descriptive statistics (frequencies and percentages) to characterise the sociodemographic characteristics, clinical factors and sedentary lifestyle. The important predictors were chosen using the results of the univariate regression analysis. Variables with p values less than 0.05 in the bivariate model were included for additional multivariate logistic regression to exclude potential confounders. In the multivariate logistic model, variables with p values lower than 0.05 were considered statistical predictors. The OR with a 95% CI was used to gauge the strength of the connection.

RESULT

After a random selection of 504 people with the condition of obesity and diabetes, 11 were refused to participate at the time of verbal consent. Figure 2 shows the recruitment of patients during the study collection period.

Among 493 people with diabetes condition, 341 (69%) were physically inactive. The sociodemographic characteristics of the study contributors are reported in table 1, which summarises the descriptive analysis of sociodemographic characteristics of physically sedentary concerning predictor variables among individuals with diabetes. Age range 46–55 years (35.5%) in females' genders (55%) in the physically inactive group were significantly higher than that in the physically active group, which belongs to Pathan ethnicity (31%) with no occupation (62%). In addition, most of the individuals of targeted population having T2D, belonged to the (11%) obese class 1 (BMI≥27.5 kg/m^2 as per WHO BMI cut-off for Asians). In the sedentary lifestyle group, more subjects had a positive family history of diabetes (49%). Likewise, the participants who sleep more than 8 hours (51.3%), dietary non-compliance multiple times a month (34%), use a medium quantity of salt intake (40.7%), presence of diabetes-related complications (51%) and has presence a family member who smokes (51%) belong to higher sedentary lifestyle group.

Table 1 also shows the significance level of each predictor variable in unadjusted univariate analysis for screening and selected those variables which significantly associated with a sedentary lifestyle (p<0.20). In table 1, each predictor variable was unadjusted significantly associated with the sedentary lifestyle; therefore, we added all the independent variables in the multivariate logistics regression model shown in table 2.

Table 2 demonstrates the adjusted multivariate association between a sedentary lifestyle with significant predictors in unadjusted univariate analysis shown in table 1. Gender shows a significant association with the level of sedentary lifestyle; the odds of adopting a sedentary lifestyle in females is 0.71 times that in males (p<0.05, 95% CI 0.418 to 1.207). The odds of developing

Table 1 Descriptive and univariate analysis of study variables

Variables	Covariables	Total n (%) n=493	Sedentary lifestyle n (%)	Univariate analysis (p<0.20)
Gender	Female	392 (79.5)	273 (55)	
	Male	101 (20.5)	68 (14)	0.005
Age group	18–24	3 (0.6)	2 (0)	
	25–35	21 (4.3)	15 (3)	
	36–45	105 (21.5)	75 (15)	0.000
	46–55	178 (36.1)	109 (22)	
	56–65	121 (24.8)	89 (18)	
	≥66	65 (13.3)	51 (10)	
Resident	Rural	18 (3.6)	9 (2)	0.000
	Urban	475 (97.3)	332 (67)	
Ethnicity	Pathan	212 (43)	153 (31)	
	Sindhi	35 (7.2)	22 (4.5)	
	Punjabi	49 (10.0)	35 (7)	0.002
	Balochi	15 (3.1)	11 (2)	
	Urdu speaking	102 (20.9)	64 (13)	
	Other	80 (16.4)	56 (11.4)	
BMI	Normal weight	94 (19)	33 (7)	0.008
	Overweight	155 (31.4)	44 (8)	
	Obese class 1	154 (31.2)	51 (11)	
	Obese class 2	90 (18.4)	27 (5)	
Smoking status	No	413 (83.6)	290 (59)	0.000
	Yes	80 (16.4)	51 (10)	
Level of stress	High distress	95 (19.5)	68 (13.8)	
	Moderate stress	242 (49.1)	183 (37.1)	0.009
	No stress	156 (32)	90 (18.3)	
Diabetes duration	1–5 years	183 (37.5)	127 (26)	
	6–10 years	296 (60)	204 (41.3)	0.026
	>10 years	14 (2.9)	10 (2)	
Diabetes family history	No	136 (27.5)	100 (20)	
	Yes	357 (73.2)	241 (48.8)	0.007
Hypertension ≥140/90*	Yes	350 (71)	249 (73)	
	No	143 (29)	92 (27)	0.004
Sleeping hours	More than 8 hours	307 (62.3)	253 (51.3)	
	Less than 8 hours	186 (37.7)	88 (17.8)	0.005
Dietary non-compliance	Once a week	98 (20)	59 (11.9)	
	Once a month	84 (17)	31 (6.2)	0.000
	Twice a month	124 (25.2)	83 (16.8)	
	Multiple times	187 (37.9)	168 (34)	
Salt intake	Mild	108 (236)	59 (12)	0.109
	Medium	236 (47.8)	201 (40.7)	
	Strong	53 (10.7)	38 (7.7)	
	Do not use	96 (19.4)	43 (8.7)	
Diabetes-related complications	Yes	317 (64.3)	254 (51.5)	0.111
	No	176 (35.7)	87 (17.6)	
Smoker in family	Yes	325 (66)	252 (51.1)	0.087
	No	168 (34)	89 (18.1)	

*As per WHO 2016 on Pakistan Health Research Council Non Communicable Diseases Survey–Islamabad, Pakistan.
BMI, body mass index.

Table 2 Multivariate logistic regression between the predictors and sedentary lifestyle

Variables	OR	95% CI	P value
Gender			*
Female	0.710	0.418 to 1.207	
Male	Ref	–	
Age			*
18–24	1.21	0.609 to 2.403	
25–35	0.927	0.508 to 1.690	
36–45	0.672	0.235 to 1.921	
46–55	5.028	1.211 to 7.421	
56–65	1.214	0.722 to 2.043	
≥66	Ref	–	
Resident			*
Urban	0.766	0.212 to 2.774	
Rural	Ref	–	
Ethnicity			*
Pathan	2.146	0.615 to 5.486	
Sindhi	1.195	0.687 to 3.981	
Punjabi	1.138	0.438 to 3.955	
Balochi	1.329	0.448 to 4.021	
Urdu speaking	0.634	0.186 to 2.170	
Other	Ref	–	
BMI			
Normal weight	0.586	0.300 to 3.314	
Overweight	1.162	0.686 to 4.966	**
Obese class 1	1.36	0.708 to 3.614	
Obese class 2	Ref	–	
Smoking status			
Yes	0.553	0.306 to 1.997	*
No	Ref	–	
Diabetes family history			
Yes	0.687	0.433 to 1.090	*
No	Ref	–	
Diabetes duration			
1–5 years	0.335	0.090 to 1.250	*
6–10 years	0.470	0.275 to 0.805	
>10 years	Ref	–	
Hypertension			
Yes	1.380	0.686 to 4.778	**
No	Ref	–	
Level of stress			
High	1.808	0.437 to 4.494	*
Moderate	0.278	0.127 to 0.607	
No	Ref	–	
Dietary non compliance			
Once a week	3.814	0.757 to 19.217	ns
Once a month	1.804	0.384 to 8.466	

Continued

Table 2 Continued

Variables	OR	95% CI	P value
Twice a month	0.861	0.179 to 4.128	
More than twice a month	Ref	–	
Sleeping hours			
Less than 8 hours	0.359	0.072 to 1.777	ns
More than 8 hours	Ref	–	
Smoker in family			
Yes			ns
No			
Diabetes-related complications			
Yes			ns
No			
Salt intake			ns
Mild			
Medium			
Strong			
Do not use			

*p<0.05.
**p<0.01.
BMI, body mass index; ns, not significant; Ref, reference category.

a sedentary lifestyle in the age group '46–55' is five times the odds of having sedentary behaviour in the age range '66 and older' (p<0.05, 95% CI 1.211 to 7.421). The odds of accepting a sedentary lifestyle in urban residents is 0.77 times the odds of having sedentary behaviour in rural residents (p<0.05, 95% CI 0.212 to 2.774). The odds of developing a sedentary routine in the Pathan ethnic group are 2.1 times of odds of having a sedentary lifestyle in another ethnicity (p<0.05, 95% CI 0.615 to 5.486). In addition to this, we also assessed the association of the BMI classes with the level of a sedentary lifestyle and found out that the odds of adopting a sedentary lifestyle in individuals with the condition of obese class 1 and diabetes are 1.36 times of odds of developing a sedentary lifestyle in obese class 2 (p<0.01, 95% CI 0.708 to 3.614). Moreover, the odds of a having sedentary lifestyle among individuals who smoke are 0.553 times the odds of having a sedentary lifestyle in non-smokers (p<0.05, 95% CI 0.306 to 1.997). Similarly, the odds of adopting a sedentary lifestyle in participants with a family history of diabetes are 0.69 times the odds of having a sedentary lifestyle in those who do not have a family history of diabetes (p<0.05, 95% CI 0.433 to 1.090). Both of the smokers and those who have diabetes family history are more prone towards sedentary lifestyle comparative to their counterparts. The odds of adopting sedentary lifestyle in participants who have diabetes between 6 and 10 years are 0.47 times the odds of having a sedentary lifestyle in a group of participants who have had diabetes for more than 10 years (p<0.05, 95% CI 0.275 to 0.805). The odds of having a sedentary lifestyle in participants with condition of diabetes and hypertension are 1.38 times the odds of adopting a static lifestyle who does not have diabetes and hypertension (p<0.01, 95% CI 0.686 to 4.778). Likewise, the odds of developing a sedentary lifestyle in people with diabetes condition and higher stress level are 1.81 times the odds of having a sedentary lifestyle of those who have no stress (p<0.05, 95% CI 0.437 to 4.494).

The dietary non-compliance, salt intake, diabetes-related complications, smoking members at home and sleeping hours were insignificantly related to a sedentary lifestyle (p>0.05), and therefore, excluded from the model.

Interaction or confounding variables

All plausible interaction and confounding effects have been assessed. However, no interaction and confounding effect was found among study variables.

DISCUSSION

The current article shows that multiple risk factors—a sedentary lifestyle, smoking, ethnicity, diabetes duration, diabetes history, hypertension, age, BMI and stress level—affect patients with T2D mellitus and obesity. The biggest population-level influences on this illness are obesity and physical inactivity. In our study, 69% were physically inactive, belonged to the 11%obese class 1 and had a positive family history of diabetes (49%).

Previous studies that are supporting include multiple chronic illnesses such as obesity,[30] poor glycaemic

control,[31 32] uncontrolled hypertension[33] and risk of developing diabetes-related distress[34–37] are critically associated with sedentary behaviour. A very limited study has been published specifically on sedentary behaviour and sedentary lifestyle association with other factors in adult diabetes patients in Pakistan, especially those who belong to the urban slum areas of Karachi. The majority of people who belong to the slums area (also named Katchi Abidis) of Karachi are tribals who migrated from different localities of Pakistan and lived in informal settlements having highly deprived life where they struggle not only to earn and living life[38] but also due to lack of awareness, facilities, education and inaccessible to primary health centres, the burden of different diseases such as respiratory diseases,[38 39] diabetes,[38] waterborne diseases increases.[38] These areas are highly neglected due to inaccessibility. Due to these, the reason for such chronic diseases is unclear and even unreported.[38]

In the collected data, most participants were middle-aged women (46–55 years) who belong to low socio-economical Pathan ethnic background. The majority of them belong to class 1 obesity show stress related to diabetes, and experience uncontrolled hypertension shown in table 2 due to their sedentary lifestyle, similar to the previously reported study by a group of researchers from Spain in 2018.[40] In addition, psychosocial factors such as depressive episodes associated also shown in our collected data which also significantly associated with their inactive physical status, which was also previously published by researchers from Lebanon in 2018.[41] Stress is the key factor that emerges out due to triglyceride levels, BMI and T2D duration,[42] which worsen further with sedentary behaviour compared with the group with desirable physical activity (150 min and more per week) among patients with T2D, especially elderly female patients.[43] One study also reported that the slum adult population having diabetes shows depression related to diabetes, and some of them show suicidal ideation to get rid of their diabetes life.[44] In addition, several past studies confirm that an inactive lifestyle plays a leading role in developing T2D among the majority of the population.[41–43]

Low socioeconomic status, low income and illiteracy are also associated with a sedentary lifestyle. Very limited research[43] identified the association with women from low-income settlements who are normally more sedentary than their higher-income counterparts.[43] Therefore, the preliminary findings of the present study fill an important potential gap in the literature examining factors related to sedentary living for low-income young mothers.

Through this research, its highlight the issues of supporting factors along with the sedentary lifestyle is worsening the diabetes situation especially those areas where limited accessibility to health setups, poverty and illiteracy.

Future direction

Our results align with other population-based studies that used more representative samples and found a substantial relationship between diabetes with obesity and self-reported measures of sedentary time. However, prospective studies or, preferably, intervention trials using objective measurements are needed to identify the physiological and behavioural processes underlying these cross-sectional relationships. However, there are significant public health benefits to increasing time spent engaging in mild to moderate-intensity physical exercise and decreasing time spent engaging in sedentary behaviour. In order to build evidence-based approaches for addressing sedentary behaviour and health, research is needed to develop new measurement methods, understand the personal, social and environmental factors that influence sedentary behaviours, and build and test the relevant interventions. At a community level, access to exercise facilities should be possible. Enhancing and collaboration with not-for-profit organizations (NGOs) should be encouraged to overcome financial constraints and provide human and physical resources. The government should take ameliorative steps, such as imposing higher taxes on unhealthy food items, educating about healthy food consumption via mandatory mention of caloric values and ingredients on all food items, and strongly advocating for exercise as a life-essential through print and electronic media. It is high time that healthcare practitioners realise the vital role of exercise and favour its optimal utilisation to help attain unique health benefits.

Limitation of the study

The key drawback of the present research is that it was cross-sectional in nature, which prevented a longitudinal investigation of the long-term consequences of the medications and other issues. The need for sufficient financial resources to assess the several important biochemical indicators is another constraint of this research. Additionally, a particular sample of people with T2D underwent 1 month of outpatient monitoring as part of the current investigation. Because of this, the results should not be generalised, and fresh study using the same or a different diagnosis in other demographic profiles is necessary. Another drawback of the research is that it focused on one demographic since most of the data were gathered in urban regions and just a small percentage in rural ones.

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Contributors SS was involved in the study idea, data analysis and result interpretations. HS prepared and finalised the manuscript, gathered the data and is the author acting as guarantor. JR was involved in the literature search, and ZF reviewed the final manuscript and discussion. All authors reviewed and approved the final version of manuscript for publication.

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Consent obtained directly from patient(s).

Ethics approval After receiving permission, the individuals filled out questions; their identities were not revealed. Before the research began, the initial proposal was submitted to the SINA's Ethical Review Board (SINA-ERB), which gave its clearance through ERB no. ERB0000015/08-22.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data may be obtained from a third party and are not publicly available. The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

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