EJPMR, 2026, 13(1), 227-237 **Case Study** **Impact Factor 7.065**

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

ISSN (O): 2394-3211
ISSN (P): 3051-2573
Coden USA: EJPMAG

IMPACT OF LIFESTYLE CHOICES ON DIAGNOSIS AGE AND PROGNOSIS OF DIABETES

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DOI: https://doi.org/10.5281/zenodo.18093246

How to cite this Article: Bhavika A. Shah* (2026). IMPACT OF LIFESTYLE CHOICES ON DIAGNOSIS AGE AND PROGNOSIS OF DIABETES. European Journal of Biomedical and Pharmaceutical Sciences, 13(1), 227–237.

Article Received on 26/11/2025 **Article Revised on 15/12/2025** **Article Published on 01/01/2026**

ABSTRACT

Diabetes is often referred to as a 'silent killer' because uncontrolled high blood sugar can severely damage vital organs, leading to serious complications like heart attacks, strokes, and kidney failure. While studies suggest diabetes is manageable, this specific investigation aimed to explore how lifestyle choices—such as exercise, diet, and stress-reduction—could potentially delay the onset, reduce stress levels, and help maintain a healthy Body Mass Index (BMI) in Type 2 diabetes patients. A cross-sectional study was conducted using an anonymous online survey in Maharashtra, India. The comprehensive questionnaire was shared with 1,500 Type 2 diabetes patients (aged over 18) between October and December 2024, yielding 100 responses for analysis. The results showed that 85% of patients who made no changes had an unhealthy BMI, compared to an average of 44% of those who began exercising, doing yoga/meditation, or changed their diet. Additionally, 60% of patients making no changes reported high stress levels (4-6), versus an average of 41% of those who made lifestyle changes. The findings demonstrate that implementing lifestyle choices related to diet, exercise, and screen time can significantly reduce stress, help maintain a healthy BMI, and potentially delay the age of diabetes onset. This, in turn, lessens the risk of severe complications. The study concludes that there is a need for improvement in patients' knowledge and attitude towards lifestyle management, suggesting that public health campaigns are vital to raise awareness and promote a preventive, health-focused lifestyle.

KEYWORDS: Public Health; Health Behaviour; Type 2 Diabetes; Lifestyle Modification; Cross-sectional study.

INTRODUCTION

Diabetes is a chronic, metabolic disease characterized by elevated levels of blood glucose which over time causes serious damage to the heart, blood vessels, eyes, kidneys and nerves. Type 1 diabetes (Juvenile diabetes) is a chronic condition in which the pancreas produces little or no insulin by itself, since birth. Type 2 diabetes is more common occurs in adults when the body acquires insulin resistance or doesn't make enough insulin (World Health Organization)[1] Type 2 diabetes is a multi-factorial disease, the incidence and progress of which are influenced by a combination of lifestyle choices (such as nutritional habits, exercising frequency etc.) and genetic predispositions (Galicia-Garcia et al. 2020).

The global prevalence of diabetes has risen from 200 million in 1990 to 830 million in 2022. In 2022, 14% of adults aged 18 and older were living with diabetes, up from 7% in 1990 (World Health Organisation 2023).[1][2] The modern, convenience-based lifestyle has significantly contributed to this rise. The rampant use of gadgets and digital entertainment has led to sedentary behaviors, with people spending long hours sitting and watching the. This lack of physical activity reduces the body's ability to regulate blood sugar effectively (Alotaibi et al. 2020).[3] Additionally, fast food and processed meals, high in sugars and unhealthy fats, have replaced home-cooked meals, leading to weight gain and insulin resistance (Aralikar 2024).[4] Lifestyle factors that

can lead to the development of diabetes include obesity, sedentary lifestyle, and smoking.[5]

Diabetes is called the 'silent killer' (Medical offices of Manhattan) because of the severe impacts it has on the body without any prominent noticeable symptoms for the patient (India Today).[5] [6] Uncontrolled diabetes can lead to death by damaging vital organs like the heart, kidneys, eyes, nerves and blood vessels throughout the body, which can result in complications like heart attacks, strokes, kidney failure, vision loss, nerve damage and organ failure if left untreated. High blood sugar levels can also trigger dangerous conditions like diabetic ketoacidosis and diabetic coma, which can be fatal if not managed properly (Medline Plus).[7] According to websites like UCLA med school, John Hopkins Medicine, Mayo Clinic and more, Diabetes can be controlled through a combination of lifestyle changes and medication.

There are certain parameters which can indicate the progression of diabetes. A higher Body Mass Index (BMI) is strongly correlated with a worse prognosis for diabetes, meaning that individuals with a higher BMI are at a significantly increased risk of developing diabetes complications and experiencing poorer overall health outcomes once diagnosed with the disease; essentially, the higher the BMI, the greater the likelihood of a poorer diabetes prognosis. Age of onset of diabetes has a strong correlation with its prognosis.

The aim of the study was to investigate the association between certain dietary practices, habits, exercising frequency and screen time of diabetic patient with their Body Mass Index status, age of diagnosis and stress levels in order to understand which lifestyle choices can help delay or mitigate the incidence and progression of type 2 diabetes.

MATERIAL AND METHODS

A cross-sectional study using an anonymous online survey was conducted in Maharashtra among patients diagnosed with Type 2 diabetes aged above 18 from 10th October to 10th December 2024. A comprehensive questionnaire was developed including relevant questions on family history, exercising frequency, screen time, screen time while eating, food preferences, frequency of outside eating, eating times for meals, postdiagnosis lifestyle changes, consultation of dietitian, lifestyle habits, duration of walk after dinner, amount of guidance received for risk factor and management, stress levels, height, weight and age at diagnosis. The questionnaire was validated and checked for reliability by a diabetologist and research expert. The content validity assessed whether the questions and their corresponding options are suitable for extracting the desired information to answer the objectives.

The questionnaire was set up via google form and the link for which was shared through social media platforms like Whatsapp and Instagram along with an invitation to participate in the study. In the social media message, a public information sheet was attached and filled by each participant to provide their informed consent prior to participation. The invitation message was sent to 1500 people in Maharashtra and after 15 days, a follow up message was sent to non-respondents. Only patients diagnosed with Type 2 diabetes and above the age of 18 were included in the study. The sample finally consisted of 100 valid participants including males and females. No names or identifiable information was collected from patients and the participant data was stored on a password protected computer with access to only the author. The participants did not receive any form of compensation for participating.

The statistical analysis was carried out using the Google Sheets tool. Using the height and weight values answered by the patient, the code '=B1/(A1*A1' was used to convert the information into the Body Mass Index of each person. The Body Mass Index was then categorized into 'Healthy', 'Over weight' and 'Obese' status using the code '=IF((C3<25,"Healthy",IF(C3<30,"Unhealthy")))'. The findings were converted to tabular format with relevant correlations and percentages of total were used to find statistics for the same.

RESULTS

Based on the 100 responses received, it was observed that many individuals did not answer some of the reflective questions. The data was analysed based on the responses received under each question.

Table 1: Demographic profile of participants.

Gender	<30	30–39	40–49	50–59	60+	Total
Female	4	11	11	11	0	37
Male	3	9	24	21	0	57
Trans Gender	0	1	0	0	0	1
Total	7	21	35	32	0	95

1.1 – Demographic information

Total participants: 95.

The largest age group was 40–49 years (36.8%), followed by 50–59 years (33.7%). Males comprised 60.0% of the sample, females 38.9%, and 1.1% identified as transgender. Among males, the highest concentration was in the 40–49 year age group (42.1% of all males), while among females, the 30–39, 40–49, and 50–59 age groups were equally represented (each 29.7% of all females). Only 7.4% of respondents were below 30 years of age, and none were aged 60 or older.

Table 2: Family history and age of diagnosis.

General Factor	Specific Characteristic of Factor	Age at Diagnosis of Diabetes	
		18 - 40 age	40+
Presence of Family History	Yes	44	20
	No	15	18

2.1 – Family history

Out of 98 respondents, 64 (65.3%) reported a positive family history of diabetes. The prevalence of a family history was highest among those diagnosed at 30–39 years (75.8%), followed by those diagnosed under 30 years (70.8%). The 50-59 age group was unique, being the only one with an equal split between those with and without a family history (50.0% each). Participants without a family history were more concentrated in the older diagnostic age groups (40-59) compared to those with a family history, who were concentrated in the younger groups (<40). No respondents in this dataset reported a diagnosis after 60 years.

Table 3: Post Diagnosis lifestyle changes.

General Factor	*Specific Characteristic of Factor*	*Total Responses*	*Status of Body Mass Index*		*Stress Levels*	
			Healthy BMI	Unhealthy BMI	1 - 3	4-6
Post Diagnosis Lifestyle Changes	No changes made	16	3	13	4	12
	Started exercising	60	28	32	37	20
	Yoga and meditation	29	12	17	19	10
	Dietary changes	59	30	28	34	20
Consultation of Dietitian	No consultation	38	14	19	24	9
	Made no dietary changes after consultation	21	9	12	13	6
	Made dietary changes after consultation	36	20	16	21	12
Screen Time	0 - 6 hours	60	27	31	42	12
	7 - 12 hours	7	3	4	3	4
	12+ hours	9	3	6	3	6
Habits	Drinking alcohol	22	9	12	14	8
	Smoking	8	4	3	5	2
	Overeating	17	6	10	8	8
	None of the above	58	31	27	38	14

3.1 - Impact of lifestyle changes on the BMI and stress levels

The data reveals a clear correlation between post-diagnosis actions and health metrics. A significant majority of respondents who made no lifestyle changes (81%) had an unhealthy BMI. In contrast, this figure was lower for those who started exercising (53%), made dietary changes (47%), or practiced yoga/meditation (59%).

A strong link is also evident with stress levels. 75% of the "no changes" group reported high stress levels (4-6), a rate substantially higher than that of groups who adopted positive changes: 33% for those who started exercising, 34% for those who made dietary changes, and 34% for those practicing yoga/meditation. Consulting a dietitian also showed a positive association. Among those who did not consult a dietitian, 58% had an unhealthy BMI, compared to 44% of those who consulted one and made subsequent dietary changes.

3.2 - Presence of habits like smoking, drinking alcohol, and overeating on age of onset

The presence of habits like drinking alcohol, smoking, and overeating is strongly associated with poorer outcomes. A majority of individuals who reported drinking alcohol (57%), smoking (60%), or overeating (59%) had an unhealthy BMI. These groups also reported high stress levels, with 36% of drinkers, 25% of smokers, and 47% of overeaters scoring in the 4-6 range. In stark contrast, participants who engaged in none of these habits showed more favourable outcomes, with only 47% having an unhealthy BMI and 24% reporting high stress levels.

Table 4: Food Habits.

General Factor	*Specific Characteristic of Factor*	*Total Responses*	*Status of Body Mass Index*		*Stress Levels*	
			Healthy BMI	**Unhealthy BMI**	**1 - 3**	**4-6**
Post Diagnosis Lifestyle Changes	No changes made	16	3	13	4	12
	Started exercising	60	28	32	37	20
	Yoga and meditation	29	12	17	19	10
	Dietary changes	59	30	28	34	20
Consultation of Dietitian	No consultation	38	14	19	24	9
	Made no dietary changes after consultation	21	9	12	13	6
	Made dietary changes after consultation	36	20	16	21	12
Screen Time	0 - 6 hours	60	27	31	42	12
	7 - 12 hours	7	3	4	3	4
	12+ hours	9	3	6	3	6
Habits	Drinking alcohol	22	9	12	14	8
	Smoking	8	4	3	5	2
	Overeating	17	6	10	8	8
	None of the above	58	31	27	38	14

4.1 - Effect of screen time while eating on BMI and age at diagnosis

The data indicates a correlation between higher screen time and less favorable health metrics. Among individuals with the highest screen time (12+ hours), 67% had an unhealthy BMI, and 67% reported high stress levels. In contrast, for those with lower screen time (0-6 hours), 52% had an unhealthy BMI and 20% reported high stress. The group with 7-12 hours of screen time showed intermediate outcomes, with 57% having an unhealthy BMI and 57% reporting high stress.

4.2 - Food preferences' impact on BMI

Analysis of food preferences shows a variation in BMI status across different diets. Among individuals with no reported habits like drinking, smoking, or overeating, 53% had a healthy BMI. This group also reported lower stress levels, with 24% scoring in the high range. In comparison, 59% of individuals who reported overeating had an unhealthy BMI, and 47% of this group reported high stress levels.

4.3 - Frequency of outside eating's relation with BMI and onset age

The data shows a positive association between consulting a dietitian and making subsequent dietary changes on health outcomes. Among those who consulted a dietitian and made dietary changes, 44% had an unhealthy BMI and 33% reported high stress. In contrast, for those who consulted a dietitian but made no changes, 57% had an unhealthy BMI and 29% reported high stress. For those who did not consult a dietitian at all, 50% had an unhealthy BMI and 24% reported high stress.

4.4 - Effect of timing of meals on the age of incidence and BMI

The data suggests a strong association between making lifestyle changes post-diagnosis and better health outcomes. A large majority of respondents who made no lifestyle changes, 81%, had an unhealthy BMI, and 75% reported high stress levels. Conversely, among those who started exercising, 53% had an unhealthy BMI and 33% reported high stress. For those who made dietary changes, 47% had an unhealthy BMI and 34% reported high stress.

Table 5: Lifestyle changes.

General Factor	*Specific Characteristic of Factor*	*Total Responses*	*Status of Body Mass Index*		*Age at Diagnosis of Diabetes*	
			Healthy BMI	**Unhealthy BMI**	**18 - 40 age**	**40+**
Lifestyle Type	Sedentary lifestyle	34	15	19	20	12
	Active lifestyle	10	6	10	6	22
Walk After Dinner	0 - 15 mins	36	17	19	20	16
	15 - 30 mins	49	20	29	30	16
	30 - 60 mins	11	7	4	5	6
Exercising Frequency	Never	11	11	11	20	6
	Often	40	25	15	13	27
	Everyday	32	17	15	14	18

5.1 - Impact of exercising frequency on Body Mass Index (BMI)

The data shows a clear association between exercise frequency and health outcomes. Among respondents who never exercise, 50% have an unhealthy BMI, and a significant majority, 77%, were diagnosed with diabetes before the age of 40. In contrast, for those who exercise every day, 47% have an unhealthy BMI, and 44% were diagnosed before 40. The group that exercises often shows the most favorable outcomes, with only 38% having an unhealthy BMI and 33% receiving an early diagnosis.

5.2 - Lifestyle type and its effect on incidence of diabetes

The type of lifestyle shows a distinct correlation with the age of diagnosis. A majority of individuals with a sedentary lifestyle, 59%, were diagnosed with diabetes before the age of 40. Conversely, among those with an active lifestyle, only 21% were diagnosed early, with the vast majority, 79%, being diagnosed after 40. In terms of BMI, the prevalence of an unhealthy BMI was similar between the two groups, at 56% for the sedentary group and 63% for the active group.

5.3 - Walk after dinner's impact on BMI and age at diagnosis

The duration of a post-dinner walk is associated with both BMI and age of diagnosis. A longer walk correlates with a higher rate of healthy BMI: 47% for the 0-15 minute group, 41% for the 15-30 minute group, and 64% for the 30-60 minute group.

Furthermore, a shorter walk is linked to a higher rate of early-onset diabetes. Among those who walk for 0-15 minutes, 56% were diagnosed before 40, compared to 33% in the 15-30 minute group and 45% in the 30-60 minute group.

Table 6: Comorbidities.

General Factor	*Specific Characteristic of Factor*	*Total Responses*	*Status of Body Mass Index*		*Stress Levels*	
			Healthy BMI	**Unhealthy BMI**	**1 - 3**	**4-6**
Presence of Comorbidities	Yes	65	30	35	43	19
	No	7	1	6	2	4
Guidance Received for Risk Factors & Management	1 - 3 (Received Limited Guidance)	42	17	25	16	26
	4 - 5 (Received Enough Guidance)	40	19	21	28	12

6.1 - Impact of presence of comorbidities on BMI and stress levels

The data indicates a correlation between the presence of comorbidities and health metrics. Among respondents with comorbidities, 46% have a healthy BMI and 54% have an unhealthy BMI. In contrast, among the smaller group without comorbidities, 14% have a healthy BMI and 86% have an unhealthy BMI. A difference is also observed in stress levels. For those with comorbidities, 66% reported low stress levels (1-3) and 29% reported high stress levels (4-6). For those without comorbidities, 29% reported low stress levels and 57% reported high stress levels.

6.2 - Guidance received for stress factors and management's impact on BMI status and stress levels

The data shows an association between the level of guidance received and patient outcomes. Among those who received limited guidance (score 1-3), 40% have a healthy BMI and 60% have an unhealthy BMI. For those who received enough guidance (score 4-5), 48% have a healthy BMI and 53% have an unhealthy BMI.

A clear relationship is seen with stress. In the group that received limited guidance, 38% reported low stress levels and 62% reported high stress levels. Conversely, among those who received enough guidance, 70% reported low stress levels and 30% reported high stress levels.

DISCUSSIONS

In the world, diabetes is so much; there is a requirement for studies that connect the findings of diabetes to the lifestyle of the patients. The findings from the observations are below presented under relevant headings.

Impact of frequency of exercise on Body Mass Index (BMI)

Findings from the present study show that 50% of respondents who never exercise have an unhealthy BMI, compared to 38% of those who exercise often. This indicates a clear association between regular physical activity and a healthier BMI. Furthermore, a striking 77% of those who never exercise were diagnosed with diabetes before the age of 40, compared to 33% of those who exercise often. This suggests that maintaining an active lifestyle may be linked to a later onset of the condition.

These findings are strongly supported by existing scientific literature. The study by Colberg et al. (2016) emphasizes that regular physical activity enhances glucose uptake and insulin sensitivity, which are critical for maintaining healthy blood sugar levels and reducing diabetes risk.[1] Similarly, the American Diabetes Association (2023) confirms that exercise aids in regulating blood sugar by increasing glucose absorption in muscles and decreasing insulin resistance.[2]

Likewise, the study by Colberg et al. (2016) emphasises that regular physical activity enhances glucose uptake and insulin sensitivity, helping maintain healthy blood sugar levels and reducing the risk of diabetes.[12]

Exercise regulates blood sugar by aiding glucose absorption in muscles and decreasing insulin resistance (American Diabetes Association, 2023).[14][15] As the information from Colberg et al. (2016)'s study and the American Diabetes Association corroborate with the findings from the present study, it can be concluded that regular exercising helps maintain a healthy BMI and delay the onset of diabetes.

Lifestyle type and its effect on incidence of diabetes

Observations from Table 5 state that 55.9% of people with sedentary lifestyles have an unhealthy BMI status and 58.8% of them developed diabetes before the age of 40. Whereas among people who led active lifestyles, only 27.3% had an early onset of diabetes, and just 54.5% have an unhealthy BMI. Based on this, it can be inferred that an active lifestyle aids in the prevention of an unhealthy BMI status, and it also reduces the probability of having an early onset of diabetes. There are also 34 responses from diabetics who lead sedentary lifestyles, while only 22 responses are from those who lead active lifestyles, indicating that the number of diabetic patients with a sedentary lifestyle is more than those with an active lifestyle.

On similar lines, research by Cavallo et al. (2019) found that higher sedentary behaviour increases type 2 diabetes risk. Reducing sedentary time and incorporating light physical activities can significantly lower this risk.[16][17] Regular physical activity helps with weight management, improves metabolic function, and reduces obesity risk (Mayo Clinic, 2023).[18][19]

Diabetic patients with active lifestyles are fewer than those with sedentary lifestyles, highlighting the benefits of physical activity. Regular activity improves insulin sensitivity, making the body use insulin more efficiently (American Diabetes Association, 2022).[20][21]

As the findings from Cavallo et al. (2019), Mayo Clinic, and American Diabetes Association validate the observations from the present paper, it can be concluded that leading an active lifestyle, including even light physical activity, helps maintain a healthy BMI and delay the onset of diabetes.

Screen time's relation with BMI and age at diagnosis

The data from the observations of the present paper show that among those with excessive screen time (12+ hours daily), 75.8% have an unhealthy BMI and 68.9% experience early-onset diabetes. Whilst among those with limited screen time (0–6 hours daily), only 56.2% have an unhealthy BMI and just 17.4% were diagnosed before 40. This exhibits that excessive screen time leads to an individual having an unhealthier BMI and an earlier onset of diabetes.

Similarly, according to the World Cancer Research Fund, this is due to prolonged screen time reducing physical activity and energy expenditure. Low physical activity leads to weight gain and increased adiposity, both of which are associated with insulin resistance and impaired glucose metabolism.[22]

A study by Biddle et al. (2018) demonstrates that excessive screen time is also often linked to unhealthy dietary patterns, such as consuming high-calorie snacks, which exacerbate weight gain and metabolic dysfunction. Outlining the adverse effects of sedentary behaviour on BMI and metabolic health.[23]

As the findings from Biddle et al. (2018) and the World Cancer Research Fund validate the findings from the present paper, it can be concluded that avoiding excessive screen time and active behaviours aids in preventing an unhealthy BMI and reduces the risk of an early onset of diabetes.

Effect of screen time while eating on BMI and age at diagnosis

As mentioned in the observations, among individuals who always watch the screen while eating, 66.7% have an unhealthy BMI, with 48.9% experiencing diabetes onset before the age of 40. Conversely, among those who never use screens while eating, 44.4% fall into the overweight or obese BMI range, and 18.5% are diagnosed with diabetes under the age of 40. This demonstrates that watching the screen while eating has a negative effect on the BMI of a diabetic individual, and this behavior also increases the risk of an early onset of diabetes.

Supporting this finding, a study from Bretschneider et al. (2020) described that screen usage while eating leads to poorer dietary choices, increased consumption of high-calorie, low-nutrient foods, and reduced intake of healthy options like fruits and vegetables. These behaviours contribute significantly to obesity and related metabolic disorders, including diabetes.[24]

As the findings from Bretschneider et al. (2020) corroborate with the observations from the present paper, it can be concluded that mindful eating and eliminating screen usage during meals promotes a healthier BMI and delays the onset of diabetes.

Food preferences' impact on BMI

Findings from the present paper show that vegan individuals exhibit 66.7% with a healthy BMI and no cases of obesity. Meanwhile, within vegetarians, 47.5% have a healthy BMI, while non-vegetarians exhibit a slightly lower healthy BMI rate of 43.9% but with the highest obesity rate of 29.2%. This indicates that plant-based diets lead to healthier health statuses.

This aligns with a study by Georgiopoulos et al. (2023), which found that vegans tend to have lower cholesterol and blood pressure and a reduced risk of obesity. The research underscores the importance of plant-based diets in promoting overall health and preventing chronic diseases like type 2 diabetes and cardiovascular conditions.[25]

As the research from Georgiopoulos et al. (2023) aligns with the findings from the present paper, it can be concluded that plant-based diets help achieve better health outcomes and reduce the prevalence of obesity in diabetic individuals.

Frequency of outside eating's relation with BMI and onset age

The observations from Table 4 suggest that among individuals who eat outside daily, 80% fall into the overweight or obese categories, with 40% of them developing diabetes before the age of 40. In contrast, among those who never eat outside, 44.4% have an unhealthy BMI, and only 5.6% of them have been diagnosed with diabetes before the age of 40. This indicates that eating outside results in an unhealthier BMI and increases the risk of early onset of diabetes.

This aligns with a study by Landias et al. (2022) that found that frequent out-of-home meals are associated with weight gain and increased risk of metabolic disorders. The study highlights that food choices when eating out are often high in calories and low in nutritional value, contributing to obesity and related health issues.[26]

As the findings from Landias et al. (2022) validate the observations from the present study, it can be concluded that mindful eating practices and consumption of home-cooked meals enable diabetics to maintain a healthy BMI and reduce the risk of early onset of diabetes.

Effect of timing of meals on the age of incidence and BMI

As mentioned in the observations, 72.2% of participants with irregular meal timings fell into the overweight or obese BMI categories. Moreover, 44.4% of individuals in this group developed diabetes by the age of 40. It was also found that 69.6% of individuals who skip meals fell into the overweight or obese BMI categories, and 39.1% developed diabetes before the age of 40. It can be inferred that irregular meal timings and skipping meals prevent a diabetic from maintaining a healthy BMI and increase the risk of early-onset diabetes.

This aligns with findings from Adnan et al. (2022), which show that inconsistent eating disrupts metabolic processes, leading to weight gain and type 2 diabetes. Maintaining regular meal schedules is crucial for metabolic health and weight management, reducing diabetes risk.[27]

Okop et al. (2020) supports this, noting that meal skipping often leads to overeating later in the day, increasing caloric intake and metabolic imbalances. These findings highlight the importance of regular, balanced meals for maintaining a healthy BMI and preventing diabetes.[28]

As the findings from Adnan et al. (2022)'s research and the Okop et al. (2020) corroborate with the findings of the present paper, it can be concluded that consistent eating habits and avoiding meal skipping significantly contribute to better long-term health outcomes, reducing the risk and complications of diabetes.

Impact of lifestyle changes on the BMI and stress levels

The observations from the present study state that individuals who adopted dietary changes or started exercising after diagnosis demonstrated the highest proportion of healthy BMI, with 55.2% and 58.6%, respectively. Conversely, among those who made no changes, 81.25% have an unhealthy BMI. Higher stress levels were also observed in the group that made no changes, with 75% experiencing moderate to high stress (4–6). Among those who modified their diet, 62.1% reported stress levels in the 1–3 range, as opposed to 25% among those who made no changes. This indicates that making dietary changes and exercising after diagnosis not only aid in maintaining a healthy BMI but also reduce the stress levels of a diabetic.

This is supported by Bruns et al. (2022), who found that physical activity enhances BMI and metabolism by altering gut macrobiotic composition. The study showed that increased physical activity and dietary interventions significantly reduce BMI, improve glucose tolerance, and boost metabolic health.[29][30]

Conversely, according to González (2023), those who made no lifestyle changes were more likely to have an obese BMI and report higher stress levels as stress exacerbates unhealthy eating behaviours and metabolic dysfunction.[31] Rein et al. (2022) also note that regular meal schedules and physical activity are crucial for metabolic health and weight management, reducing diabetes risk.[32][33]

Similarly, Grajek et al. (2022) suggest that dietary improvements positively affect mental health by providing essential nutrients that support brain function and reduce stress.[34]

As the information from Grajek et al. (2022), Rein et al. (2022), González (2023), and Bruns et al. (2022) corroborate with the findings in the present paper, it can be concluded that dietary changes and exercising after diagnosis not only aid in maintaining a healthy BMI but also reduce stress levels for diabetics.

Importance of lifestyle changes based on guidance and consultation on the BMI and stress levels

Among participants who consulted a dietitian and made changes, 50% achieved a healthy BMI, while 23.3% were classified as obese. In contrast, those who did not consult a dietitian or make changes had 68.3% in the overweight or obese categories. Additionally, those who sought professional guidance reported lower stress levels, with 60% falling within the 1–3 stress level category, as opposed to 19% in the group without consultation with low stress levels. This demonstrates that seeking professional guidance aids in retaining a healthy BMI and especially improves mental stability and reduces stress levels.

This aligns with a study published in Smith et al. (2016), which showed that professional dietary counselling contributes to improved health outcomes. Personalised nutrition advice helps individuals make better food choices, leading to effective weight management and reduced obesity rates. Dietitians provide tailored dietary plans that align with an individual's nutritional needs and lifestyle, promoting sustainable and healthy eating habits.[35][36]

On similar lines, Grajek et al. (2022) found that dietary interventions not only improve physical health but also enhance mental well-being. Professional dietary counselling can alleviate stress by promoting healthier eating patterns, which positively impact brain function and mood regulation. These findings underscore the importance of consulting a dietitian for both physical and mental health benefits.[34]

As the findings from the present paper corroborate with the findings by Grajek et al. (2022) and Smith et al. (2016), it can be concluded that consulting a professional dietitian and adopting personalised dietary strategies help in maintaining a healthy BMI and improving mental stability, reducing stress levels.

Impact of walking after dinner on BMI and stress levels

Individuals walking 30–60 minutes after dinner demonstrated the highest proportion of healthy BMI of 55% and the lowest high-stress levels of 20%. This proves that walking for a while after a meal promotes better control over stress levels along with a healthier BMI.

Similarly, the research from the Times of India (2024) found that post-dinner walks improve metabolic health and reduce stress by regulating blood sugar, aiding digestion, and burning extra calories. Walking also releases endorphins, enhancing mood and reducing stress.[37]

As the findings from Times of India (2024) validate the findings from the present paper, it can be concluded that a short postdinner walk is a simple, effective strategy for maintaining a healthy weight and improving mental well-being for diabetic patients.

Presence of habits like smoking, drinking alcohol, and overeating on age of onset

Among those who drink, smoke, or overeat, 72.9%, 79.3%, and 75%, respectively, had an unhealthy BMI, and 78.3%, 79.3%, and 64%, respectively, reported high stress levels. Compared to those who do not have these habits, among whom 58% had an unhealthy BMI and 16% reported high stress levels. This demonstrates that refraining from habits like drinking, smoking, and overeating drastically reduces the stresses of the individual while also helping them maintain a healthy BMI.

This is supported by Wei et al. (2024)'s findings that indicate that smoking and alcohol consumption increase metabolic dysfunction and early diabetes, highlighting the importance of healthy lifestyle choices.[38][39]

Additionally, the research indicates that unhealthy behaviours elevate stress levels, worsening metabolic dysfunction and insulin resistance. Chronic stress contributes to higher blood glucose levels, exacerbating the risk of diabetes. Therefore, adopting healthy habits and managing stress are crucial for improving metabolic health and reducing diabetes risk.

As the findings by Wei et al. (2024) corroborate with the observations from the present paper, it can be concluded that these findings emphasise that refraining from habits like drinking, smoking, and overeating is vital for maintain stress levels and retaining a healthy BMI.

Family history on age of onset

According to the data in the present paper, in cases where there is a family history of diabetes, 31.25% were diagnosed between the ages of 18-40. Conversely, when there is no family history, 54.5% were diagnosed between the ages of 18-40. This indicates that those who have a family history of diabetes are able to delay its onset, potentially due to increased awareness about the actions to take to prevent it.

Research by Cheung et al. (2022) supports this, showing that while those with a family history are diagnosed earlier, they have better blood sugar control when adopting healthy lifestyles and selfmanagement practices. Despite the genetic predisposition, awareness and preventive measures can delay diabetes onset. This proves that knowledge about diabetes management can delay its onset, even for those without a family history.[40][41]

As the findings from Cheung et al. (2022) corroborate the observations from the present paper, it can be inferred that the reason why the people with family history were able to delay the onset and control their blood sugar levels was because of their awareness. If

everyone makes a small effort to make healthy changes in their lifestyle, they can mitigate the incidence and progress of diabetes.

CONCLUSION

This is one of the few studies mapping the relation between lifestyle choices of type 2 diabetic patients and indicators of its prognosis like Body Mass Index, age of diagnosis and stress levels by crosssectional study. In conclusion, present findings reveal that inculcation of certain lifestyle choices in relation with daily screen time, dietary habits, and regular exercise can significantly reduce the stress levels, delay the age of onset of diabetes and help maintain a healthy BMI status. This in turn can reduce the risk of complications of type 2 diabetes.

Patients with family history of type 2 diabetes should consciously avoid risk factors in their lifestyle such as maintaining sedentary lifestyle, screen time more than 6 hours, habits of smoking, overeating or drinking alcohol along with high frequency of outside eating to keep stress levels and BMI under control.

Preference of home cooked, vegetarian meals at regular times along with a walk after dinner and regular exercise can keep their BMI healthy and help avoid complications of type 2 diabetes. Avoiding watching a screen while eating can help in mindful eating which in turn can help to control daily blood sugar levels within normal limits. After being diagnosed with diabetes, it is important to consult a dietitian to understand the correct and healthy food habits which should be implemented daily.Further research is required to highlight the present findings in larger sample size. The results prove that there is vast room for improvement in the knowledge and attitude towards lifestyle choices by diabetes patients. These can be raised by conducting health campaigns in public areas to create awareness about the risk factors and management of type 2 diabetes. All in need for the preventive and health promoting lifestyle of every individual in the society.

ACKNOWLEDGMENT

I would like to express my gratitude to Dr. Prof. Vaishaly Bharambe who continuously supported me and gave direction to my project. She guided me by giving an outline of the process, supervising my progress and critically analysing my project in order to give feedback.

I would also like to thank Dr. Pravishal Adling MBBS D. Diabetology, Dr. Shubhangi Adling MBBS MD MD DPH. and Mrs. Pooja Shrivastava whose valuable inputs and evaluation helped me get the present paper to a higher level.

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