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Compensatory Health Beliefs, Food Preferences and Sedentary Behaviors in Patients with Diabetes Type II

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This study investigated the relationship between Compensatory Health Beliefs, Food Preferences and Sedentary behaviors in Patients with Diabetes Type II. It was hypothesized that there is will be a relationship between Compensatory Health Beliefs, Sedentary behavior and Food Preferences in Patients with Diabetes Type II. It was also hypothesized that Sedentary behaviors predict the influence of Compensatory health beliefs Food preferences in Patients with Diabetes Type 2. Correlational research design was used and the sample consist of 200 patients from which 30 patients were removed after data screening from Diabetic Units of Public sector hospitals of Lahore. Pearson Correlation analysis revealed that age, no. of children, work status and duration of diabetes was positively correlated Compensatory Health Belief. There was positive correlation among Gender, family system and weight with Food Preferences. The demographics variables i.e. Gender and Monthly Income were positively correlated with Sedentary behaviors. Marital status was positively correlated with the study variables. Age and height were negatively correlated with Compensatory Health Belief, Food Preferences and Sedentary Behavior. Independent Sample t- test, One way Anova and Hierarchical regression were also employed to assess the mean differences and prediction of hypothesis. Hierarchical regression showed that there was no significant prediction among the variables. The findings of the research may lay ground for further research studies.

Keywords: Compensatory Health Beliefs, Food Preferences, Sedentary Behavior, Diabetes Type II.

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Diabetes mellitus is a metabolic disorder characterized by elevated blood glucose levels. Normally, insulin—a hormone produced in the body—moves sugar out of the bloodstream and into cells, where it can be used immediately for energy or stored for later use. This glucose is essential, as it serves as the primary energy source that allows tissues and organs to carry out their normal functions (Shoiup, 2015). The International Diabetes Federation (IDF) has published updated figures showing a troubling global increase in diabetes cases. Compared to figures from 2017, an additional 38 million people worldwide are now living with diabetes. The IDF's 9th edition of the Diabetes Atlas identifies Pakistan as one of the ten countries experiencing the largest absolute rise in diabetes cases (IDF, 2019). Given this trend, experts argue that Pakistan needs to embed diabetes prevention strategies within its national health policy in order to lessen the disease's overall burden (Meo et al., 2016).

The patient may realize the frequently silent feelings they are experiencing regarding having diabetes by working with a health therapist. Comparing those with and without diabetes, those with diabetes are 2-3 times more likely to be categorized as depressive. Diabetes care, with its required dietary adjustments and self-management duties, can negatively impact quality of life. Diabetes patients are more likely to experience dread and anxiety. Fear of hypoglycemia and fear of needles are two specific types of anxiety that can accompany diabetes, eating disorders and Sexual disorders such as erectile dysfunction in men. Compensatory Health Beliefs are beliefs that an unhealthy behavior (such as eating

unhealthily) can be compensated for by a subsequent healthy behavior (such as eating healthily or being physically active). Maintaining a healthy diet is often challenging, and relatively few people manage to sustain changes to their eating behavior over the long term (e.g., Wing & Phelan, 2005). It is believed that individuals draw on Compensatory Health Beliefs (Knäuper et al., 2004) as a way to ease this discomfort and rationalize indulgent eating (Rabiau et al., 2006). Food preferences refer to the evaluative judgments people hold about different foods, encompassing both qualitative assessments and the degree to which foods are liked or disliked. Cultural background plays a major role in shaping these food preferences. Keeping blood glucose within the target range set by one's medical team depends on carefully monitoring food choices, portion sizes, and meal timing (Krause, 2015). Sedentary behaviour, by contrast, refers to activity that requires little to no energy expenditure while awake and does not involve physical exercise. This includes extended periods spent on activities such as playing video games, reading, listening to music, watching television, or using a computer (Han et al., 2017).

A substantial body of research suggests that inadequate transportation options, along with the absence of sidewalks, streetlights, and other supportive environmental features, can discourage physically active lifestyles across various population groups. Over time, this can contribute to diminished mobility and a range of adverse health outcomes (Beard et al., 2009; Owen et al., 2010; Botticello et al., 2015; Clarke & George, 2005).

Rationale

An individual's food preferences are frequently shaped by cultural background, socioeconomic status, health condition, and personal beliefs, and are often reflected in the degree to which specific food groups are consistently favored. The present study seeks to examine the relationship among Compensatory Health Beliefs, Food Preferences, and Sedentary Behavior in patients with Type II Diabetes. This area remains notably understudied, despite the fact that individuals with diabetes who neglect regular physical activity and dietary management face a heightened risk of serious complications. By exploring these connections, the current research aims to determine whether a meaningful relationship exists between Compensatory Health Beliefs, Food Preferences, and Sedentary Behavior among Type II Diabetes patients, while also laying the groundwork for future researchers to further investigate these variables.

Aim of the Study

To investigate the associations between demographic variables and Sedentary Behaviors, Compensatory Health Belief and Food Preferences in Patients with Diabetes type II.

Hypotheses

- Age, gender, education, family system, Family background (i.e. rural and urban), marital status, Social economic status (lower, middle, upper) will be correlated with Sedentary Behaviors, Compensatory Health Belief and Food Preferences in Patients with Diabetes type II.
- Age, gender, education, family system, Family background (i.e. rural and urban), marital status, Social economic status (lower, middle, upper) will predict Sedentary Behaviors, along with Compensatory Health Belief and Food Preferences in Patients with Diabetes type II.
- There will be demographics differences on Sedentary Behaviors, Compensatory Health Belief and Food Preferences in Patients with Diabetes type II.

Method

Research Design

A correlational research design was used in the present research.

Sample and Sampling Technique

In order to determine the appropriate sample size for the present research, power analysis was undertaken through G-power calculator. The analyses revealed an estimated sample size of N 200. However, after missing values and outliers, a final sample of 170 was considered. Therefore, a sample of (N-170) was included in the present study. The sample was recruited from public sector hospitals. Non- probability purposive sampling technique was utilized in the present study. Diabetes type 1 and gestational diabetes were excluded.

Instruments

Demographic Information Sheet

The sheet included the following demographics i.e. age, gender, education, family system (nuclear, joint), Family background (i.e. rural and urban), marital status, Social economic status (lower, middle, upper) (Kamran, 2014).

Table 1

Descriptive Statistics of Demographic Variables

Variable	*N*
Gender	
Male	72
Female	98
Age (years)	
20–40	44
41–60	88
61–80	38
Education	
Primary	22
Middle	21
Matric	52
Intermediate	24
Bachelor's	30
Master's	21
Marital status	
Married	155
Unmarried	9
Divorced	1
Separated	3
Engaged	2
Duration of marriage (years)	
1–20	43
21–40	104
41–60	12
Age of partner (years)	
25–45	48
46–65	87
66–85	24
Work status	
Working	74
Non-working	96
Family system	
Joint	70
Nuclear	100

Clinical Information Sheet

It included information about clinical factors such as weight, height, blood sugar level, cholesterol level etc (Kamran, 2014).

Table 2

Descriptive Statistics of Clinical Variables (N=170)

Variable	*n*	*%*
Age at onset (years)		
20–40	78	42.0
41–60	92	54.0
Cause of diabetes		
Bedridden	1	0.5
Hypertension	19	11.0
CKD (renal)	14	8.0
Inherited	17	10.0
Gestational diabetes	23	13.0
Liver-related	4	2.3
Obesity	16	9.4
Tension/anxiety	12	7.1
Stress	8	4.7
Unspecified cause	14	8.2
Weight (kg)		
45–60	50	29.0
61–85	86	50.5
81–105	31	18.0
101–135	1	0.5
Family history of diabetes		
Parents (both)	12	7.0
Father	67	39.4
Mother	23	14.0
Siblings	16	4.9
Grandparents (maternal)	5	2.9
Grandparents (paternal)	2	1.1
Husband	45	26.0

Sedentary Behavior Questionnaire SBQ (Rosenberg et al., 2010)

The Sedentary Behavior Questionnaire (SBQ), adapted from an existing adult measure with established reliability and validity, was used to assess time spent engaging in nine sedentary activities: watching television, playing video or computer games, listening to music while seated, talking on the phone while seated, performing paperwork or office-related tasks, reading while seated, playing a musical instrument, engaging in arts and crafts, and riding as a passenger or driving in a car, bus, or train. Responses were recorded on a Likert-type scale ranging from "none" to "15 minutes or less," "30 minutes," and successive one-hour increments up to "6 hours or more." The instrument demonstrated strong test-retest reliability, with a reported coefficient of $\alpha = 0.85$ (Rosenberg et al., 2010).

Eating Specific Compensatory Health Beliefs (Wilde et al., 2013)

The eating specific CHB Scale assesses a participant's likelihood of engaging in Compensatory Health Belief. The scale consists of 10 items. Participants respond on a Likert scale ranging from 1 (never) to 5 (always). The published reliability for these scales is Cronbach's alpha of 0.80 (Wilde et al., 2013).

Food Preferences Questionnaire FPQ (Filde et al., 2014)

The food preference questionnaire requires participants to rate their liking of 62

individual foods on a 5-point Likert scale, ranging from “not at all” to “a lot”. Participants are instructed to select ‘not applicable’ if they are not familiar with, or have no memory of having tried a food item. The reliability of the scale varies from 0.62 to 0.8 (Filde et al., 2014).

Procedure

The required formalities for the study approval were done. Permissions from diabetic Units of Public sector hospitals were sought and after permissions, participants were approached. The standard protocol for participants recruitment in the research was followed that is Participant Information Sheet and consent form upon their agreement. Compensatory Health Beliefs Scale, Food preferences Questionnaire and Sedentary Behavior Questionnaire were translated into Urdu language by MAPPI guidelines. After that the questionnaires were administered. Participants were ensured about their confidentiality of the information they provided. Moreover, they were given the choice to withdraw. Data Collection was followed by the statistical analysis of the raw data. Reliability of the assessment measures was assessed by calculating the Cronbach's Alpha value of each construct. Pearson Moment Correlation Analysis, Independent Sample t- test, One way Anova and Hierarchical Multiple Regression was employed to assess the prediction hypothesis. SPSS version 21.0 was used to carry out all analysis.

Ethical Considerations

Prior to data collection, permission to use the scales was obtained from their respective authors via email, and approval was also secured from the heads of the relevant hospital departments. Informed consent was collected from each participant after the nature and purpose of the study had been explained to them. Participants were also informed of their right to withdraw from the study at any point without obligation to continue.

Results

Pearson Product Moment Correlation was used to examine the relationships among the study variables, with results presented in the table below. Specifically, this analysis was conducted to determine the correlations between Compensatory Health Beliefs, Food Preferences, and Sedentary Behavior, along with the relevant covariates, among patients with Type II Diabetes.

Table 3

Pearson Product Moment Correlation between Variables (N=170)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1.Gender	-	-.23**	.149	-.120	-.007	.057	.076	.157*	.105	-.138	-.274**	-.046	-340**	.125	-.020	-.058	-.083	-.132	.035
2.Age	-	-	-.20**	.748**	.586**	.613**	.042	.117	.284	.031	.056	-.072	.450**	.368**	.124	.029	.001	-.056	-.079
3.Marital status	-	-	-	-.178*	-.250**	-.265**	-.093	-.240**	.143	-.031	-.082	.125	-.099	-.026	-.020	-.273**	.019	.007	.022

4.Duration of marriage	-	-	-	-	.528**	.533**	.223**	.169*	.202**	.066	.030	-.115	.416**	.405**	.002	.051	.048	-.051	-.089
5.Age of partner	-	-	-	-	-	-	-.234**	.248**	.099	.121	.014	.110	.305**	.315**	-.005	.207**	-.113	-.064	-.004
Work status	-	-	-	-	-	-	-	-.094	.222**	-.090	-.128	-.187*	-.090	.052	-.155*	-.096	.074	-.019	-.028
6.No. of siblings	-	-	-	-	-	-	-	-	-.014	-.114	.021	-.184*	.122	-.053	.042	.003	-.088	.012	-.007
7.Monthly income	-	-	-	-	-	-	-	-	-	-	.459**	.316**	.196*	-.019	-.141	.204**	.019	.017	.081
8.Age at onset of	-	-	-	-	-	-	-	-	-	-	-	-	-.020	-.065	-.270**	.152*	-.035	-.035	.022
9.Diabetes																			
10.Duration of diabetes	-	-	-	-	-	-	-	-	-	-	-	-	-	-.088	.124	.172*	.050	-.138	-.024
11.HbA1c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-.095	.090	-.029	.039	.020
12.Weight	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.020	.164*	.041	.024
13.Height	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.078	-.001	.125
14.Family																			
15.History of diabetes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.129	-.010	.104
16.Medication																			
Adherence	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-.161*	-.114	-.189

17.Compensatory Health Beliefs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-.003	.094	-.1400	
18.Food preferences	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.1011	.037	
19.Sedentary Behaviors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-.1118	

Note: *p < .05; **p < .01; ***p < .001.

It is revealed that age, number of children, work status whether working or not, duration of diabetes were positively correlated with Compensatory Health Belief while Gender, Age, Family system, weight and HbA1c was positively correlated with Food Preferences. Moreover, gender and Monthly Income were positive correlated with Sedentary Behaviors. Marital status was positively correlated with all the study variables. Whereas, other covariates such age of partner, height and medication adherence were negatively correlated with the all of the study variables such as Compensatory Health Belief, Food Preferences and Sedentary Behaviors.

Table 4

Hierarchal Multiple Regression Analysis for Study variables.

Step	Predictor	*B*	*SE*	*β*	R^2	ΔR^2
1	CHB	0.27	0.30	0.07	0.05	0.05
	FPQ	0.24	0.14	-0.13		
2	Age	0.29	0.91	-1.91	0.07	0.02
	Marital Status	1.32	0.03	0.03		
	No. of Siblings	0.30	1.20	0.11		
	Monthly Income	-1.82	0.00	-0.05		
	HbA1c Test	1.11	3.14	0.02		
	Family History of Diabetes	-0.67	4.7	-0.11		
	Any Other Physical Condition	-0.25	4.5	0.04		

Note. p < .05, p < .01, p < .001

It was hypothesized that Sedentary Behavior predicts the relation between Compensatory Behavior and Food preferences. To analyze this hierarchical regression was done. Table 4 presents the results of multiple hierarchical regressions for study variables. The overall model explained 27 % variance F (2,156) = .16, p= <.001. It showed in the analysis that there was non-significant prediction of variables.

Table 5

Independent Sample t-test for Mean Differences of Male and Female on study variables (N=170)

Variable	Male (n = 72)	Female (n = 98)	*t*	*p*	Cohen's d
	M (SD)	*M (SD)*			
Compensatory Health Beliefs	33.50 (6.22)	32.32 (7.52)	1.08	.03	0.17
Food Preferences	235.26 (19.89)	228.20 (29.85)	1.72	.04	0.27
Sedentary Behaviors	40.02 (14.60)	41.08 (15.15)	-0.45	.74	—

Note. CI= confidence interval; LL: lower limit; UL= upper limit M = mean; SD = standard deviation.

An independent samples t-test was conducted to compare mean scores between the two gender groups. As shown in Table 5, the results revealed a statistically significant difference between male and female participants on both Compensatory Health Beliefs and Food Preferences, whereas no significant gender difference emerged for Sedentary Behavior. Additionally, male participants reported a greater overall preference across all food groups (M = 235.09, SD = 19.89). However, this mean difference did not reach statistical significance, t(170) = -.45, p > .05, d = 0.07.

Table 6

Independent Sample t-test for Mean Differences of Work Status on study variables (N=170)

Variable	Working (n = 72)	Non-Working (n = 94)	*t*	*p*
	M (SD)	*M (SD)*		
Compensatory Health Beliefs	32.40 (7.25)	32.98 (6.53)	0.50	.75
Food Preferences	233.26 (28.83)	228.80 (28.29)	1.20	.79
Sedentary Behaviors	41.36 (16.70)	39.78 (13.53)	0.78	.19

Note. CI= confidence interval; LL: lower limit; UL= upper limit M = mean; SD = standard deviation.

The results of the independent samples t-test indicated no statistically significant mean differences across Compensatory Health Beliefs, Food Preferences, and Sedentary Behavior.

Table 7

Independent Sample t-test for Mean Differences of Family system on study variables (N=170)

Variable	Joint (n = 70)	Nuclear (n = 100)	*t*	*P*
	M (SD)	*M (SD)*		
Compensatory Health Beliefs	31.98 (6.64)	33.41 (7.22)	-1.30	.20
Food Preferences	230.60 (23.70)	231.60 (28.03)	-0.25	.98
Sedentary Behaviors	42.97 (14.23)	39.00 (15.18)	1.70	.74

Note: CI= confidence interval; LL: lower limit; UL= upper limit M = mean; SD = standard deviation.

The result of independent sample t-test which indicated that there was a no significant mean difference between Compensatory Health Beliefs, Food Preferences and Sedentary Behaviors.

Discussion

The study aimed to investigate the associations of study variables which were Compensatory Health Beliefs, Food Preferences and Sedentary behaviors with demographic variables (Age, gender, education, family system, family background (i.e. rural and urban), marital status, Social economic status (lower, middle, upper) in Patients with Diabetes Type II. The study showed a positive relationship with age, no. of children, work status and duration of diabetes. Moreover, it showed positive relationship between family system, weight and HbA1c test with Food Preferences. In order to test the research question, a hierarchical regression was conducted. The results showed that the utility of the predictive model was non-significant, $F(2,156) = .16$, $p < .0001$. The model explained a large amount of the variance between the variables (27%).

In a previous study, Parry (2013) it was reported that people who had more office time has been found to be independently associated with obesity and more incidence of Diabetes Type II. So, we can say that people who are more engaged in office work or work that includes physical inactivity are more at risk of getting Diabetes Type II.

COMPENSATORY HEALTH BELIEFS

The study variable marital status was significantly positively correlated with Compensatory Health Beliefs, Food preferences and Sedentary behavior which means that the study variables had positive relationship with marital status. It was suggested in a study that mother and married couples are more likely to be engaged in Sedentary behaviors as compared to the unmarried ones because they might be involved in child feeding, households, work from home, baby sitting and watching TV while eating meals (Lindsay, 2016). The number of hours per day spent watching TV or using a computer was positively correlated with weight (Lindsay et al, 2013) which means that weight increase as number of hours and watching TV time increases.

The descriptive analysis of the present study showed significant results through descriptive statistics. The patient with diabetes type II who had age at onset of diabetes ranging from 40-60 years are more likely to have Diabetes Type II (M=39.10). The cause of Diabetes Type II revealed to be more prevalent in patients who had CKD (Chronic Kidney Disease) (M=14.11), Hypertension (M=11.23) and Inheritance or Genetically (M=9.34) mostly. A recent study, Murata (2021) in Japan reported a High cholesterol, renal issues, high lipoprotein, increased BMI, and high systolic pressure are all significant risk factors for Diabetes Type II. Obesity, in turn, is recognized as a major contributing factor to Type II Diabetes. Research has highlighted a strong link between the two conditions, noting that approximately 80% of individuals with diabetes are also classified as obese (Parmar, 2018).

Earlier research has indicated that individuals with a family history of diabetes face nearly double the risk of developing Type 2 diabetes compared to those without such a history (Cederberg et al., 2014). In line with these findings, the present study similarly found that participants with a family history of diabetes were more likely to have the condition themselves than those without one. In particular, individuals whose fathers had diabetes (M = 39.4) appeared to be at greater risk of developing Type II Diabetes.

A recent study reported that dietary knowledge, education level, occupation, monthly income, and dietary habits were significantly linked to patients' overall dietary practices and nutritional status (Wahome et al., 2018), a finding that aligns with the present study, which similarly found that education, employment status, and monthly income were associated with participants' food preferences and choices. Additionally, other research has identified age, family history, low socioeconomic status, obesity, and certain unhealthy lifestyle behaviors as sociodemographic factors linked to an elevated risk of Type II Diabetes (Mavrogianni, 2020).

Conclusion

Diabetes remains one of the most widespread diseases globally, with several sociodemographic factors linked to its occurrence among affected individuals. In Pakistan specifically, the prevalence rate stands at 9.8%, with the condition affecting men and women at nearly comparable rates (10% and 9.7%, respectively). As the country with the seventh-highest global prevalence of diabetes, Pakistan is projected to see continued increases in cases as urbanization advances, driven by contributing factors such as unhealthy lifestyle patterns, genetic susceptibility, insufficient physical activity, obesity, and elevated caloric consumption (Bhatti et al., 2018). The present study also concluded the demographic and clinical/medical factors associating with Diabetes Type II with effect of Compensatory Health Beliefs, Food Preferences and Sedentary Behaviors. The present study explored that age, no, of children, work status and duration of diabetes was positively correlated with Compensatory Health Belief. There were positive correlations of gender, family system and weight with food preferences. The demographics variables i.e. gender and monthly income were positively correlated with sedentary behaviors. Marital status was positively correlated with the study variables. Age and height were negatively correlated with Compensatory Health Belief, Food Preferences and Sedentary Behavior.

Limitations

The present study had some limitations that should be taken into considerations.

- The very first limitation of this study was that the present study is conducted by a beginner or amateur so there are chances of technical faults/ drawbacks in designing and conducting the research.
- The second limitation of the research was that the sample was not representative as due to the shortage of time it was not possible to recruit from other hospitals such as the private sector hospitals.
- There is a probability that the present situation (inflation) might had influenced the response across the study constructs such as Food Preferences.

Implications

- Diabetes remains a significant epidemic in the modern era. While the clinical dimensions of this chronic condition tend to be widely recognized, the psychological and demographic aspects of living with a lifelong illness are often overlooked.
- Findings of the present research revealed that role of demographic variables and clinical factors such as Weight gain, HbA1c test, physical inactivity, spending more time on TV or mobile phone and computers.
- People generally focuses on their medical points such blood glucose level, cholesterol levels etc but do not focus on the physical and mental health that will improve consequently there quality of life by engaging in healthy lifestyle, healthy food choices and preferences and exercises.

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