Factors Related to Lifestyle Behavior of Persons with Type 2 Diabetes in a Selected Hospital, Nepal

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Abstract:

Diabetes is one of the major health issues of non-communicable diseases. Illness perception and social support of persons with type 2 diabetes and their relationships with lifestyle behaviors in Nepal were little known. This study aimed to examine the associations of illness perception and social support with the lifestyle behavior of persons with type 2 diabetes in Nepal guided by the Commonsense Model. A total of 134 participants attending the outpatient endocrinology department in Bir Hospital, Kathmandu, Nepal, were recruited in this study. The research instruments comprised the Brief Illness Perception Questionnaire, the Social Support Scale, and the Lifestyle Behavior Scale. Descriptive statistics, Pearson's correlation, one-way ANOVA, and independent t-test were used for the data analysis. The results showed social support had a positive relationship with lifestyle behavior. Having a better illness perception was associated with better lifestyle behavior. In addition, people with a high income and a family history of diabetes had healthier lifestyles than those with a low income and without a family history of diabetes. These findings illustrated that nurses should assess and promote positive illness perception and social support among people with type 2 diabetes to inspire them to have lifestyle behavior better for controlling blood sugar levels.

Keywords: Diabetes, Illness perception, Lifestyle behavior, Social support

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ปัจจัยที่มีความสัมพันธ์กับพฤติกรรมการดำเนินชีวิตของผู้เป็นโรคเบาหวานในโรงพยาบาลแห่งหนึ่ง ประเทศเนปาล

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บทคัดย่อ:

เบาหวานเป็นหนึ่งในปัญหาสุขภาพหลักของโรคไม่ติดต่อเรื้อรัง การรับรู้ความเจ็บป่วย แรงสนับสนุนทางสังคม และพฤติกรรมการดำเนินชีวิตของผู้เป็นโรคเบาหวานชนิดที่ 2 และความสัมพันธ์ระหว่างตัวแปรเหล่านี้ยังไม่เป็นที่เข้าใจในผู้เป็นโรคเบาหวานชนิดที่ 2 ในประเทศเนปาล จุดประสงค์ของการศึกษานี้เพื่ออธิบายการรับรู้ความเจ็บป่วย แรงสนับสนุนทางสังคม และพฤติกรรมการดำเนินชีวิตของโรคเบาหวานและศึกษาความสัมพันธ์ของตัวแปรต่าง ๆ ที่เกี่ยวข้องกับพฤติกรรมการดำเนินชีวิตในผู้เป็นเบาหวาน ในประเทศเนปาลโดยใช้กรอบแนวคิดคอมมอนเซนส์เป็นแนวทางในการศึกษา ผู้เข้าร่วมวิจัยเป็นผู้เป็นเบาหวานที่มาตรวจที่หน่วยผู้ป่วยนอกระบบต่อมไร้ท่อ โรงพยาบาลเบอร์ เมืองกาฐมาณฑุ ประเทศเนปาลจำนวน 134 ราย แบบสอบถามประกอบด้วยแบบสอบถามส่วนบุคคล แบบสอบถามการรับรู้ความเจ็บป่วยอย่างย่อ แบบสอบถามแรงสนับสนุนทางสังคม และแบบสอบถามพฤติกรรมการดำเนินชีวิต โดยใช้การวิเคราะห์สถิติเชิงบรรยาย ความสัมพันธ์แบบเพียร์สัน การวิเคราะห์ความแปรปรวน และการทดสอบค่าที ผลการศึกษาพบว่าแรงสนับสนุนทางสังคมมีความสัมพันธ์ทางบวกกับพฤติกรรมการดำเนินชีวิต การรับรู้ความเจ็บป่วยที่ดีมีความสัมพันธ์กับพฤติกรรมการดำเนินชีวิตที่ดี นอกจากนี้ ยังพบว่าผู้ที่มีรายได้สูงและมีประวัติครอบครัวเป็นโรคเบาหวานมีคะแนนพฤติกรรมการดำเนินชีวิตสูงกว่าผู้ที่มีรายได้น้อยและไม่มีประวัติครอบครัวเป็นโรคเบาหวาน ผลการวิจัยครั้งนี้แสดงให้เห็นว่าพยาบาลควรประเมินและส่งเสริมการรับรู้ความเจ็บป่วยในทางที่ดีและแรงสนับสนุนทางสังคมของผู้ป่วยโรคเบาหวานชนิดที่ 2 เพื่อให้มีแรงจูงใจต่อการมีพฤติกรรมการดำเนินชีวิตที่ดียิ่งขึ้นสำหรับการควบคุมระดับน้ำตาลในเลือด

คำสำคัญ : เบาหวาน การรับรู้ความเจ็บป่วย พฤติกรรมการดำเนินชีวิต แรงสนับสนุนทางสังคม

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Introduction

Diabetes is one of the most rapidly expanding health challenges of the 21st century. In the southeast Asian region in 2017, around 82 million people aged 20 to 79 years were living with diabetes, and this number is predicted to rise to 151 million by 2045.[1] Among the types of diabetes, type 2 diabetes is the primary condition accounting for 90-95% of global diabetic sufferers.[2] Nepal with low socioeconomic development has limited access to healthcare facilities and necessary medications, and it faces the burden of diabetes.[3] Recent statistical data detailing the prevalence of type 2 diabetes in Nepal are scant and unreliable. Various small studies from different areas of Nepal showed the prevalence of diabetes ranging from 6.3%[4] to 11.7%.[3] In 2017, 657,200 cases of diabetes were reported in Nepal[5] and this number is expected to increase to 1,328,000 people by 2030.[6] Diabetes cannot be cured completely. Thus, remedial action should control blood glucose levels either via pharmacological or non-pharmacological measures. Taking medications, following a healthy diet with low saturated fat, reducing smoking habits, and performing physical exercise are the best to control type 2 diabetes.[7] Oral diabetic medications or other lifestyle behaviors are efficient and effective; however, adherence levels remain low worldwide, resulting in low-income countries like Nepal. Previous studies in Nepal identified the lifestyle behavior of people with diabetes as poor.[8,9] For example, around 87% of the participants did not adhere to a healthy diet while 42.1% did not perform any physical activity.[9] Hence, both healthcare personnel and policymakers must recognize diabetes as an alarming issue that requires control through proper planning. Thus, related factors to disease occurrence, such as lifestyle behavior, must be identified and assessed.

Illness perception is one vital factor that can influence lifestyle behavior.[10] According to Leventhal, Meyer, and Nerenz,[11] the Common Sense Model of Illness Representations (CSM) is essential in describing illness perception. In a model of the CSM, stimuli such as symptoms of an illness start a three-phase feedback cycle of self-regulation. An individual constructs a cognitive and emotional representation of illness (illness perceptions); illness perception is also influenced by other stimuli such as the experience of symptoms and information obtained via health personnel, friends, family, and so on. Secondly, a person acts and copes with the illness and an individual takes an action with various coping procedures, such as a change of lifestyle behavior. Finally, an appraisal is evaluated.[11] However, the appraisal has not been included due to being beyond the scope of this study. Additionally, sociodemographic and clinical factors including age, educational level, occupation, income, family history of diabetes, body mass index (BMI), and waist circumference (WC) influence the performance of good lifestyle behavior.[9,12,13]

Furthermore, social support and lifestyle behavior of persons with diabetes are interrelated. Those who have social support have suitable lifestyle behavior modification.[14] However, most studies related to illness perception, social support, and lifestyle behavior are from western countries which might not be applicable in Nepal.[14,15] In Nepal, it is

still unknown how the diabetes population perceives their illness and whether or not they receive necessary social support. As health behavior influences health outcomes, it is crucial to understand the existing health behaviors and factors associated with their practice among Nepal's diabetes population. For this reason, this study was conducted to examine demographic factors, illness perception, social support, and lifestyle behavior among the diabetes population in Nepal. The findings of this study could help develop health protocols in Nepalese communities as a groundwork of helpful evidence to prepare clinical settings for future interventions and prevention of diabetes in the population.

Objectives of the study

1. To describe the lifestyle behaviors of persons with type 2 diabetes in Nepal.

2. To examine the relationship of age, BMI, WC, illness perception and social support with lifestyle behavior of persons with type 2 diabetes in Nepal.

3. To examine the differences in lifestyle behaviors according to educational and income levels among persons with type 2 diabetes in Nepal.

4. To examine the difference in lifestyle behaviors between the persons having a family history of diabetes and those not having a family history of diabetes among persons with type 2 diabetes.

Methods

This study was a descriptive correlational study. People diagnosed with type 2 diabetes for > 6 months were included, as recently diagnosed people might have a different understanding of the disease than those with a long duration of diabetes. Age ≥ 18 years to 60 years, being on oral medications without any acute illness, speaking and understanding the Nepali language, and non-pregnant women were eligible participants for the study. The sample size was calculated by G* power analysis. A previous survey that stated the association between lifestyle behavior and BMI showed there was a significant negative correlation between lifestyle behavior and BMI (r_s =-.248, p=.014).[13] Thus, the sample size of this study was 122 using the statistical power of 0.80 (two-tailed direction), alpha $\alpha = 0.05$, and effect size (r_s) =.248. Ten percent of the total sample number was added if there was a refusal rate during data collection.[16] Thus, twelve samples were added, making the total sample number 134. The research was conducted at the tertiary care government hospital, the National Academy of Medical Sciences Bir Hospital, the endocrinology medicine outpatient clinic, Kathmandu, Nepal. Various kinds of ill patients from different areas of Nepal have visited this outpatient department. Thus, the sample characteristics were considered various.

Research Instruments

A structured self-reported questionnaire consists of 4 parts.

1. Sociodemographic information included age, educational level, occupation, income, family history of diabetes, smoking, and alcohol drinking history. In addition, clinical information such as weight, height, and WC data was taken from the patient's record file.

2. Social Support Scale (SSS) was developed by Toljamo and Hentinen.[14] The scale in the Nepalese population had been used previously among hypertensive patients.[17] The scale consisted of 12 items, including 10 positive and 2 negative items. Negative items were reverse scores. A 5-point Likert Scale (1 = strongly disagree; 5 = strongly agree) ranged from 12 to 60. The higher score specified good social support. An item example was "My family and friends take care of me if necessary." The Cronbach alpha measurement of the scale in the current study was .91. Permission for the original and Nepali-translated versions was granted.

3. Illness Perception was assessed via the Brief Illness Perception Questionnaire (BIPQ)scale[18]. The BIPQ is a short form of illness representation.[19,20] It comprised 9 items examining the cognitive and emotional representations of illness (one open-ended item and eight closed-ended items). The open-ended item was the "cause" item. The 8 items rated on a 10-point scale (0 = a very short time; 10 = forever) ranged from 0 to 80. A higher score showed a poor or more threatening view of illness perception. An example of an item was "How much do you experience symptoms from your illness?" The Cronbach alpha value in the current version was .64, considered acceptable.[21] Permission to use the original BIPQ and Nepali translated versions was granted.

4. The lifestyle Behavior Scale (LBS) included dietary behavior, physical activity, and medication-taking behavior. The LBS was developed by the principal investigator and the team, using previous literature reviews. The scale included three subscales with eight items each, for 24 items. The first subscale, "dietary behavior questions," was prepared based on the National Institute of Health[22]and Canadian Guidelines.[23] For example, one serving of rice was equal to 1/3 cup of cooked rice, while one serving of vegetables was equal to ½ cup of cooked vegetables. The second subscale, "physical activity or exercise questions," was prepared based on the Global Physical Activity Questionnaire[24] with previous literature. The overall scale with a 4-point rating, (1 = never; 4 = always) ranged from 24 to 96. The Content Validity Index (CVI) of the questionnaire was .82, and the Cronbach alpha measurement was .72. The scale was translated before data collection, with the steps of translation and back-translation according to the recommendation of Behling and Law.[25]

Ethical considerations

After the approval from the ethical clearance committee on human rights related to research involving human subjects, the Faculty of Medicine Ramathibodi Hospital, Mahidol University (COA. MURA2020/95), Nepal Health Research Council (Ref. No. 1707), and Bir Hospital (NAMS) in Nepal, data collection commenced. Before the interview process, the principal investigator explained the objectives of the study to persons with type 2 diabetes, and consent was taken from those eligible participants

who were willing to participate. Participants were informed that they were participating voluntarily and could withdraw from the study at any time during the data collection period. All information recorded from the participants was coded for confidentiality and anonymity.

Data collection

After the approval from the concerned authorities, senior consultants operating in the endocrinology department of Bir Hospital, Kathmandu, Nepal advised the principal investigator (PI). The PI explained the objectives of the study to eligible participants. Those who agreed to participate were invited to a quiet place and signed a consent form before an interview. The PI conducted a semi-structured interview for no more than 30 minutes. After the interview, all questionnaires were kept in a secure place. Completed questionnaires were shredded after study completion, with the data kept and presented for research purposes only.

Data analysis

Descriptive statistics such as frequency, percentage, range, mean, and standard deviation were used for data analysis of variables such as age, educational level, occupation, income, family history of diabetes, BMI, WC, illness perception, social support, and lifestyle behavior. Pearson's correlation coefficient was used to examine the relationships among variables of age, BMI, WC, illness perception, and social support with the lifestyle behavior of the participants. Before running the data analysis, the Kolmogorov- Smirnov (K-S) test was used to examine the normality of the variables. Age, WC, and illness perception showed statistical significance under the K-S test. These variables were further analyzed for skewness and kurtosis. They were found to be within the normal range and were included in Pearson's correlational analysis. One-way ANOVA was used to examine the differences in mean scores of lifestyle behavior according to educational and income levels. Furthermore, the difference in mean scores of lifestyle behavior between participants having a family history of diabetes and those not having a family history of diabetes was examined using an independent t-test.

Results

The study was composed of 134 participants with a mean age of 51.6 years (SD = 7.97). Most participants (51.5%; n=69) were males. More than half of the participants (53.7%; n = 72) were Brahmin. The majority (92.5%; n = 124) were Hindus, and more than sixty percent (n = 85) were from nuclear families. More than 25% (n = 36) of the participants were illiterate. Most participants (43.3%; n=58) were unemployed and 46.3% (n = 62) had a family income of less than Rs.10,000. The mean duration of diabetes was 5.38 years (SD = 5.19). Most participants (70.1%; n = 94) had comorbidities like hypertension. Around sixty percent (62.7%; n = 84) of the participants had a smoking history and almost half (54.5%; n = 73) of the participants had smoked less or equal to 10 cigarettes per day. A total of 60.4% (n = 81) of the participants had a history of drinking alcohol (Table 1).

The mean BMI of the participants was 25.30 kg/m^2 (SD = 3.53), higher than the "cut off" point of the BMI for Asian people. Approximately 23% (n = 31) of the participants had a BMI of less than 23 kg/m^2. Likewise, the mean WC of the male was 87.77 cm. (SD = 8.16) and that of the female was 87.07 cm. (SD = 9.23).

Table 1 Descriptions of Demographic and Clinical Information of the Persons with Type 2 Diabetes in Nepal (N = 134)

Variables		Frequency	Percentage
Age	20-35 years	5	3.7
	36-55 years	73	54.5
	56-60 years	56	41.8
	Mean age= 51.66; SD =7.97		
Educational level	Illiterate	36	26.9
	Informal education	19	14.2
	Primary	20	14.9
	Secondary	32	23.8
	Higher secondary	10	7.5
	Bachelor/masters/more	17	12.7
Occupation	Unemployed	58	43.3
	Laborer	17	12.7
	Own business	29	21.7
	Working in the private sector	9	6.7
	Government service holders and others	21	15.6
Income	< Rs. 10000	62	46.3
	Rs.10000 to Rs.30000	51	38.1
	>Rs.30000 to Rs.50000	16	11.9
	> Rs. 50000	5	3.7
Smoking history	Number of cigarettes per day (≤10 pieces)	73	54.5
	11 to 20 pieces	11	8.2
Alcohol history	Having alcohol history	81	60.4
	Not having an alcohol history	53	39.6
Family history	Having a family history of diabetes	75	56
	Not having a family history of diabetes	59	44
BMI kg/m^2	BMI< 23 kg/m^2	31	23.1
	BMI > or = 23 kg/m^2	103	76.9
	Mean BMI =25.30; SD = 3.53		
WC (cm)	Male (> 90 cm)	23	33.3
	Female (> 80 cm)	11	16.9
	Mean WC Male 87.77; SD = 8.16		
	Female 87.07; SD = 9.23		

The total mean score of SSS was 47.72 (SD = 7.08), reflecting good social support among the participants for managing diabetes. Participants had good emotional and instrumental support, received better information about diabetes, and had the opportunity to discuss the concerning issues about the illness with another person. Participants were not overprotective of their loved ones or health personnel and had better financial support for medications and so on. The overall mean score of BIPQ was 40.20 (SD = 5.82), interpreted as a mild threatening view of illness perception. Participants had better personal control, treatment control, better understanding, and less emotion. Participants had some effects of diabetes on their life, had some perception of symptoms, and were more concerned about the disease. Participants believed that diabetes was caused by heredity, lifestyle, diet, stress, smoking, obesity, and so on. The total mean score of the LBS was 68.87 (SD = 7.75) and reflected that the participants had good lifestyle behavior. Medication-taking behavior was better than dietary behavior and physical activities (Table 2).

Table 2 Descriptions of Social Support, Illness Perception, and Lifestyle Behavior of the Participants (N = 134)

Variables		Mean	SD	Min - Max
Social Support	Emotional and instrumental support	15.77	2.89	6- 20
	Informational support	8.75	1.2	4-10
	Peer Support	11.11	2.10	6-15
	Negative support	8.69	1.5	4-10
	Financial support	3.43	1.02	1-5
	Total	47.72	7.08	27-60
Illness Perception	Consequences	5.43	1.74	2-10
	Timeline	5.79	1.92	2-10
	Personal control*	4.57	1.35	0-8
	Treatment control*	4.30	1.57	0-8
	Identity	5.07	1.43	2-10
	Concern	5.33	1.43	2-10
	Understanding*	4.74	1.34	0-8
	Emotional representations	4.97	1.5	0-8
	Total	40.20	5.82	23-56
Lifestyle Behavior	Dietary behavior	21.44	3.59	14-29
	Physical activity	18.95	2.93	11-24
	Medication taking behavior	28.41	7.75	26-32
	Total	68.87	7.75	50-84

Note. *The items were reversed.

After the assumptions were met, Pearson's correlational analysis showed a positive relationship between social supports and lifestyle behavior ($r = .28$, $p < .01$) but a negative relationship between illness perception and lifestyle behavior ($r = -.24$, $p < 0.01$). This means the more the social support, the better the lifestyle behavior, and the less the bad illness perception, the better the lifestyle behavior. There were no relationships of age, BMI, WC, and lifestyle behavior. See Table 3.

Table 3. The Correlations of Age, Body Mass Index, Weight Circumference, Illness Perception, Social Support, and Lifestyle Behaviors (n= 134)

Variables	Age	BMI	WC	IP	SS	LB
1. Age	-					
2. BMI	-.03	-				
3. WC	.03	.73**	-			
4. IP	.07	.02	-.02	-		
5. SS	-.15	-.12	.00	-.36**	-	
6. LB	-.17	-.02	.07	.-24**	.28**	-

Note. *p <.05 (two-tailed) **p <.01 (two-tailed). Abbreviation: BMI= Body Mass Index; WC= Waist Circumference; IP= Illness Perception; SS= Social Support; and LB= Lifestyle Behavior

Furthermore, One-way ANOVA showed a significant difference in the mean score of income levels on lifestyle behavior $F_{(3,130)} = 14.24$, $p < .01$. Those with income higher than Rs. 10,000 had better lifestyle behavior than those with lower income than Rs.10,000. There was no difference in a mean score of educational level $F_{(5,128)} = .79$, $p > .05$ on lifestyle behavior. In the independent t-test, there was a significant mean difference between participants with a family history of diabetes and those with no history of diabetes on lifestyle behavior ($t_{131} = 11.13$, $p < .01$). Those with a family history of diabetes had a higher mean score than those with no family history of diabetes.

Discussion of the study

Most participants in the current study reported receiving social support from family, friends, or health professionals. The finding was consistent with a previous study.[26] Patients and their family members should be recommended the importance of lifestyle modifications regards taking a healthy diet and medications and performing regular physical activities because family members or friends play a crucial role in the patient's life. In terms of illness perception, participants had some diabetic symptoms and were concerned about diabetes and changing their lifestyle behavior. They had a good understanding of diabetes with less emotion and had learned how to live with the chronic condition. Additionally, participants reported heredity, diet, lifestyle, and stress as the cause

factor. This finding supports previous Georgian, Chinese, and African American studies.[27-29]

Participants' lifestyle behavior was good; however, the regular intake of fruits and vegetables was low. It might be due to the higher cost of fruits and some beliefs that one could have a cold after eating fruits. The finding was consistent with the survey among participants with non-communicable diseases in Nepal.[30] Participants considered physical activities easy to perform; however, few participants engaged in bodily exercise, possibly due to the lack of open spaces and parks near communities or weather issues. Therefore, nurses should encourage and suggest persons with type 2 diabetes do a few sessions of exercise a day or go brisk walking to maintain their blood sugar level. Participants had good medication-taking behavior relevant to the earlier study.[31.] Furthermore, participants were unwitting of the BMI, WC, and ideal weight of their own's bodies that might lack or have a poor commitment to the recommended physical activities or diet.

The finding showed participants who received good social support performed healthier lifestyle behavior to control their blood sugar levels. The previous studies supported the findings.[14,26,32] Participants supported by family, friends, or health personnel adhered to a nutritious diet engaged in regular physical activities and demonstrated better medication adherence because family members or friends encouraged the diabetes patients to take medicines or to go for a check-up. If a person with diabetes lives with family members (spouse or children) who prepare foods with less salt, low fat, or high fiber with green leafy vegetables and provide fruits, these aid in complying with a healthy diet. In contrast, if social support lacks, the consequences of the disease might worsen.[33] Thus, social support has a positive association with self-management behavior.

In addition, a negative association was determined between illness perception and lifestyle behavior. Participants in the current study were less committed to performing lifestyle behavior when they believed diabetes was a threatening disease. It illustrated that illness perception effect coping behavior. Earlier studies supported this current finding.[10, 28]As illustrated by the previous studies,[29, 34, 35] better understanding of chronic nature and believing the control of diabetes with the help of medications and lifestyle modifications might progress to increase the medication-taking behavior and other self-care behaviors. Similarly, when diabetes people believe medicines reduce the symptom experience or the consequences, they might become more compliant with their medications or other lifestyle modifications.[34] In contrast, if a patient misconceives diabetes as curable with a short period of medications, the patient might hold treatment. Furthermore, a study[29] illustrated that understanding diabetes aids to be the less concern, less threatening perception of diabetes and strengthening the patient's compliance with the recommended lifestyle behaviors. Thus, health personnel needs to understand the illness perception of patients related to diabetes as it does influence the performance of self-care activities for controlling the blood sugar level.

There were mean differences in lifestyle behavior among the participants with type 2 diabetes in the high-income and low-income groups, which

concurred with a previous study.[9] Control of diabetes requires a healthy diet, good exercise, and medication for long periods. Low socioeconomic conditions might result in less adherence to recommended medicines or diets due to a lack of accessibility and affordability. Different lifestyle behaviors were recorded between the participants having a family history of diabetes and those who did not. The finding was incongruent with a previous study[36]despite congruent with an earlier Nepalese study.[9] People with a family history of diabetes might be more concerned about the effects of the illness, leading to a change in lifestyle behavior to prevent other cardiovascular disorders or consequences.[37,38] As related to the theoretical framework of the "CSM," when persons have a family history of diabetes, they might feature emotional or physical problems. They might be concerned with the condition and plan or change the lifestyle that maintains the blood sugar level. An earlier study found that younger people with higher education and working people were more likely to engage in self-care activities to maintain blood sugar levels.[39] The current study, on the other hand, found no relationships between age, education, and lifestyle behavior. It is possible due to the differences in the sample population, as the previous study was conducted among the South-East Asian population. In contrast to previous research,[13] BMI and WC in the current study did not show significant relationships with lifestyle behavior; however, the BMI range tended to be high among the participants. The WC among female participants was more elevated than among male participants.[40] It might be a cultural impact. Nepalese people tend to eat oilier and spicy foods and alcohol but hardly exercise. Fasting by a female during the Teej festival without water to admire her husband might affect her blood sugar level if she has diabetes.[41] It revealed that the participants did not understand the illness which might result in low obligation towards the recommended physical activities and diet, leading to obesity. For this reason, healthcare personnel must construct and act upon strategies about the lifestyle of Nepalese people. Additionally, the government should provide essential equipment, facilities, or open spaces to the public for motivation.

It showed that previous disease experiences, family history of the disease, socioeconomic status of a family, accurate perception of illness, family/friends, or health professional's support play a role in a patient's self-management behaviors for controlling their blood sugar level. Furthermore, the CSM aids in apprehending that Nepalese diabetes patients perceive their illness as less threatening. Those who perceived diabetes as a chronic illness and had a less harmful view were likely to have better lifestyle behaviors than those who perceived it more seriously. Even though it is challenging to change the belief about diabetes among Nepalese people, making them aware of the correct perception of diabetes is necessary.

Implications for Nursing

In the future, nurses should design feasible intervention research based on illness perception for strengthening the lifestyle behavior of people with type 2 diabetes in Nepal. This will help the patient in complying with healthy lifestyle behaviors. Additionally, nurses should explore research related

to barriers to maintaining healthy lifestyle behavior among the diabetes population to find a way to minimize the difficulties of lifestyle modification among people with diabetes in Nepal.

Limitations and Recommendations of the Study

There are some limitations to this study. Firstly, the study had been taken from only one tertiary-level hospital in the central region of Nepal, which might not provide generalization for the Nepalese diabetes population despite various types of diabetic patients. The study needs to be extended to other clinical settings in Nepal to increase the variation of the samples. Secondly, a lifestyle behavior scale may require examining the psychometric properties of various populations to strengthen validity. Further studies in diabetic patients under 18 years and over sixty years of age and less than six months of diagnosis of diabetes and the relationships between smoking and drinking risk behaviors are recommended for the future. Related factors derived from the CSM have limited the scope in terms of "the appraisal" of the CSM. It should be further explored in the future. Despite the situation of the COVID-19 pandemic, the process of data collection was hampered a little and the hospital still has had health services available for patients.

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