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Research Article

Medication Adherence and Its Associated Factors among Type-2 Diabetes Mellitus Patients

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Abstract

Introduction: Diabetes is a chronic metabolic disorder of carbohydrates, fats and proteins characterized by hyperglycemia, where a beta cells of pancreas either donot secrete enough insulin or resist to the produce insulin.

Objective: To determine the factors influencing adherence to anti-diabetic medication among type-2 diabetes patients.

Method: The study was descriptive cross- sectional and 196 type-2 diabetes patients were enrolled by purposive sampling technique. Adherence level was screened with the Morisky Green Levine 4 item (MGL-4 item)

Results: A total of 196 respondents (mean age55.34±12.98). Analysis of MGL-4 item scores of patients showed that 38.3% had poor adherence level, 61.7% had moderate adherence level and none of the respondents were found to have high level of adherence with prescribed anti-diabetic medications. The variables like age, gender, marital status, educational, occupation, comorbid conditions, forgetfulness, pill burden, busy schedule, high cost, different brands, were not found significantly associated with medication adherence (P>0.05) however, majority of the patients were found to have forgetfulness (15.8%) followed by forgetfulness plus busy schedule (13.3%). However, age was found significantly associated with glycemic control (HbA1c level).

Conclusion: A low to moderate adherence level was observed in the study which needs to be recognized and improved through general adherence advocacy.

Keywords: Anti-diabetic drugs, Diabetes Mellitus, Glycemic control, Medication adherence

BACKGROUND

Diabetes mellitus (DM) is a group of chronic, metabolic diseases characterized by hyperglycemia where the pancreas does not secrete enough insulin, which is a hormone that regulate blood sugar or the body develops resistance to insulin produces by it [1]. It is associated with abnormal metabolism of lipid, protein and carbohydrate [2]. In diabetes individuals, HbA1c has been mostly accepted and widely used test for monitoring glycemic control [3]. World Health Organization and American Diabetes Association (ADA), an international expert committee recognized an A1c level ≥ 6.5% as diagnostic for diabetes [4]. For the management of type-1 diabetes, it mainly depends on insulin, whereas the management of type-2 diabetes is managed mainly using oral hypoglycaemic agents (OHAs) [5].Globally 422 million adults living with diabetes mellitus has been reported by World Health Organization (WHO) and since 1980 the prevalence had nearly doubled increasing from 4.7% to 8.5% in adults [6]. In Nepal diabetes has been considered as a significant public health problem. With among people aged ≥20 years, the reported urban prevalence of diabetes is ~15% and 19% among people aged ≥40 years. In Nepal after cardiovascular and Chronic Obstructive Pulmonary Disease (COPD), diabetes is also reported as the third highest prevalent non-communicable disease in hospitals [7].

According to the World Health Organization (WHO), "adherence is the extent to which a person's behaviour, following a prescribed diet, taking medication and executing lifestyle changes corresponds with agreed recommendations from the healthcare provider" [8].For the management of diabetes, non-adherence to treatment therapy has been a major huddle for healthcare providers and also the efforts that are made to improve and explain are not always effective on maintaining adherence of patients to their treatment [9]. Non-Adherence to medications has been a challenging aspect always, which leads to decrease in therapeutic effect of the drug results in high health care expenditure, overburdening the health system and multiple visits to the hospital [10].In Nepal the prevalence of T2DM in 2020 was 8.5% which was higher than that of 8.4%. Similarly, in 2020, the prevalence of pre-

diabetes was 9.2% as compared to 10.3% in 2014 [11].Assisting patients to adhere to often complex treatment therapy and to achieve a tight control in blood glucose level is a challenge. The main factors that are observed in poor glycemic control are poverty, non-adherence, poor follow-ups and lack of knowledge [12].Patients with type2 diabetes (T2D) of at least 45% fail to achieve adequate glycaemic control (HbA1c <7%). Poor medication adherence is one of the major contributing factors. Poor medication adherence is associated to key patient demographic factors, non-patient factors, patients' critical beliefs regarding their medications, and perceived patient burden about obtaining and taking their treatment regimens [13].So even though providing proper intervention, it has been observed that the patient receiving anti-diabetes medications complaining about the different SE (Side-effects), not meeting therapeutic requirements leading to macrovascular and microvascular complications, increased health care costs and death.If a health care professional is unable to detect the factors leading to non-adherence, it is impossible to correct the problems leading to high mortality rate.

Non-adherence to the prescribed anti-diabetic medications remains a major obstacle in the effective management of diabetes population and has been a principal factor in poor glycaemic control, microvascular complications including neuropathy, nephropathy and retinopathy and macrovascular complications like angina, cardiac failure, MI, peripheral vascular disease, stroke with deleterious consequences.Despite the high prevalence of diabetes in Nepal, there is a limited study done in Nepal for determining the factor influencing adherence to anti-diabetes medication in diabetes population.Thus, this study will help to assess the factor influencing adherence to anti-diabetes medications in type-2 DM patient and also contribute to assess the medication compliance to DM drug therapy. Which will serve a reference guide for the nation and bridge the gap between the developed country and the developing country like Nepal.

Research questions

What are the factors associated with anti-diabetes medication non-adherence among type-2 DM patients?

Research hypothesis

Null hypothesis (H): There is no significant association between socio-demographic characteristics and adherence level in type-2 DM patients receiving anti-diabetic medications.

Alternative hypothesis(H): There is significant association between socio-demographic characteristics and adherence level in type-2 DM patients receiving anti-diabetic medications.

Operational definition

Type 2 DM: Type 2 DM (non-insulin dependent DM formally) is the most common form of DM addressed by insulin resistance, hyperglycaemia and relative insulin deficiency [14].

Adherence: The WHO defines adherence as "the extent to which a person's behaviour-taking medication, following a diet, and/or executing lifestyle changes corresponds with agreed recommendations from a healthcare provider" [15].

Forgetfulness: Failure of recall and recognition called forgetfulness. It tends to happen when the previous or past events has not been activated for days or month [16].

Pill burden: Pill burden is the number of pills that needs to take each day by a patient/subject which may have a substantial impact on adherence to therapy [17].

High Cost medicines: HCMs, are those of speciality medicines which could cost 10 times more than the cost of traditional medicines and provides highly effective treatments for many life threatening diseases [18].

Different brands of same drug: It is a medicine that have same active ingredients that functions the same but discovered, developed and marketed by different pharmaceutical company.

Busy schedules: A time table or programme in which a person is actively engaged or occupied by work, which directly impact on adherence to the prescribed medication therapy.

Comorbid conditions: It describes the medical conditions that exist at the time or later of diagnosis of the main condition (index disease) but are not a consequences of the main condition under study [19].

Duration of treatment: The time frame or period on which a patient is under the treatment regimen which may have a substantial impact on adherence to therapy.

Age: Age describes the patient demographic characteristics and a continuous variable expressed as a mean with SD or median with IQR or as a categorical variable [20].

Gender: Gender concerns the social, psychological and cultural differences between man and woman [21] and is a nominal variable expressed in percentage frequency.

Marital status: It describes the whether a individual is single of in relation with other in accordance with customs of the country or marriage laws and is a nominal variable expressed in percentage frequency.

Occupational status: It denotes the actual performance or a pre-existing structure that guides the human performance [22].

Education status: It describes the patients demographic characteristics which is a nominal variable or implies the individuals degree of skills, knowledge and character and is expressed in percentage frequency.

MATERIALS AND METHOD

1. Study site

The study was carried out in Kathmandu Diabetes and Thyroid centre Pvt. Ltd, which is located at Jawalakhel, Lalitpur. Around 40-50 diabetes patients visit per day in this diabetes centre considering one of the well reputed and trustworthy diabetes centre in whole Lalitpur, also

it has been successfully providing its services from very long time. This site was selected since the treatment centre was specific for diabetes disease and patient can be easily available for our study.

2. Study duration

The study was conducted for 8 weeks.

3. Study type

The study was of quantitative type.

4. Study design

In this study prospective cross- sectional analytical study design was used to identify factors influencing adherence to anti-diabetic medications and the level of adherence among type-2 DM.

5. Study variables

Independent variables: The independent variables are forgetfulness, higher cost of medicines, different brands, income, busy schedules, duration of the treatment, pill burden, socio-demographic characteristics like age, gender, educational status, occupational status and marital status.

Dependent variable: The dependent variable was adherence level.

6. Study population

The study was conducted among Type II DM aged 20 years and above receiving diabetic treatment since 3 months, attending the outpatient department of diabetes care centre.

6.1 Inclusion criteria

Patients age 20 or above diagnosed with type-2 DM.

Type-2 DM patients receiving anti-diabetic medications from at least 3months.

6.2 Exclusion criteria

Uncooperative patients

Patients with other coexistent causes of hyperglycaemia (e.g., Cushing's syndrome, pancreatic cancer, or hormone-secreting tumors).

7. Sample Size

According to Cochran's formula,

Sample size (n): $z^2 p(1-p)/d^2$

n= sample size

z= standard normal deviation, the value is 1.96 at 95% confidential interval

p= 15% (Prevalence) [7]

d= precision [d is considered 0.05 margin of error (5%) to produce good precision & small error of estimate]

q = 1-p

= 1- 0.15

= 0.85

$n= (1.96)^2 0.15\times0.85/0.05^2$

n=195.92

n≅196

The sample size was 196 patients.

Sampling technique

Purposive sampling technique was carried out for the selection of 196 patients with Type II DM aged 20 years and above receiving diabetic treatment since 3 months attending at diabetic centre.

Ethical Approval

Ethical approval for the study was obtained from the respective college before initiating the research. Permission was also secured from Kathmandu Diabetic & Thyroid Centre prior to data collection. The study was conducted without any discrimination based on caste, religion, or socio-economic status. Participants were fully informed about the purpose and objectives of the study, and they were assured that all collected information would be used strictly for research purposes while maintaining confidentiality.

Pre-testing, Validity and reliability of the study

- Pre-testing was done in 10% of calculated sample size in type-2 diabetic patients of Kathmandu Diabetes and Thyroid Centre.
- Pre-tested data were excluded in the study.
- After pre-test, the questions was consulted with supervisor and one statistician to maintain validity.
- Reliability was established by cross checking or rechecking the tools that are required for data collection.
- The internal consistency of the tool was established through Cronbach alpha method.

Data collection tool

Semi-structured questionnaire was developed after reviewing the related literatures to collect the information. At first the questionnaire was prepared in English language and then it was translated into simple Nepali language for avoiding technically difficult words. Questionnaire consists of part-I related to socio-demographic variables including age, gender, educational status, occupational status and marital status, part-II was related to clinical information including FPG, PPG and HbA1c, Part -III is related to other informations including forgetfulness, pill burden, higher cost of medicines, different brands, busy schedules, comorbid condition and duration of treatment and part -IV was related to the adherence measurement scale questions.MGL-4 items questionnaire was used for the assessment of adherence among T2DM patients for which all responses are dichotomous (No=0 and Yes=1). At last scores are added together for a total ranging between 0 & 4, with (0)=high adherence, (1,2)=moderate/Average adherence, (3,4)=low/poor adherence [23].

Data collection technique

Written consent was taken from every patient before enrolling in this study. The patients who met the inclusion criteria was enrolled in the study. In the case where the patients were not able to answer or physically or mentally disabled, the informed consent was taken from the patient party. The medical records of patients kept by clinic, prepared data was analysed and also data was collected by questionings to patients for the conformation of adherence disorders according to Morisky Green Levine 4 items (MGL-4 items).

Data Management & Analysis

Data was collected, analysed and interpreted according to the objectives and the nature of the research questionnaire. All the collected data was overviewed, checked and verified for its completeness, consistency and accuracy. Then all the collected data was entered in MS-EXCEL and analysed through Statistical Package for Social Science (SPSS) version 20. Findings were analysed by using descriptive statistics like percentage, frequency, mean and SD.

The association between variables and adherence was carried out using chi-square test. The factor associated with adherence to medication was calculated using Pearson correlation and the corresponding confidence interval was 95%. A 'p' value less than 0.05 was considered at level of significant. Data then was presented in the tables.

RESULTS

1. Socio-demographic factor of the patients

The demographic studies were performed under age, gender, educational status, income and marital status.

1.1 Age distribution of the type-2 DM patients

Table 4.1.1: Age distribution of type-2 DM patients

Mean ±SD	**55.34±12.98**

The mean ages of the patients were 55.34±12.98 years.

1.2 Gender wise distribution of the type-2 DM patients

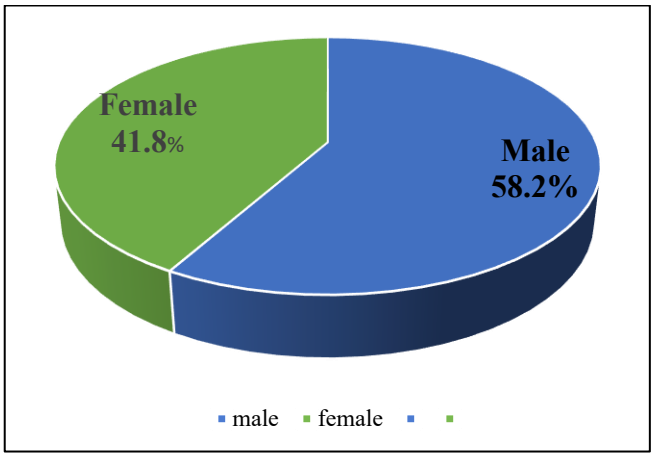

Figure 1: Gender wise distribution of the type-2 DM patients

As shown in figure1, among 196 patients with type-2 DM, 58.2 % of patients were male and 41.8% of the patients were female.

1.3 Marital Status of patients having type-2 DM

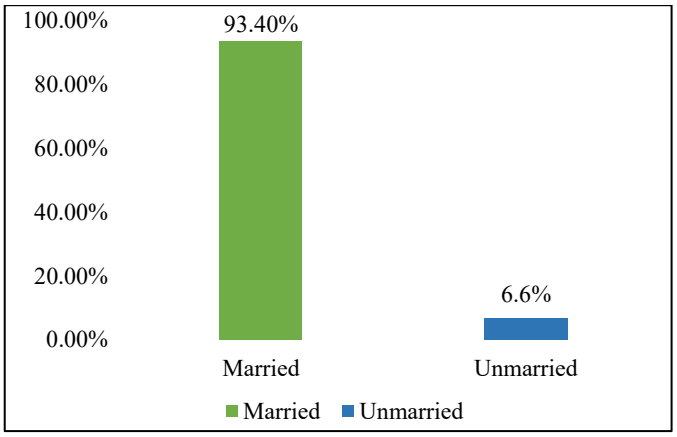

Figure 2: Marital Status of patients having type-2 DM

As shown in figure 2, majority of the type-2 DM patients were married (93.4%) and those unmarried were found to be of 6.6%.

1.4 Educational status of type-2 DM patients

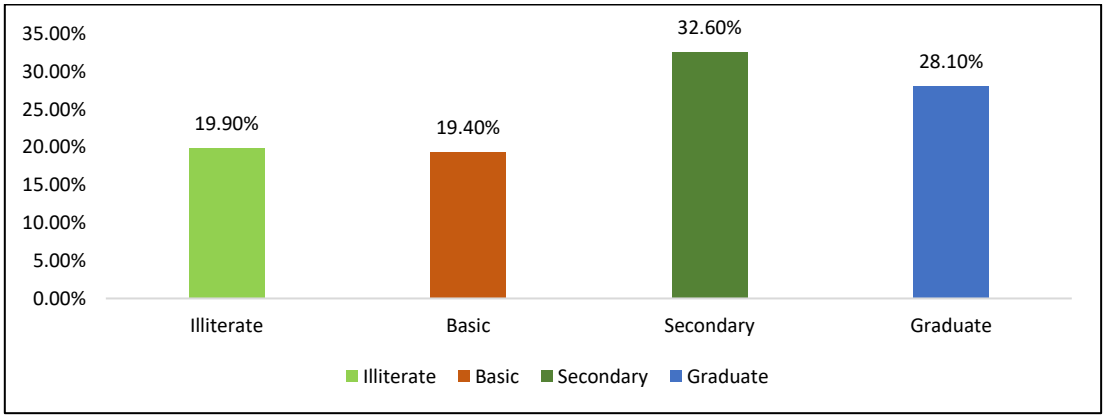

Figure 3: Educational status of type-2 DM patients

Out of 196 patients, 32.6 % of the patients have secondary level of education followed by 28.1% with basic level of education. Similarly, 19.9% of the patients were illiterate and 19.40% of the patients have basic education level as shown in figure 3.

1.5 Occupational status of type-2 DM patients

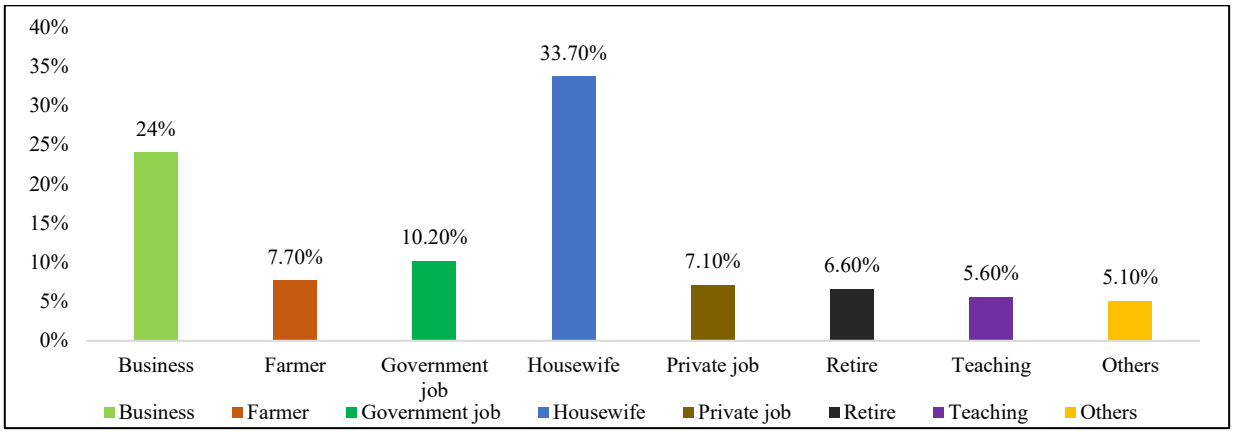

Figure 4: Occupational status of type-2 DM patients

Note: Others includes labour, fashion designer, peon

As shown in figure 4, out of 196 patients, 33.7 % of the patients were found to be house wife followed by 10.2% with government job. Similarly, 56% of the patients were found to be teachers and 5.1% of the patients engaged in other occupations.

2. Comorbid condition of type-2 DM patients

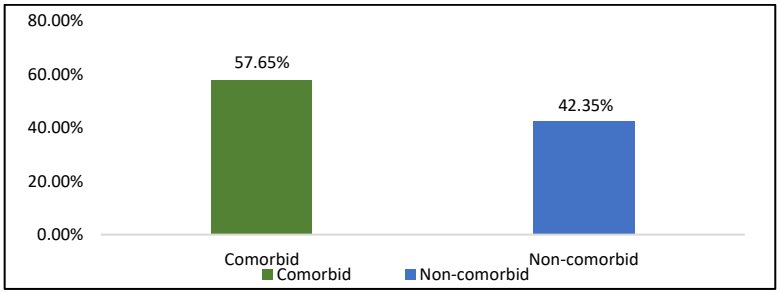

Figure 5: Comorbid condition of type-2 DM patients

Note: comorbid includes hypertension, thyroid, hyperlipidaemia, chronic kidney disease, COPD, asthma, depression, piles, liver cirrhosis, gout

Out of 196 participants 57.65% patients were found to have comorbid conditions and 42.35% were found to have non-comorbid conditions as shown in figure 5.

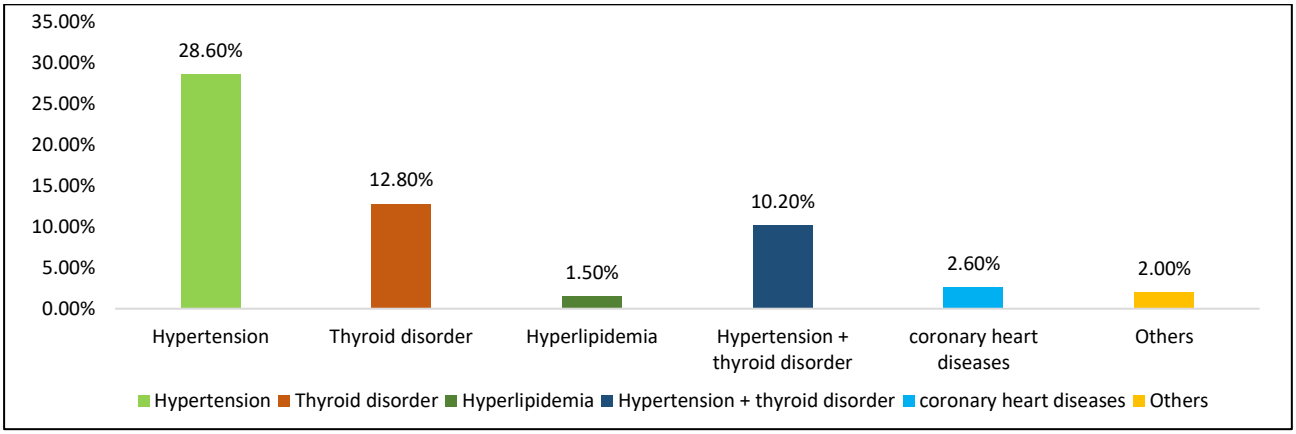

Figure 6: Comorbid condition of patients suffering from type-2 DM

As shown in figure 6, among 57.65% comorbid patients, majority had hypertension (28.6%) followed by thyroid disorder (12.8%) and minority had other comorbidities (2%) followed by hyperlipidemia (1.5%).

Note: others includes COPD, asthma, depression, piles, liver cirrhosis, gout

3. Medication list of type-2 DM patients

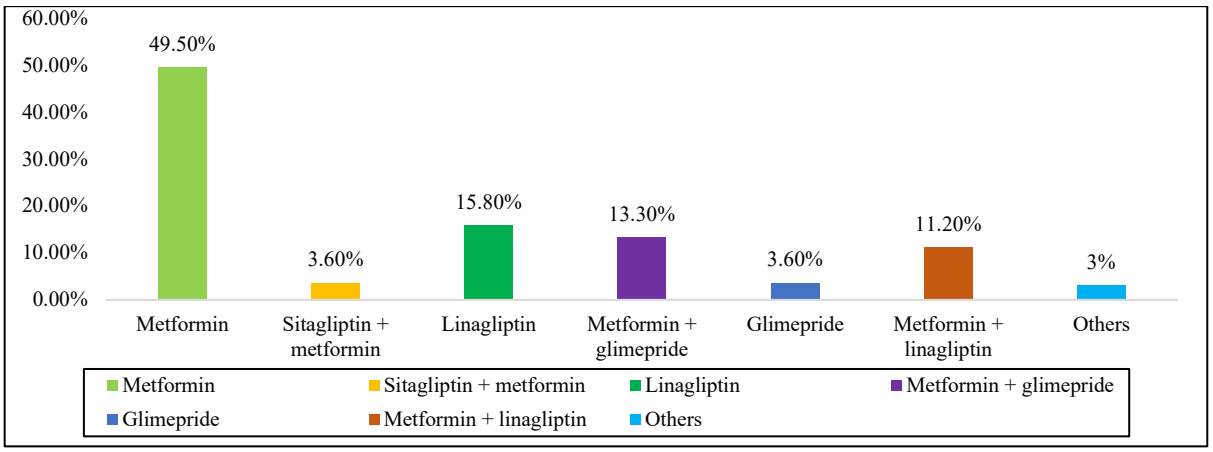

Figure 7: Medication list of type-2 DM patients

Others. Acarbose, inj. novomix+lintor, empagliflozin

As shown in figure 7, among different anti-diabetic drugs, metformin was found to be mostly prescribed in 49.5% patients likewise, linagliptin in 15.8%. Similarly, glimepride in 3.6% and in 3% of the patients with other anti-diabetic medications.

4. Reason behind missed doses

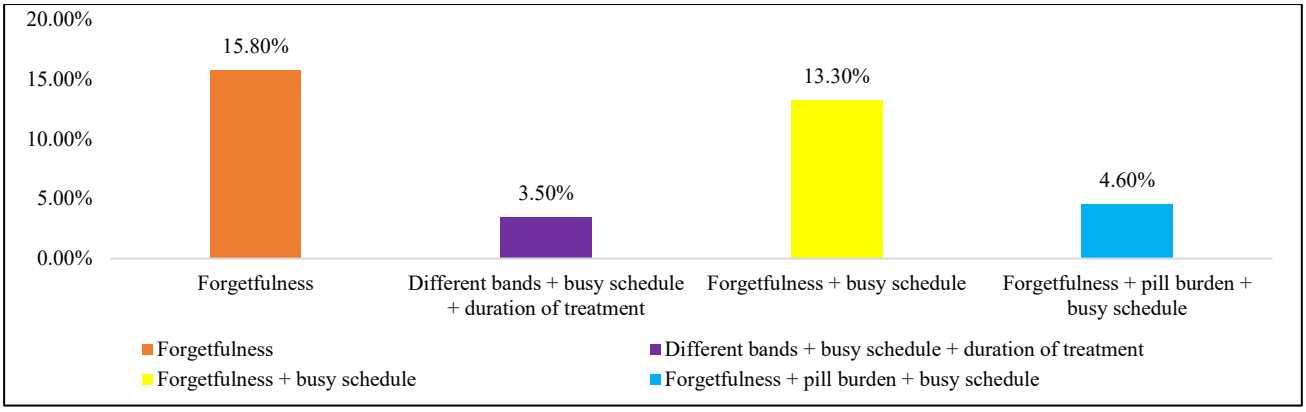

Figure 8: Reason behind missed doses

As shown in figure 8, out of 196 study population, most frequently 15.8% of the patients missed their doses due to forgetfulness followed by13.3 % due to forgetfulness + busy schedule, likewise 4.6% patients due to forgetfulness + pill burden + busy schedule followed by 3.5% patients due to different brands+ busy schedule + duration of treatment.

5. Self reported complications

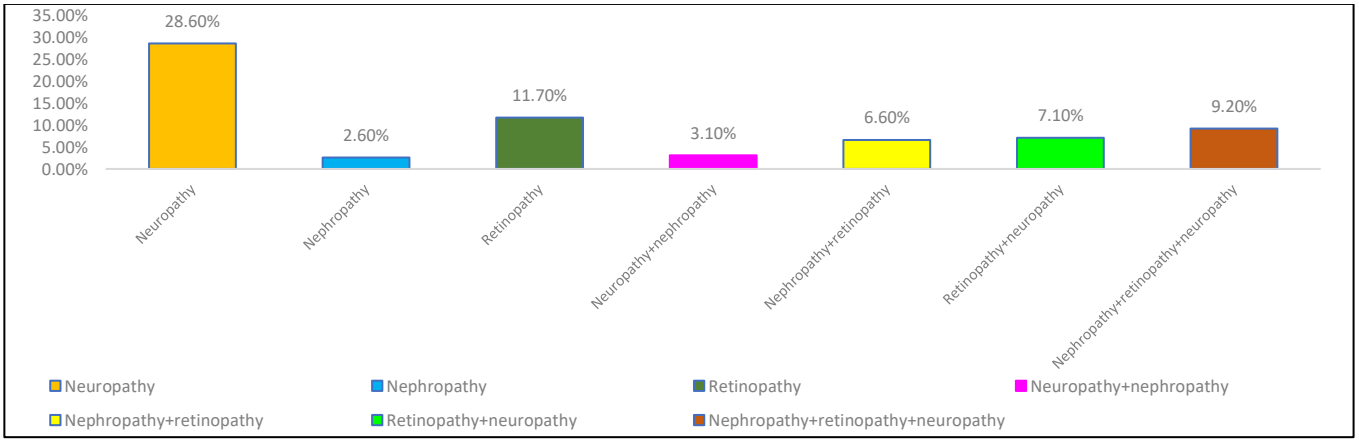

Figure 9: Self reported complications

As shown in figure 9, among 196 participants, 28.6% patients self-reported neuropathy followed by 11.7% patients self-reported retinopathy. Likewise, 3.1% self-reported neuropathy+ nephropathy followed by 2.6% patients self-reported nephropathy.

6. Laboratory report value

Table 4.6: Laboratory report of type-2 DM patients

Characteristics	Mean ± SD
HbA1c	7.98 ±2
FPG	135.79±47.83
PPG	207.53±76.25

As shown in table4.6, the mean HbA1c, Fasting Plasma Glucose (FPG), Post Prandial Blood Glucose (PPG) of T2DM patients was 7.98±2, 135.79±47.83 and 207.53±76.25 respectively.

7. Morisky Green Levine

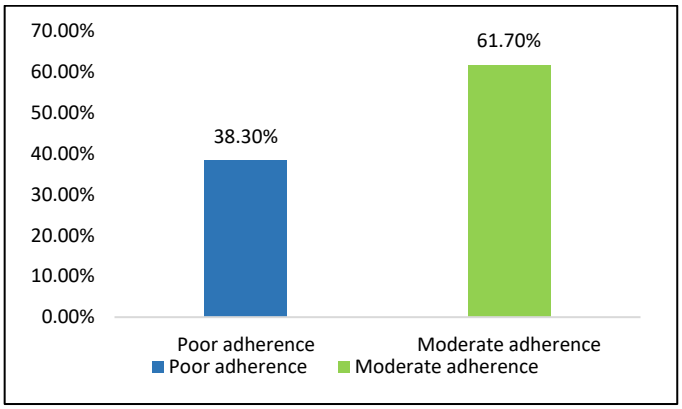

Figure 10: Morisky Green Levine

Among 196 study population, 38.3% of patients were found to have poor adherence level where as 61.7% patients were found to have moderate level of adherence which was shown in figure10.

8. Association between demographic variables and medication adherence

Table 4.8: Association between demographic variables and medication adherence of type-2 DM patients.

Variables	Categories	Medication adherence		p-value
		Adherence	Non-adherence	
Age	≤60	78(61.90%)	48(38.09%)	0.441
	≥60	43(61.43%)	27(38.57%)	
Gender	Male	74(64.91%)	40(35.09%)	0.280
	Female	47(57.32%)	35(42.68%)	
Marital status	Married	116(63.39%)	67(36.61%)	0.074
	Unmarried	5(38.46%)	8(61.54%)	
Educational status	Education	101(64.33%)	56(35.67%)	0.133
	No education	20(51.28%)	19(48.72%)	
Comorbid condition	Comorbid	69(62.16%)	42(37.84%)	0.888
	Non-comorbid	52(61.18%)	33(38.82%)	
HbA1c	Controlled	36(65.45%)	19(34.55%)	0.503
	Uncontrolled	85(60.28%)	56(39.72%)	

As seen in table 4.8, 78 (61.90%) patients with medication adherence belongs to below 60 age while 43(61.43%) subjects with medication adherence belongs to above 60 age. Statistical categorical analysis review that there is no significance association between age strata and medication adherence of type-2 diabetes patients (p=0.441).Likewise, 74 (64.91%) patients with medication adherence belongs to male while 47(57.32%) patients with medication adherence belongs to female. Statistical categorical analysis review

that there is insignificant association between gender strata and medication adherence of type-2 diabetes patients (p=0.280).

Similarly, 116 (63.39%) patients with medication adherence belongs to married while 5(38.46%) patients with medication adherence belongs to unmarried. Statistical categorical analysis review that there is no significance association between marital status strata and medication adherence of type-2 diabetes patients (p=0.074) and 101(64.33%) patients with medication adherence were found to be educated and 20(51.28%) patients with medication adherence found to have no education status. Statistical categorical analysis review that there is no significance association between educational status strata and medication adherence of type-2 diabetes patients (p=0.133).

Likewise, 69(62.16%) patients with medication adherence were found to have comorbid conditions while 52(61.18%) patients with medication adherence were found to have non comorbid conditions. Statistical categorical analysis review that there is insignificant association between comorbid strata and medication adherence of type-2 diabetes patients (p=0.888) and 36(65.45%) patients with medication adherence were found to have controlled HbA1c level while 85(60.28%) patients with medication adherence were found to have uncontrolled HbA1c level. Statistical categorical analysis review that there is insignificant association between HbA1c strata and medication adherence of type-2 diabetes patients (p=0.503).

9. Association between demographic variables and HbA1c

Table 4.9: Association between demographic variables and HbA1c of type-2 DM patients

Variables	Categories	HbA1c		p-value
		Controlled	Uncontrolled	
Age	≤60	43(78.18%)	83(58.87%)	0.030
	≥60	12(21.82%)	58(41.13%)	
Gender	Male	33(60%)	81(57.45%)	0.745
	Female	22(40%)	60(42.55%)	
Comorbid condition	Comorbid	31(56.36%)	80(56.74%)	0.962
	Non-comorbid	24(43.64%)	61(43.26%)	

As seen in table 4.9, 43(78.18%) patients with age below 60 years and 12(21.82%) patients with age above 60 years were found to have controlled HbA1c level while 83(58.87%) patients with age below 60 years and 58(41.13%) with age above 60 years were found to have uncontrolled HbA1c level. Statistical categorical analysis review that there is a significant association between HbA1c strata and age of type-2 diabetes patients (p=0.030). Similarly, 33(60%) male and 22(40%) female patients were found to have controlled HbA1c level while 81(57.45%) male and 60(42.55%) female patients were found to have uncontrolled HbA1c level. Statistical categorical analysis review that there is no significance association between HbA1c strata and gender of type-2 diabetes respondents (p=0.745).

Likewise, 31(56.36%) patients with comorbid and 24(43.64%) patients with non-comorbid were found to have controlled HbA1c level while 80(56.74%) patients with comorbid and 61(43.26%) non-comorbid patients were found to have uncontrolled HbA1c level. Statistical categorical analysis review that there is no significance association between HbA1c strata and comorbid condition of type-2 diabetes patients (p=0.962).

DISCUSSION

A total of 196 patients were included in our study with a mean age of 53.34 ± 12.98 years. In our study 58.2% were males and 41.8% were females. In another study 47.9% were males and 52.1% were females conducted among Sudanese individuals with type -2 DM by Badi et al., in 2019 [24]. Thus, our study shows a considerable male predominance of type-2 DM, i.e., 58.2%. In our study the majority of type-2 DM patients were married (93.4%). A study conducted by Balkhi et al., (2019) in Saudi Arabia were found that more than 90.6% of the type-2 DM patients were married, which is similar to our research [25]. Our study showed majority of patients about 32.6% had education of secondary level, whereas the previous study done in type-2 DM in Ehiopian General Hospital by Ayele et al.,(2019) showed majority of patients were illiterate (44.4%) [26].

In our study, the majority of type-2 DM patients were housewives (33.7%). In previous study by Abebaw et al., (2015) showed that majority of patients were housewives (34.0%) conducted at university of Gondar hospital, North- west Ethiopia [27].Thus, the higher prevalence of type- 2 DM among housewives probably due to lack of routine self-care and improper balance diets. In our study more than half of the patients i.e. 56.6% were found to have comorbid conditions among them, hypertension in 26.02% likewise thyroid disorder(11.73%), hypertension plus thyroid disorder(10.20%), coronary heart disease(3.57%), hyperlipidemia (3.06%) and others(3.06%) which

included COPD, asthma, depression, piles, liver cirrhosis and gout whereas the previous study done by Thapar et al., (2020) in 124 patients 58.1% were found to have comorbidities [10]. Our study showed that metformin about 49.5% had been found to be the most commonly prescribed anti diabetic medications among type-2 DM patients. A similar result was observed with majority of 89.2% metformin prescribed in a tertiary hospital in Saudi Arabia done by Balkhi et al., (2019) [25]. In our study the most common reasons stated was patients forgetting to take their medications (15.8%) followed by forgetfulness plus busy schedule (13.3%), forgetfulness plus pill burden plus busy schedule (4.6%) and different brands plus busy schedule plus duration of treatment (3.5%). A similar result was observed in 387 patients in Assela General Hospital Oromia Region, Ethopia done by Kassahun et al., (2016), where forgetfulness (60.7%) was the major contributing factors for their missed doses, followed by being away from home (7.8%), drug side-effect (19.1%) and to feel better (12.4%) [12].

In the present study, majority of the patients had self-reported neuropathy (28.6%) followed by retinopathy (11.7%) and minority of the patients had self-reported neuropathy plus nephropathy (3.1%) followed by (2.6%) nephropathy as a complications of DM. In previous study by Elsous et al., (2017) in 369 patients, showed the majority of patients reported nephropathy (96.5%) followed by neuropathy (96.2%) in type-2 DM patients [28]. In this study we observed the mean HbA1c level of T2DM patients was 7.98±2. A past result showed that the mean HbA1c was 10.16±3.14 done in Sudanese outpatient clinic by Mirghani (2019) [29], Whereas the mean Fasting Plasma Glucose (FPG) level was 135.79±47.83 and the Post Prandial Level (PPG) level was 207.53±76.25, which shows still majority of the patients had uncontrolled glucose level, it may be due to the various factors contributing for uncontrolled blood glucose level. In our study MGL-4 item scores of patients showed that 61.7% had moderate adherence followed by 38.3% poor adherence among T2DM patients. While a study done in West Bank, Palestine by khdour et al.,(2020) observed among 380 diabetic patients, 57.9% had high adherence and 42.9% had low adherence level [30].

In our present study noted insignificance association between age of the patients with medication adherence (p=0.441) which can be assume that age does not affect medication adherence but the previous study done in Cameroon by Aminde et al., (2019), showed there was a significant association between age of the patients with medication adherence (p=0.0011) [9]. Which can be assumed that patients now a days were more aware to take the medications prescribed. In our study male patients (61.90%) were more adhere to anti-diabetic medication adherence than females (57.32%) however there was a insignificant association between gender and medication adherence (p=0.2800). A similar, result [p=0.30] was observed in Cameroon by Aminde et al., (2019) [9]. Our study showed that married patients 63.39% were more adhere to medications than unmarried (38.46%) however there is insignificant association between marital status with medication (p=0.074). A similar result(p=0.731) was observed done by Mannan et al., (2021) in Southern Bangladesh [31]. In this study 64.33 % patients with medication adherence were educated, though there was a insignificant association between educational status and medication adherence among T2DM [p= 0.095]. But a significant association between educational status and medication adherence was observed [p=0.015] done by Mannan et al., (2021) [31]. In our study more than half of the patients (62.16%) had comorbid condition, although there was a insignificant association between comorbid and medication adherence (p=0.888). A similar past study resulted insignificant association between comorbid conditions and medication adherence which consisted 56.9% patients with comorbid conditions with medication adherence (p=0.897) done by Thapar et al., (2020) in Mangalure [10].

In the current study, we assessed 65.45% patients with controlled HbA1c had medication adherence. From which we can assumed, on being adhered with medication there are still other triggering factors contributing to uncontrolled HbA1c in T2DM patients. However, our study concluded there was no significant association between HbA1c strata and medication adherence of type-2 DM (p=0.503). Although a significant association was observed between HbA1c level with medication adherence (p=0.005) done by Balkhi et al., (2019) in tertiary hospital in Saudi Arabia [25].

Our study observed among 35.71% patients with aged of above 60 years, only 21.82% had controlled HbA1c level and among 64.29% of the patients with aged below 60 years more than half of the patients (78.18%) had controlled HbA1c level, showed there was a significant association between HbA1c and age of T2DM patients (p=0.030]. From this we can assumed that with age forgetfulness and patients body physiology diminished leading inadequate or resistance to insulin production in type 2 diabetes mellitus. In this study, among 58.16% male patients (60%) had controlled HbA1c level. While among 41.84% female patients less than half (40%) female had controlled HbA1c level. However, the study showed there was insignificant association between HbA1c and gender of type-2 diabetes patients (p=0.745). In this current study, more than half of the patients (56.36%) with comorbid conditions had controlled HbA1c level and less than half of the patients (43.26%) with non-comorbid had controlled HbA1c level, which showed that presence of comorbidities caused uncontrolled HbA1c level. However, the statistical categorical analysis showed that there was no significance association between HbA1c and comorbid condition of type-2 diabetes patients (p=0.9620).

CONCLUSION

This study concluded that, the evaluation of various factors influencing adherence to antidiabetic medications among type-2 diabetes mellitus patients and was analyzed at Kathmandu Diabetes and Thyroid Centre Pvt. Ltd. This study mainly focused on the socio-demographic details, glycemic control, adherence level and various factors influencing adherence to

antidiabetic medications. We observed that male patients were dominant over the female in number. Forgetfulness (15.8%) was the most common factors influencing non -adherence to antidiabetic medications leading poor glycemic control. This study indicated more than half of the patients 61.7% were found to have moderate level of adherence also the age was significant factor associated with glycemic control.

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