Knowledge and Self- care Practices in Diabetic Patients and Their Role in Disease Management in Pyay, Myanmar

A Senior Thesis Submitted

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By

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Abstract

Background: Poor knowledge and inadequate practices among diabetic patients play important role in influencing the progression of diabetes and its complications while these diabetes complications are largely preventable.

Methods: A cross sectional study was conducted among both patients with type 1 and type 2 diabetes mellitus attending the diabetes clinics and hospitals in Pyay, Bago Division in the Irrawaddy region of Myanmar. A semi structured questionnaire was administered to understand knowledge and self-care practices among diabetic patients.

Results: A total of 100 diabetic patients consented and in the study of whom 19 (36.5%) and 16 (33.3%) were male who have poor and good diabetic management respectively. The remaining 33 (63.5%) and 32 (66.7%) were poor and good diabetic management of female. Majority of participants were married who have poor and good diabetic management of (76.9%) and (79.2%). Majority of the participants (42.3%) and (45.8%) were between the age of 41-60 years who have poor and good diabetic management. Half of the participants 27 (51.9%) with poor management and 24 (50%) with good diabetic management have diabetic awareness. A significant relationship was found between diabetic management and primary healthcare provider, though most participants 39 (75%) with poor diabetic management and 26 (54.2%) with good diabetic management do not have primary healthcare providers. Half of the participants (55.8%) with poor diabetic management and (47.9%) with good diabetic management received diabetic medications. A significant relationship existed between diabetic management and level of knowledge. The highest percentage of participants (92.5%) with poor diabetic management and (68%) with good diabetic management

have poor diabetic knowledge. Few of participants (7.5%) and (25%) with poor diabetic knowledge and good diabetic knowledge respectively had moderate diabetic knowledge.

Conclusions: Participants with better diabetic knowledge followed the advice of their healthcare providers and had regular checkup allowing glycemic control.

Key Words: knowledge, self-care practices, diabetes mellitus, glycemic control

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1. Introduction

Diabetes is a chronic, metabolic disease characterized by elevated levels of blood glucose (or blood sugar), which leads over time to serious damage to the heart, blood vessels, eyes, kidneys, and nerves. Type 2 diabetes is most common, usually in adults, which occurs when the body becomes resistant to insulin or doesn't make enough insulin (WHO, 2016). The global prevalence of diabetes among adults over 18 years of age has risen from 4.7% in 1980 to 8.5% in 2014. In 2012, an estimated 1.5 million deaths were directly caused by diabetes and another 2.2 million deaths were attributable to high blood glucose. Almost half of all deaths attributable to high blood glucose occur before the age of 70 years (WHO, 2016). WHO projects that diabetes will be the 7th leading cause of death in 2030. Healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use are the recommended ways to prevent or delay the onset of type 2diabetes. Diabetes can be treated and its consequences avoided or delayed with diet, physical activity, medication and regular screening and treatment for complications (WHO, 2016).

According to International Finance Corporation (IFC), A World Bank group in South-East Asia, which includes India and Indonesia, there has been a 564 percent increase in the number of diabetics, up from 17 million sufferers in 1980 to 96 million in 2014 (IFC, 2015). The prevalence of diabetes in South-East Asia has more than doubled, from 4.1 percent to 8.6 percent of the population (IFC, 2015). For existing practice and health awareness about diabetes in Southeast Asian countries, people are still facing lack in supply of treatment. Moreover, as people are poor in diabetic awareness, people are presenting late with serious conditions and which lead compulsory diabetes mellitus treatments. For health facilities, many governments in developing countries are still in the process of having underinvested in diagnostics, health professionals, infrastructure, health promotion

and appropriate equipment. However, people are promoting of both public and private health awareness programs and trainings for a range of non-communicable diseases (IFC, 2015).

According to the IDF Atlas 2013, the diabetes prevalence in Myanmar is 5.7%. However, during 2003 – 2004, with the support of the World Health Organization (WHO-SEARO), a survey was conducted in Yangon, and the prevalence was 10.5% (World Diabetes Foundation, 2015). Burmese people have poor health awareness about diabetic process and its long-terms effects. As a result of poor health care services in Myanmar, Burmese people are facing the problems such as higher cost of monitoring and insulin therapy and restricted availability of the insulin. In addition to knowledge and health education about Type 1 diabetes, especially for younger age children, teachers at school are not aware about diabetes and the teachers are not able to cooperate in promoting health education for young children. For health trainings, Burmese patients resort to traditional medicines as Burmese healthcare providers have weaknesses of personnel trainings and lack of availability of modern insulin in Myanmar (National Center for Biotechnology Information, U.S. National Library of Medicine, 2014).

Poor knowledge and practices among diabetic patients play as the important role influencing the progression of diabetes and its complications, while these diabetes complications are largely preventable. In general population, incidence of Coronary heart disease and stroke are mostly found among diabetic patients. Developing countries especially like Southeast Asia countries become double the burden of the infective diseases as non-communicable diseases are more and more prevalent. In low and middle-income countries, people are not able to support on the health care system for burden of disease. Prominent causes for heart disease, diabetes, cancer and pulmonary diseases can be prevented but preventive actions are needed. Moreover, among the patients who are having poor glycemic control, diabetic renal disease, diabetic retinopathy and neuropathy are found

as the impact of diabetic complications. Having poor glycemic control is led by sub-optimal treatment, inadequate health education and other unnecessary disabilities among the people. Therefore, it is essential to provide comprehensive services such as health education promotion, public awareness and trainings regarding the self-management of the disease in order to prevent the draining complications of diabetes and to reduce the financial burden on the health care system (Karam et.al, 2012).

Implementation of appropriate therapy, appropriate monitoring, and comprehensive instruction in diabetes self-management are necessary to achieve optimal level of glycemic control for patients who have high or low glycemic control. Self-care practice for diabetes mellitus such as blood glucose monitoring, foot care, exercise, recognition of symptoms is essential in secondary prevention. As various studies described, interventions to promote better self-management can give advantageous in controlling the long term complications of diabetes by giving improvements in blood glucose control and improved glycemic control. Diabetes self-management education is promoting health knowledge to people for managing their diabetes and it is also necessary to raise health awareness about clinical management of diabetes by professional health care giver of a patient. Determinant of patient's knowledge and practices about diabetes is crucial in progressing various intervention approaches and educational sustainability (Karam et.al, 2012).

In Myanmar, people are likely to have poor awareness and self-care practices of diabetes as they are influenced by social factors such as diabetic hereditary, illiteracy, social economic status, bad eating habits, physical inactivity, and lack of control in smoking, alcohol and drugs and so on. Lack of knowledge about diabetes mellitus is challenging in Myanmar and Burmese diabetic patients are not following the practices to control blood glucose level such as not doing physical exercises regularly and eating fast foods and fizzy drinks although the doctor advised them to manage their

disease (Diabetes: Myanmar's hidden health threat, 2016). Therefore, this study aimed to find out the association between poor or good diabetic management in terms of socioeconomic status, level of knowledge, glycemic control, health seeking practices, medical symptoms and smoking, alcohol and drugs used.

2. Methods

2.1. Study Design and Participants

A cross sectional study was conducted among both patients with type 1 and type 2 diabetes mellitus attending the diabetes clinics and hospitals during 15th June to 30th July, 2016 were included in the study. The purpose of the study was explained and informed consent was obtained from the respondents. Privacy and confidentiality was ensured during the process. 100 patients were consented and participated in the study.

(2.2) Study Setting

The study was conducted at three hospitals and three clinics located on Pyay, also known as Sri Ksetra (Thayekhittaya) which is a small, charming town, and district in Bago Division in the Irrawaddy region of Myanmar. Hospitals and clinics were randomly selected.

2.3. Sample Size Determination

The sample size was determined by using population proportion formula by considering 95% CI of both, type 1 and type 2 diabetic patients including men and women in Pyay, Myanmar in 2016. However, since the study setting is a small place and less population, duration for collecting data had limitation and not having enough funding, sample size adjustment was done with 100 participants.

2.4. Sampling Method

A consecutive Sampling Method was used to select study participants. For this study, HemoglobinA1C, height, weight and blood pressure of each patient were collected from hospital and clinical records. The questionnaires were translated into Burmese. Sampling method and procedures were taken from similar researches which were done in India and Bangladesh in 2012.

2.5. Data Collection

A semi structured questionnaire was administered which consider the following parts, (1) Socio-demographic information, (2) Diabetes specific information, (3) Knowledge regarding diabetes among diabetes patients, and (4) Diabetic management followed by the patients. In socio-demographic information included patients' age, gender, and educational status. Socioeconomic status of the patients was included total family monthly income, occupational and educational status of the participants. Diabetes specific information included duration of the disease, glycemic level, mode of the treatment and medical care personal. Knowledge regarding diabetes among diabetes included the questionnaires related to the nature of the disease, importance of diet, exercises and drug compliance in controlling glucose level. Diabetic management followed by the patients included the questionnaires such as patient's behavior regarding testing blood sugar, following healthy eating plan, exercise, health seeking practices such as traditional medicine used, having health care provider and other medical symptoms including feet and eye problem etc.

2.6. Data Analysis

Descriptive analyses were done to understand sociodemographic characteristics (age, gender education, occupation, income etc.) of the study participants in Pyay, Myanmar. Poor management and good management were calculated using a set of variables related to diet, physical exercise and

medication recommendations. Data were analyzed using SPSS Version 22, Chi-squared test, Logistic regression analysis and final paper will be shared with AUW community.

2.7. Ethical Consideration

Ethical Approval was obtained from Institutional Review Board at Asian University for Women (AUWIRB). Permission to conduct the study was also obtained from the hospitals and clinical administrations. Participants were given Informed consent by maintaining research participants' privacy and confidentiality etc.

3. Result

3.1. Demographic Information among Diabetic Patients

Demographic information among diabetic patients is described in table 1. Out of 100 participants, 19 (36.5%) and 16 (33.3%) were male who have poor and good diabetic management respectively. The remaining 33 (63.5%) and 32 (66.7%) were poor and good diabetic management of female. Majority of participants were married diabetic patients who have poor and good diabetic management of (76.9%) and (79.2%). Age ranged from 26 years to more than 61 years in the sample with majority of the participants (42.3%) and (45.8%) were between the age of 41-60 years who have poor and good diabetic management. Regarding economic status of the participants, employed with poor diabetic management were 28 (53.8%) and 30 (62.5%) were employed with good diabetic management. The participants, 41 (78.8%) and 39 (81.3%) with poor and good diabetic management had monthly income which was more than 50 US dollars. About (40.4%) and (39.6%) were illiterate who have poor diabetic management and good diabetic management. Regarding habitat, (42.3%) and (52.1%) of participants with poor and good diabetic management live in rural area.

Table 1: Socio-Demographic characteristics by diabetic management among diabetic patients in

Pyay, Myanmar

Variables' Name	Numbers (n=100) (%)	Poor Management (%)	Good Management (%)	Chi-square	d.f	p-value
Gender Male	35 (35)	19 (36.5)	16 (33.3)	0.11	1	0.74
Female	65 (65)	33 (63.5)	32 (66.7)			
Marital Status Married	78 (78)	40 (76.9)	38 (79.2)	0.07	1	0.79
Unmarried	22 (22)	12 (23.1)	10 (20.8)			
Age 26-40 years	13 (13)	9 (17.3)	4 (8.3)	1.79	2	0.41
41-60 years	44 (44)	22 (42.3)	22 (45.8)			
>61 years	43 (43)	21 (40.4)	22 (45.8)			
Economic Status Employed	58 (58)	28 (53.8)	30 (62.5)	3.52	2	0.17
Homemakers	35 (35)	22 (42.3)	13 (27.1)			
Others	7 (7)	2 (3.8)	5 (10.4)			
Income ($) 0-50	20 (20)	11 (21.2)	9 (18.8)	0.10	1	0.76
>50	80 (80)	41 (78.8)	39 (81.3)			
Education Primary or less	2 (2)	2 (3.8)	0 (0)	2.57	3	0.46
Middle School	31 (31)	17 (32.7)	14 (29.2)			
High School	27 (27)	12 (23.1)	15 (31.3)			
Others	40 (40)	21 (40.4)	19 (39.6)			
Habitat Urban	29 (29)	15 (28.8)	14 (29.2)	1.57	2	0.46
Semi-urban	24 (24)	15 (28.8)	9 (18.8)			

Rural	47 (47)	22 (42.3)	25 (52.1)			

3.2. Drug and Alcohol Use

Majority of the participants 30 (57.7%) with poor diabetic management and 30 (62.5%) with good diabetic management did not use drug. Specifically, participants (88.4%) with poor diabetic management and (97.9%) with good diabetic management did not use cigarette, more than half of the participants (80.8%) with poor management and (81.3%) with good management did not use cigars, participants (73.1%) with poor management and (77.1%) with good management did not chew betel nuts and majority participants (86.5%) with poor diabetic management and (93.8%) with good management did not drink alcohol.

Table 2: Diabetic Management and Drug Use and Alcohol Drink

Variables' Name	Numbers (n=100) (%)	Poor Management (%)	Good Management (%)	Chi-square	d.f	p-value
Any Drug Use Yes	40 (40)	22 (42.3)	18 (37.5)	0.24	1	0.62
No	60 (60)	30 (57.7)	30 (62.5)			
Cigarettes Yes	7 (7)	6 (11.5)	1 (2.1)	3.56	1	0.17
No	93 (93)	46 (88.4)	47 (97.9)			
Cigar Yes	19 (19)	10 (19.2)	9 (18.8)	0.11	1	0.95
No	81 (81)	42 (80.8)	39 (81.3)			
Betel nut Yes	25 (25)	14 (26.9)	11 (22.9)	0.22	1	0.90
No	75 (75)	38 (73.1)	37 (77.1)			
Alcohol Drink Yes	10 (10)	7 (13.5)	3 (6.3)	1.44	1	0.23
No	90 (90)	45 (86.5)	45 (93.8)			
How Many Alcohol Drink						

Per day	4 (4)	3 (5.8)	1 (2.1)	1.51	2	0.47
Occasionally	6 (6)	4 (7.7)	2 (4.2)			
No	90 (90)	45 (86.5)	45 (93.8)			

3.3. Knowledge of Diabetes, Family History and Diagnosed type of diabetes

Table 3 shows knowledge of diabetes, family history and diagnosed diabetes type. Half of the participants 27 (51.9%) with poor management and 24 (50%) with good diabetic management adopted diabetic awareness. More than half of the participants 32 (61.5%) and 32 (66.7%) with poor diabetic management and good diabetic management respectively have type 1 diabetes. Most 38 (73.1%) and 36 (75%) of the participants with poor diabetic management and good diabetic management don't know exactly whether they have type 1 or type 2 diabetes. The participants (73.1%) with poor diabetic management and (75%) with good management said they don't have a family relationship who had diabetes. Regarding diagnosed diabetes, (42.3%) with poor diabetic management and (37.5%) with good diabetic management respectively have diagnosed diabetes less than one year. Moreover, participants (36.5%) with poor diabetic management and (35.4%) good management have diagnosed diabetes within 1 year to 5 years.

Table 3: Knowledge of Diabetes, Family History and Diabetic Management

Variables' Name	Numbers (n=100) (%)	Poor Management (%)	Good Management (%)	Chi-square	d.f	p- value
Knowledge of Diabetes						
Yes	51 (51)	27 (51.9)	24 (50)	0.04	1	0.85
No	49 (49)	25 (48.1)	24 (50)			
Have Diabetes						
Yes- Type 1	64 (64)	32 (61.5)	32 (66.7)	1.82	2	0.61
Yes- Type 2	29 (29)	16 (30.8)	13 (27.1)			
Others	7 (7)	4 (7.7)	3 (6.3)			

Family History						
Yes- Type 1	1 (1)	0(0)	1 (2.1)	2.33	2	0.51
Yes- Type2	25 (25)	14 (26.9)	11 (22.9)			
Don't have	74 (74)	38 (73.1)	36 (75)			
Family-Relationship						
Parent	16 (16)	10 (19.2)	6 (12.5)	3.10	4	0.54
Sibling	5 (5)	3 (5.8)	2 (4.2)			
Grandparents	4 (4)	1 (1.9)	3 (6.3)			
Aunt or Uncle	1 (1)	0 (0)	1 (2.1)			
Don't have	74 (74)	38 (73.1)	36 (75)			
Diagnosed diabetes						
Less than 1 year	40 (40)	22 (42.3)	18 (37.5)	1.90	3	0.59
1 to 5 years	36 (36)	19 (36.5)	17 (35.4)			
5 to 10 years	10 (10)	6 (11.5)	4 (8.3)			
More than 10 years	14 (14)	5 (9.6)	9 (18.8)			

3.4. Health Care Seeking Practices

Health care seeking practices of the participants are presented in table 4. More than half of the participants 36 (69.2%) with poor diabetic management and 31 (64.6%) with good diabetic management did not use traditional medicines. A significant relationship existed between diabetic management and primary healthcare provider as most participants with the highest percentage, (75%) with poor diabetic management and (54.2%) with good diabetic management do not have primary healthcare providers. Half of the participants (55.8%) with poor diabetic management and (47.9%) with good diabetic management received diabetic medications.

Table 4: Diabetic Management and Health Care Seeking Practices

Variables' Name	Numbers (n=100) (%)	Poor Management (%)	Good Management (%)	Chi-square	d.f	p- value
Traditional Medicine Use						
Yes	33 (33)	16 (30.8)	17 (35.4)	0.24	1	0.62
No	67 (67)	36 (69.2)	31 (64.6)			
Primary Healthcare Provider						
Yes	35 (35)	13 (25)	22 (45.8)	4.76	1	0.03
No	65 (65)	39 (75)	26 (54.2)			
Receive Medication of Diabetes						
Yes	52 (52)	29 (55.8)	23 (47.9)	0.62	1	0.43
No	48 (48)	23 (44.2)	25 (52.1)			

3.5. Other Care Practices related with Diabetic Management

 Table 5 represents practices related with diabetic management of the participants. The majority of participants, 46 (88.5%) with poor diabetic management and 44 (91.7%) with good diabetic management said they checked blood sugar before breakfast time. More than half of the participants (59.6%) and (68.8%) with poor diabetic management and good management respectively said they did not check blood sugar two hours after meals. Most 42 (80.8%) of participants with poor diabetic management and participants 40 (83.3%) with good diabetic management said they did not check blood sugar before their bedtime. The majority (82.7%) and (91.7%) of the participants with poor diabetic management and good diabetic management said they never have low blood sugar level which is less than 70 last month. Most 43 (82.7%) of the participants with poor diabetic management and 44 (91.7%) of the participants with good diabetic management said they do not know symptoms of low blood sugar level when it is less than 70. The majority (82.7%) and

(89.6%) of the participants with poor diabetic management and good diabetic management respectively said they do not know how to make normal blood sugar level when blood glucose is less than 70. More than half of the participant (57.7%) with poor diabetic management and (66.7%) of the participants with good diabetic management said they do not have experience with high blood sugar level. Participants (55.8%) with poor diabetic management and (68.8%) with good diabetic management respectively said they do not know how to make normal blood sugar level when blood sugar level is high.

Table 5: Other Care Practices related with Diabetic Management

Variables' Name	Numbers (n=100) (%)	Poor Management (%)	Good Management (%)	Chi-square	d.f	p- value
Check BS Before Breakfast Yes	90 (90)	46 (88.5)	44 (91.7)	0.29	1	0.59
No	10 (10)	6 (11.5)	4 (8.3)			
Check BS 2 hours After Meals Yes	36 (36)	21 (40.4)	15 (31.3)	0.90	1	0.34
No	64 (64)	31 (59.6)	33 (68.8)			
Check BS Before Bedtime Yes	18 (18)	10 (19.2)	8 (16.7)	0.11	1	0.74
No	82 (82)	42 (80.8)	40 (83.3)			
Last Month Blood Sugar Less than 70 Never	87 (87)	43 (82.7)	44 (91.7)	2.06	2	0.36
Once	8 (8)	6 (11.5)	2 (4.2)			
Two and more	5 (5)	3 (5.8)	2 (4.2)			
Symptoms BS when less than 70 Got tired	5 (5)	4 (7.7)	1 (2.1)	3.79	3	0.29
Felt weak or pale	5 (5)	4 (7.7)	1 (2.1)			

Unconscious	3 (3)	1 (1.9)	2 (4.2)			
Don't know	87 (87)	43 (82.7)	44 (91.7)			
How to make Normal when BS Less than 70						
Medication	4 (4)	1 (1.9)	3 (6.3)	5.52	3	0.14
Eating sweet foods	6 (6)	4 (7.7)	2 (4.2)			
Taking soft drinks	4 (4)	4 (7.7)	0 (0)			
Don't know	86 (86)	43 (82.7)	43 (89.6)			
Tell Blood Sugar High						
Yes	38 (38)	22 (42.3)	16 (33.3)	0.85	1	0.36
No	62 (62)	30 (57.7)	32 (66.7)			
How to make Normal when BS High Medication						
	38 (38)	23 (44.2)	15 (31.3)	1.79	1	0.18
Don't know						
	62 (62)	29 (55.8)	33 (68.8)			

3.6. Clinical Symptoms related with Diabetes Management

Clinical Symptoms related with Diabetes Management of the participants is showed in Table 6. Most 40 (76.9%) and 42 (87.5%) of the participants with poor diabetic management and good diabetic management said they don't have eye problems. A significant relationship was found and it showed that majority of participants (69.2%) and (87.5%) with poor diabetic management and good diabetic management respectively said they do not have kidney problems. More than half of participants 37 (71.2%) and 29 (60.4%) with poor diabetic management and good diabetic management said they had numbness. A significant relationship was found between diabetic management and dental problems as the majority of the participants (88.5%) with poor diabetic management and (100%) with good diabetic management said they do not have dental problems. More than half of the

participants 26 (50%) and 26 (54.2%) of the participants with poor diabetic management and good diabetic management respectively said they do not have high blood pressure. The majority 51 (98.1%) of participants with poor diabetic management and 46 (95.8%) of the participants with good diabetic management said they have no symptoms of sexual problems. Most (76.9%) and (95.8%) of participants with poor diabetic management and good diabetic management have no depression by showing that there is a significant relationship existed between diabetic management and depression.

Table 6: Clinical Symptoms related with Diabetes Management

Variables' Name	Numbers (n=100) (%)	Poor Management (%)	Good Management (%)	Chi-square	d.f	p- value
Eye Problems Yes	18 (18)	12 (23.1)	6 (12.5)	1.89	1	0.17
No	82 (82)	40 (76.9)	42 (87.5)			
Kidney Problems Yes	22 (22)	16 (30.8)	6 (12.5)	4.86	1	0.03
No	78 (78)	36 (69.2)	42 (87.5)			
Numbness Yes	66 (66)	37 (71.2)	29 (60.4)	1.28	1	0.26
No	34 (34)	15 (28.8)	19 (39.6)			
Dental Problems Yes	6 (6)	6 (11.5)	0 (0)	5.89	1	0.02
No	94 (94)	46 (88.5)	48 (100)			
High Blood Pressure Yes	48 (48)	26 (50)	22 (45.8)	0.17	1	0.68
No	52 (52)	26 (50)	26 (54.2)			
Sexual Problems Yes	3 (3)	1 (1.9)	2 (4.2)	0.43	1	0.51
No	97 (97)	51 (98.1)	46 (95.8)			
Depression Yes	14 (14)	12 (23.1)	2 (4.2)	7.41	1	0.01
No	86 (86)	40 (76.9)	46 (95.8)			

3.7. Medical Tests of Diseases related with Diabetes Management

Table 7 describes medical tests of diseases related with diabetic management of participants. Majority of participants 49 (94.2%) with poor diabetic management and 45 (93.8%) of the participant with good diabetic management told they had no medical test for dilated eyes last year. Majority of the participants (96.2%) and (95.8%) with poor diabetic management and good diabetic management respectively told they did not have urine test for protein last year. Most participants 47 (90.4%) with poor diabetic management and 46 (95.8%) with good diabetic management said they did not have medical test for their foot according to their willingness to check last year. The highest percentage of the participants (94.2%) and (95.8%) with poor management and good management respectively told that they have no medical test for their foot though their healthcare professional advised them to check up last year. Majority 49 (94.2%) of participants with poor diabetic management and 47 (97.9%) of participants with good diabetic management told they did not have medical test for dental problems last year. The highest percentage of participants 46 (88.5%) and 46 (95.8) with poor diabetic management and good diabetic management said they did not have medical test for blood pressure last year. Majority 50 (96.2%) of participants with poor diabetic management and 48 (100%) of participants with good diabetic management respectively told that they did not have medical test for flu shot last year. Participants (98.1%) with poor diabetic management and (97.9%) with good diabetic management said that they had no medical test for pneumonia shot last year. More than half of the participants (65.4%) and (64.6%) with poor diabetic management and good management told that they are in normal weight range for their body mass index (BMI). Half of the participants 22 (42.3%) with poor diabetic management and 30 (62.5%) with good diabetic management told they are in normal blood pressure range for their systolic blood pressure (SBP). More than half participants 40 (76.9%) and 38 (79.2%) with poor diabetic management and good

diabetic management respectively also said they are in normal blood pressure range for their diastolic blood pressure (DBP).

Table 7: Medical Tests of Diseases related with Diabetes Management

Variables' Name	Numbers (n=100) (%)	Poor Management (%)	Good Management (%)	Chi-square	d.f	p-value
Medical Test for Dilated eyes						
Yes	6 (6)	3 (5.8)	3 (6.3)	0.01	1	0.92
No	94 (94)	49 (94.2)	45 (93.8)			
Urine Test for Protein						
Yes	4 (4)	2 (3.8)	2 (4.2)	0.01	1	0.94
No	96 (96)	50 (96.2)	46 (95.8)			
Medical Test for foot (self)						
Yes	7 (7)	5 (9.6)	2 (4.2)	1.14	1	0.29
No	93 (93)	47 (90.4)	46 (95.8)			
Medical Test for foot (healthcare professional)						
Yes	5 (5)	3 (5.8)	2 (4.2)	0.14	1	0.71
No	95 (95)	49 (94.2)	46 (95.8)			
Medical Test for Dental Problems						
Yes	4 (4)	3 (5.8)	1 (2.1)	0.88	1	0.35
No	96 (96)	49 (94.2)	47 (97.9)			
Medical Test for Blood Pressure						
Yes	8 (8)	6 (11.5)	2 (4.2)	1.84	1	0.18
No	92 (92)	46 (88.5)	46 (95.8)			
Medical Test for Flu shot						
Yes	2 (2)	2 (3.8)	0 (0)	1.88	1	0.17
No	98 (98)	50 (96.2)	48 (100)			
Medical Test for						

Pneumonia Shot						
Yes	2 (2)	1 (1.9)	1 (2.1)	0.003	1	0.95
No	98 (98)	51 (98.1)	47 (97.9)			
BMI						
Under Weight	9 (9)	6 (11.5)	3 (6.3)	1.71	3	0.64
Normal Weight	65 (65)	34 (65.4)	31 (64.6)			
Over Weight	23 (23)	10 (19.2)	13 (27.1)			
Obesity	3 (3)	2 (3.8)	1 (2.1)			
SBP						
Normal Blood Pressure	52 (52)	22 (42.3)	30 (62.5)	5.59	3	0.13
Pre hypertension	29 (29)	20 (38.5)	9 (18.8)			
Stage 1 Hypertension	16 (16)	8 (15.4)	8 (16.7)			
Stage 2 Hypertension	3 (3)	2 (3.8)	1 (2.1)			
DBP						
Normal Blood Pressure	78 (78)	40 (76.9)	38 (79.2)	0.28	2	0.87
Stage 1 Hypertension	19 (19)	10 (19.2)	9 (18.8)			
Stage 2 Hypertension	3 (3)	2 (3.8)	1 (2.1)			

3.8. Diabetic Management and Level of Knowledge

Diabetic management and knowledge distribution of the participants are presented in Figure 1. A significant relationship existed between diabetic management and level of knowledge. The highest percentage of participants (92.5%) with poor diabetic management and (68%) with good diabetic management have poor diabetic knowledge. Few of participants (7.5%) and (25%) with poor diabetic knowledge and good diabetic knowledge respectively have moderate diabetic knowledge. Only (7%) of the participants has good diabetic management have good diabetic knowledge.

Figure 1: Diabetic Management and Level of Knowledge
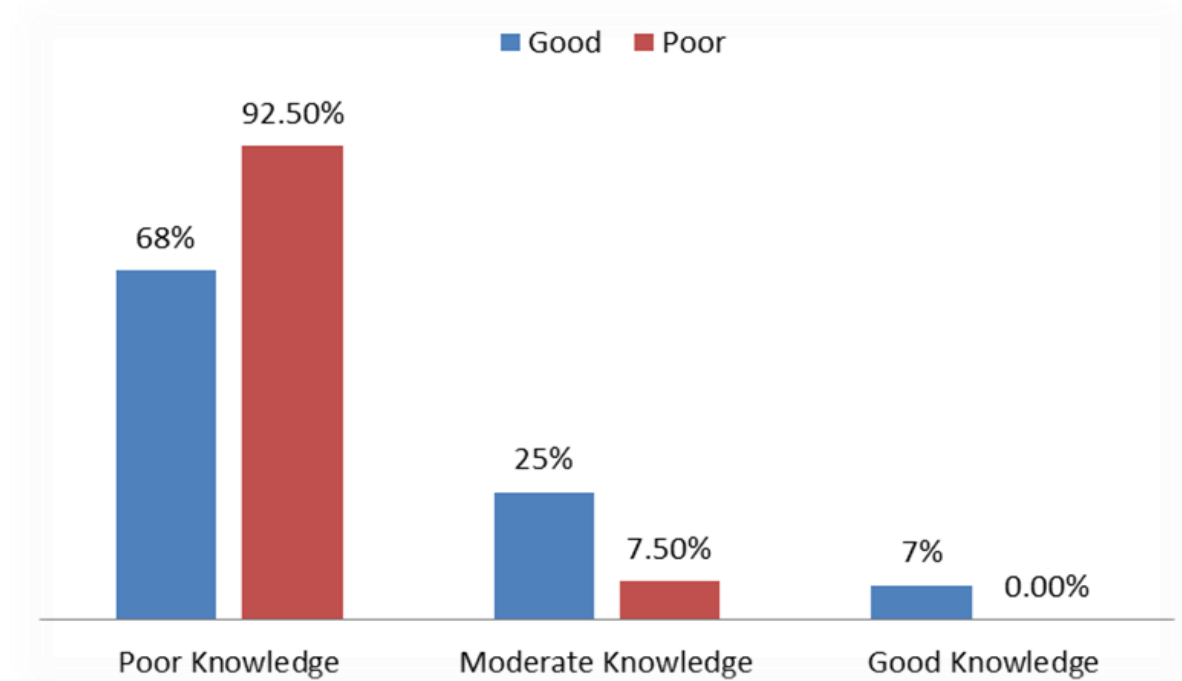
Chi - square= 8.13, P value = 0.02

3.9. Binary Logistic Regression for estimating the odds ratio and 95% confidence interval for diabetic management (poor and good) by the selected factors

Results of the binary logistic regression analysis are showed in Table 8. Prime Healthcare Provider and diabetic management have significant relationship [OR = 2.54, 95% CI = 1.09 – 5.92, P = 0.03] before adjusted regression but after adjusted regression, there is no longer significant association between primary healthcare provider and diabetic management [OR = 0.55, 95% CI = 0.20-1.54, P = 0.25]. A significant relationship was also found between poor diabetic knowledge and diabetic management [OR = 0.07, 95% CI = 0.01 – 0.39, P = 0.00] before adjusted regression however after adjusted regression, there is no longer significant relationship between poor diabetic knowledge and good or bad diabetic management [OR = 3.04, 95% CI =0.75- 12.22, P = 0.12]. Moderate diabetic knowledge and diabetic management also have significant relationship [OR = 0.17, 95% CI = 0.05 –

0.66, P = 0.01] before adjusted regression and there is also significant association after adjusted logistic regression [OR = 17.19, 95% CI = 2.19-135.13, P = 0.01]

Table 8: Binary Logistic Regression for estimating the odds ratio and 95% confidence interval for diabetic management (poor and good) by the selected factors

Independent variables	Sig.	Unadjusted OR	95% C.I	Sig.	Adjusted OR	95% C.I
Gender Male Female	0.74	0.87	0.38-1.98	0.98	1.01	0.38-2.71
Age (years) 26-40 41-60 61 and above	0.20 0.91	0.42 0.96	0.11-1.59 0.41-2.21	0.42 0.21	1.85 2.53	0.41-8.36 0.58-11.17
Monthly Income ($) 0-50 51 and above	0.76	0.86	0.32-2.30	0.42	0.58	0.16-2.15
Diagnosed Diabetes Less than 1 year 1 to 5 years 5 to 10 years More than 10 years	0.22 0.28 0.24	0.46 0.50 0.37	0.13-1.60 0.14-1.78 0.07-1.97	0.28 0.29 0.70	0.55 0.39 0.74	0.19-1.63 0.07-2.20 0.16-3.44
Prime Healthcare Provider Yes No	0.03	2.54	1.09-5.92	0.25	0.55	0.20-1.54
Diabetic knowledge Poor Moderate Good	0.00 0.01	0.07 0.17	0.01-0.39 0.05-0.66	0.12 0.01	3.04 17.19	0.75-12.22 2.19-135.13

4. Discussion

      This study is highlighting that participants who have good level of knowledge about diabetes had good diabetic management. Another study was done on diabetic knowledge, health belief and diabetic management among the Igala, Nigeria, also found that there was a significant relationship existed between level of diabetes knowledge and diabetes management. A study conducted on Knowledge about diabetes and relationship between compliance to the management among the diabetic patients from Rural Area of Sangli District, Maharashtra, India; it showed that knowledge was significantly associated with the compliance to the pharmacological and non-pharmacological management. A study was conducted on diabetes knowledge and glycemic control among patients with type 2 diabetes in Bangladesh; the result showed that weak negative association between diabetes knowledge score and glycemic control.

      With regard to diabetic management, it was favorable to notice that majority of participants (88.5%) with poor diabetic management and (91.7%) with good diabetic management checked their blood glucose before their breakfast time. However, the relationship was not significant. Moreover, more than half of the participants 31 (59.6%) with poor diabetic management and 33 (68.8%) with good diabetic management checked their blood glucose two hours after their meals though there was also no significant relationship. These results disclosed that checking blood sugar level among diabetic patients increased due to the changes of their knowledge level. The patients in this study showed higher rate of glycemic control than those found in the study of Bangladesh.

      Further findings suggested that a majority of the participants were unaware of the symptoms of hypoglycemia and almost one-fourth of the study participants did not know their optimal glycemic control levels. In Delhi, it was found that among diabetic patients, (48%) of the participants were unaware of the symptoms of hypoglycemia while (37%) of the patients lacked

awareness of the lifetime treatment requirement in diabetes. Similarly, in the present study, majority of the participants (82.7%) with poor diabetic management and (91.7%) with good diabetic management were unaware of the symptoms of hypoglycemia although the relationship was not significant. Moreover, in this study, participants (82.7%) with poor diabetic management and (89.6%) with good diabetic management don't know the treatment requirement for hypoglycemia.

Family history of diabetes has a positive impact on diabetes knowledge, which suggests that knowledge is being passed down from the experience of their family. In this study, majority of participants (73.1%) with poor diabetic management and (75%) with good diabetic management said they don't have family history of diabetes and there is no significant relationship. Another study was done on Depression and poor glycemic control: a meta-analytic review of the literature, Diabetes Care in US, and Lustman et al. completed a meta-analysis of 24 studies and found that depression was significantly associated with poor glycemic control in individuals with type 1 and type 2 diabetes. Similarly, the significant was found between depression and diabetic management and in the present study, participants (76.9%) with poor diabetic management and (95.8%) with good diabetic management said they don't have depression.

A study was done on the relationships between knowledge and self-care practices among newly diagnosed type 2 diabetic patients in Bangladesh, it presented that 16%, 13% and 12% of the patients in GAP basic knowledge groups did not smoke. About 80% of respondents with good levels of basic knowledge consumed betel nuts. In the present study, more than half of the participants (57.7%) and (62.5%) with poor diabetic management and good diabetic management respectively said they did not smoke. More than 70 percentage of participants (73.1%) with poor diabetic management and (77.1%) with good diabetic management said they did not consume betel nuts.

Diabetic foot ulcer is one of the chronic complications of DM. Diabetic patients might end up with disability and death if it is not effectively prevented and controlled. A study done in Nigeria presented that 46% were poorly knowledgeable about foot care principles but slightly lower than South Africa which is 75%. In the present study, more than 90 percent of the participants (94.2%) and (95.8%) with poor diabetic management and good diabetic management said they had medical test for their feet.

Participants of the present study were fairly justified about diabetic management and I have found an association between diabetic knowledge and diabetic management. There is affirmation that patient awareness is the most essential way to minimize the complication of diabetes. Women which are one of categories of gender are more likely to have diabetes than men. Moreover, adult and older people who are more than 41 years, one of the categories of ages are mainly impacted by diabetes and income is also one of categories that are objected by diabetes. I assume that this might have been due to their requirement of managing on their diabetes. Additionally, a rural area which is one of the categories of habitat is also affected by diabetes. I assume that this might be due to lack of knowledge, lack of health services such as lack of accessibility and affordability of diabetic drugs, hospitals and clinics and their eating habits.

In this study, several additional suggestions were feasible for the fact that the participants had good diabetic knowledge, but still require having better management for diabetes. One of the important things, participants needs to have more knowledge about glycemic control and symptoms, cause and treatment of hyperglycemia as most of the participants don't know how to manage their diabetes when they have hyperglycemia. Various issues need to be initiated to have good diabetic management in order to diabetic knowledge. The results of this study presented a positive viewpoint; the requirements are to have better diabetic management, participants are necessary to get health

promotion, counseling and perception of the diabetes such as diet, lifestyle changes, glycemic control and the complications of diabetes.

Conclusions

As evidenced by this study, participants who have more diabetic knowledge, following the advice of their healthcare providers and having regular checkup glycemic control have better diabetic management. Strengthening of health education, promotion health awareness regarding disease and stimulating self-care management during treatment will minimize the burden of the diabetic mellitus and reduce the long term complications of disease.

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Appendix-1

Investigator: Su Su Aung (120027)

Hello! I am an Undergraduate 3 student from Asian University for Women (AUW) and I am doing a research study on health. The objective of this research is to assess the relationship between knowledge and practices among diabetic patients in Myanmar. This questionnaire will only take maximum 30 minutes of your time. If you would like to take part, please take a moment to read this information sheet and we would appreciate a response. Please note that this information cannot be connected to you once you have completed the survey. We guarantee that it will not harm you both physically and psychologically

If you have any difficulties and confusion about the questions before and during answering, please feel free to ask me. I also would like to request you to answer the questions honestly. I also guarantee that your personal information will not be leaked into the public. If you have any difficulties to continue answering the questions, you can withdraw from the study at any time and no further consequences will be attached to your withdrawal. To ensure your confidentiality, your participation is absolutely anonymous and your personal details will be safely kept during analyzing data as well as after doing this research. I will also store your personal data in advanced software, SPSS with password. I may use the information of this research again in my future study. . I will also provide you some fruits after participating.

If you agree to participate in the research, I politely request you to sign beneath this consent letter.

Signature   Date

_____   _____/_____/_____

Researcher's name:

_____

Signature   Date

_____   _____/_____/_____

If you have any questions, concerns or complaints about the study at any stage, please contact:

Name, position: Su Su Aung

Address: Aunglan, Magway Division in Myanmar

Telephone number: 09780296847, 09971816050

Email: su.aung@auw.edu.bd

If you have any concern about the way in the study has been designed or conducted and wish to contact someone else at the Asian University for Women, please email the AUW Institutional Review Board (AUWIRB) (AUW Research Ethics Committee) through the following information:

Name, position: Chair of the AUWIRB

Address: 20H501, Asian University for Women, 20A MM Ali Road

Telephone number: +880-31-2854980

Email: irb@auw.edu.bd

Bibliography:

Name: _____

Serial No_____

Gender: _____

Marital Status: _____

If you are interested in our further research, please provide your contact address:

_____

Phone: _____ Email address_____

Q1. Age

☐ 18-25

☐ 26-30

☐ 31-40

☐ 41-50

☐ 51-60

☐ 61-70

☐ 71+

Q2. Monthly Income

☐ Under $10

☐ $10 to $20

☐ $21 to $30

☐ $31 to $40

☐ $41 to $50

☐ $50 or over

Q3. Highest Completed Level of Education

☐ Illiterate

☐ Less than high school

☐ High school

☐ Polytechnic

☐ University

☐ Graduate and above

Q4. Employment Status

☐ Employed

☐ Unemployed

☐ Retired

☐ Student

☐ Homemaker

Q5. Habitat

☐ Urban

☐ Semi-urban

☐ Rural

Q6. Do you use tobacco?

☐ Cigarette

☐ Pipe

☐ Cigar

☐ Chewing

☐ None

Q7. Do you drink alcohol?

☐ per day

☐ per week

☐ Occasionally

☐ No

Q8. This research refers to diabetes, were you aware that there are different types of diabetes?

☐ Yes

☐ No

Q9. Do you have diabetes?

☐ Yes– Type 1

☐ Yes– Type 2

☐ Yes– other/unspecified

☐ No

Q10. Do you personally know anyone who has diabetes?

☐ Yes–Type 1

☐ Yes–Type 2

☐ Yes– other/unspecified

☐ No

Q11. Do you have a family history of diabetes that you are aware of?

☐ Yes– Type 1

☐ Yes– Type 2

☐ Yes– other/unspecified

☐ No

Answer If Yes is selected in Q11

Q12. What relationship are they to you?

☐ Parent

☐ Sibling

☐ Grandparent

☐ Aunt/Uncle

☐ Cousin

Q13. What years were you diagnosed with diabetes?

☐ <1 year

☐ 1-5 years

☐ 5-10 years

☐ >10 years

Health Status:

Q14. Date: _____ Height: _____ Weight: _____Blood Pressure: _____

Q15. Do you use traditional medicine for your diabetes? ☐Yes ☐No Please describe_____

Q16. Do you currently have a primary care healthcare provider? Yes___ No___

Q17. Are you currently receiving medical care for your diabetes? Yes___ No___

Q18. Have you had a Hemoglobin A1c within the last 6 months? Yes___ No___

Q19. Have you had insulin injections within the last 6 months? Yes __No___

Diabetes Knowledge:

Please circle one answer for each line:

Q20. How do you rate your understanding of:	Poor	Fair	Average	Good	Excellent
a. Overall diabetes care	1	2	3	4	5
b. Ways to cope with daily stress	1	2	3	4	5
c. Planning meals to control blood sugar	1	2	3	4	5
d. The role of exercise in diabetes care	1	2	3	4	5
e. Medication you are taking	1	2	3	4	5
f. How to use the results from blood sugar monitoring	1	2	3	4	5
g. The effect of diet, physical activity, and medication on your blood sugar	1	2	3	4	5
h. Signs and symptoms of high blood sugar and low blood sugar	1	2	3	4	5
i. How to prevent and treat high blood sugar	1	2	3	4	5
j. How to prevent and treat low blood sugar	1	2	3	4	5
k. Ways to prevent/reduce long term complications of diabetes	1	2	3	4	5
l. The importance of taking care and protecting your feet	1	2	3	4	5
m. The importance of taking care and protecting your oral health	1	2	3	4	5
n. The importance of taking care and protecting your eye health	1	2	3	4	5
o. Practice of following advices given by diabetes educator	1	2	3	4	5
p. Importance of following fixed time for eating meal	1	2	3	4	5

q. knowledge of high sugar contained foods	1	2	3	4	5

Health Behavior:

Q21. Do you check your blood sugars: ☐ Yes ☐ No

Blood sugar range: _____to_____

Q22. If yes, how often do you check your blood sugar?

  ☐ 1-2 times a day

  ☐ 3-4 times a day

  ☐ 1-3 times a week

Q23. When do you check your blood sugar?

☐ Before breakfast

☐ 2 hours after meals

☐ Before bedtime

Q24. Last week how often did you follow your schedule for checking your blood sugar?

☐ I did not follow the schedule

☐ Most of the time

☐ All of the time

☐ N/A

Q25. In the last month, how often have you had a blood sugar less than 70?

☐ Never

☐ Once

☐ One or more

☐ _____times/week

What are your symptoms? _____

How do you treat your blood sugar? _____

Q26. Can you tell when your blood sugar is too high? ☐Yes ☐No

Q27. What do you do when your sugar is high? _____

Q28. What type of meal plan have you been asked to follow to manage your diabetes?

☐ Small frequent meals

☐ Counting Carbohydrates

☐ The Plate Method

☐ Other (please specify) _____

☐ N/A

Q29. During the past week, how often did you follow your meal plan?

☐ I did not follow the schedule

☐ Most of the time

☐ All of the time

☐ N/A

Q30. Approximately, how many glasses (250ml) of sweetened drinks do you drink per week (such as sports drinks, fizzy drinks, fruit juice, V, etc.)?

☐ None

☐ 1-2

☐ 3-4

☐ 5-6

☐ 7+

Q31. During the past week, how many times did you exercise at least 15 -30 minutes?

☐ I did not exercise at all

☐ 1-2 times a week

☐ 3-4 times a week

☐ 5 days or more

Other Medical Concerns:

Q32. Do you have any of the following?

☐ eye problems

☐ kidney problems

☐ numbness/tingling/loss of feeling in your feet

☐ dental problems

☐ high blood pressure

☐ high cholesterol

☐ sexual problems

☐ depression

☐ other_____

Please list any other medical conditions _____

Q33. Check any of the following tests/procedures you have had in the last 12 months:

☐ Dilated eye exam

☐ urine test for protein

☐ foot exam—self

☐ foot exam—healthcare professional

☐ dental exam

☐ blood pressure

☐ weight

☐ cholesterol

☐ HgbA1c

☐ flu shot

☐ pneumonia shot

Pregnancy and Fertility:

Q34. Are you:

☐ Pre-menopausal

☐ Menopausal

☐ Post-Menopausal

☐ N/A

Q35. Are you pregnant?

☐ Yes

☐ No

Q36. Are you planning on becoming pregnant?

☐ Yes

☐ No

Q37. Have you been pregnant before?

☐ Yes

☐ No

Q38. Do you have any children?

☐ Yes--Ages: _____

☐ No

Q39. Are you aware of the impact of diabetes on pregnancy?

☐ Yes

☐ No

Q40. Are you using birth control?

☐ Yes-please specify_____

☐ No