



Study On Patients' Knowledge And Practice Regarding Diabetes Foot Ulcer At Khulna Division In Bangladesh

Suparna Basak (RN) PhD

Nursing Instructor

Nursing & Midwifery College, Khulna, Bangladesh

ABSTRACT

Background: Diabetes foot ulcers represent the first cause of hospitalization in diabetics and a significant cause of health care costs (more than 20%-40% of health care resources have been reported as related to diabetes-related foot care). According World Health Organization, its' possible encompass all foot complications in the term diabetic foot syndrome (DFS) that has been defined as "ulceration of the foot (distally from the ankle and including the ankle) associated with neuropathy and different grades of ischemia and infection". These foot vascular complications represent a very common precursor event prior of lower extremity amputation among persons with diabetes. Thus, it explains that the foot ulcerations are considered as significantly predictive of morbidity, mortality, and disability in the world as well as in Bangladesh. **Purpose:** To determine the level of patients' knowledge towards diabetes foot ulcer, to identify the factors associated with different level of knowledge and practices of foot ulcer and to examine the relationship between patients' knowledge & practices towards diabetes foot ulcer. **Method:** This study was a non-experimental descriptive type of cross-sectional study. It was used to examine the patients' knowledge and practices regarding diabetes foot ulcer. This study was conducted two public hospitals, one is Khulna medical college hospital and another one is diabetes hospital in Khulna. The target populations of this study were patients' who were admitted in hospital. A total 220 patients employed in surgical ward and dressing room of outpatient department (OPDs) who are directly involve in diabetes wound care management for more than 6 months will be recruit for the study. The participation will be entirely voluntary. Simple random sampling was used for data collection. Data were collected from primary and secondary sources. Primary data were collected from the respondent of the study area. Secondary data were collected from the secondary sources. The data collection tools were divided into three parts. Part one was patients' Demographic Data Form; Part two were patients' Knowledge regarding foot ulcer questionnaire; and Part three were Practice regarding foot ulcer questionnaire. The questionnaires were hand deliver to ensure a higher response rate. The complete questionnaires were collected on the same day within 4 hours of distribution to improve data quality. The investigators were checking all questions for completeness. Data were analyzed by using Statistical Package for the Social Sciences (SPSS) version 21. From the result it was found that poor glycemic control, inappropriate foot care and smoking as important risk factors of diabetic foot ulcer. **Conclusion:** The study revealed that residence, level of education, occupation, number of family members and monthly family expenditure were significantly different between cases and controls. It was that most of the component parts of foot care were significantly associated with development of diabetic foot ulcer. Neither duration of foot examination at home nor presence of any foot complications before diabetes made any significant difference between the two groups for the development of diabetic foot ulcer. Smoking habit, early start of smoking along with increased duration was significantly associated with development of diabetic foot ulcer. Level of HbA_{1c}, measuring indicator for glycaemic status of the respondent in this study, was found significantly varied between the two study groups for the development of diabetic foot ulcer along with other influencing factors like types of diabetic management, regularity of treatment, exercise habit and food habit. Confounders like serum lipoproteins, BMI of the respondent and other diabetic complications were found insignificant except diabetic neuropathy. A physician can play the most vital role by giving proper foot care education to the diabetic individuals about the risk factors and how to prevent them and early diagnosis of the problem along with prompt treatment to decrease the burden. The government should allocate adequate resources and manpower to prevent or minimize the problem before it

becomes out of control. It is not possible to reverse the situation once this foot ulcer has been established, diabetic patients must be careful about the possible risk factors of diabetic foot ulcer.

Key words: *Diabetes foot ulcers, Risk factors, Awareness, Foot care, Early diagnosis, Peripheral neuropathy, Clinical practice, Bad sensation filling*

INTRODUCTION

Diabetes is a disease of metabolism clinically expressed by chronic hyperglycemia and blood lipid and protein disorders that have been extensively reported as linked to several complications that significantly impair the quality of life. Among diabetic vascular complications, foot ulcers represent the first cause of hospitalization in diabetics and a significant cause of health care costs (more than 20%-40% of health care resources have been reported as related to diabetes-related foot care). According World Health Organization, its' possible encompass all foot complications in the term diabetic foot syndrome (DFS) that has been defined as "ulceration of the foot (distally from the ankle and including the ankle) associated with neuropathy and different grades of ischemia and infection" [3]. More than 80000 amputations directly related to diabetes have been registered in the United States annually[4] and the majority (80%) of these has been performed in patients with previous foot ulceration [5]. These foot vascular complications represent a very common precursor event prior of lower extremity amputation among persons with diabetes [6, 7]. Thus it explains that the foot ulcerations are considered as significantly predictive of morbidity, mortality, and disability.

It has been estimated that 15% of patients with diabetes will develop a lower extremity complication in their life [8]. Some authors reported a 0.5% to 3% incidence of diabetic foot ulcers [9], whereas foot ulcer prevalence, as reported by some population surveys, ranges from 2% to 10% [9]. A retrospective cohort study conducted in United States and enrolling more than 8000 patients with type 1 and type 2 diabetes showed that new cases of DFS were 5.8 % over a period of 3 years [10]. More than 15% of patients with DFS experienced a lower limb amputation and some authors reported that survival rate in patients that undertaken a lower limb amputation is significantly shorter and more than \$ 2700 is the cost for a 2-year care of a new-diagnosed foot ulcer. Foot ulcers have a complex and multifactorial pathogenesis with several causes working together to create pathogenetic pathway linked to foot ulceration onset in diabetic patients. Pathogenetic events able to cause diabetic foot ulcers are multifactorial. Among the commonest causes of these pathways, it's possible to consider some triggers such as peripheral neuropathy, foot deformity, abnormal foot pressures, abnormal joint mobility, trauma, peripheral artery disease (PAD).

Peripheral neuropathy represents the most important cause in the pathway that causes foot ulceration in diabetic patients. Diabetic peripheral neuropathy (DPN) significantly impairs nerve activity throughout the body and can affect autonomic, motor, and sensory functions [11]. In sensory involvement the impairment of sensation that protects foot skin integrity makes the foot vulnerable to traumatic damage caused by an excess of pressure, mechanical or thermal injury. As reported by a recent study, sensory neuropathy represents the most frequent event in the pathogenetic axis that causes ulceration in diabetic patients [12]. Other forms of neuropathy may also play a role in foot ulceration. Motor neuropathy impairs the balance of biomechanical forces, alter the integrity of foot anatomy by means foot deformities, impaired joint mobility and compromised loading of the extremities. These pathogenetic events impair mechanical forces balance during walking and induce a reactive thickening of skin (callus) and thus facilitating ischemic necrosis of tissues nearest to callus and leading to loss of skin and subcutaneous tissue integrity (breakdown) and to ulcers that represent the final step of this pathogenetic way.

Also autonomic neuropathy has a role in ulcer pathogenesis causing impairment and texture changes of skin integrity thus predisposing dryness and fissuring and opening potential entry for bacteria. Another disorder that contributes to the development of foot ulcers is peripheral vascular disease that affects the blood vessels of small and large size. Both macro- and microvascular diseases are believed to contribute to the consequences of peripheral vascular disease, resulting in the inability of the ischemic limb to heal itself properly. PAD has an increased incidence and prevalence in subjects with diabetes in relation of age and duration of disease. Hypertension, smoke habit, and lipid blood disorders are frequent comorbidities in diabetes with a well demonstrate role in PAD pathogenesis. Studies have shown that peripheral vascular disease develops at a younger age among patients with diabetes as compared to the general population [13]. Ankle-brachial index (ABI), that originates by comparison of the systolic blood pressure at posterior tibial

or dorsalis pedal level with brachial blood pressure, it's widely used to diagnose and evaluate severity of PAD.

In patients with an ABI < 0.90, the relative risk has been reported to be 1.25 (95%CI: 1.05, 1.47) for developing an ulcer vs diabetic patient with a normal ABI [14]. Lower limb ischemia due to proximal arterial occlusive atherosclerosis is an important cause able to predispose to ulceration in more than 30% of cases[15]. Nevertheless, a recent study reported that diabetic patients with PAD are more likely in comparison to non-diabetic subjects to have a distal occlusive arterial disease and a higher incidence of amputations and death related to cardiovascular causes[13].

Figure 1: Infected diabetic foot ulcer. Tuttolomondo et al [21], personal data.



An ischaemic diabetic foot appears as red, dry and with clinical findings suggestive of peripheral neuropathy and it also is susceptible to pressure damage by footwear. Thus diabetic foot with ulceration is a complex problem resulting of the interplay of multiple pathogeneticnoxae such as neuropathy, peripheral vascular disease, trauma and infections. Neuropathy and ischaemia may represent the first acting factors, most often together as neuroi-schaemia that is peripheral neuropathy and vascular disease in overlapping, whereas infection is mostly a super-infection.It's possible to classify a diabetic foot in a pathophysiological and clinical way in: ischemic diabetic foot, neuropathic ischemic foot and infected diabetic foot, but this type of classification in clinical practice may appear too simple owing to the fact that it's possible to distinguish more frequent mixed clinical variants called neuro-ischemic diabetic foot. All these clinical variants of DFS have typical morphologic and clinical findings.

OBJECTIVES OF THE STUDY

General Objectives:

The general objective of the study is to assess patients' knowledge & their practices towards diabetes foot ulcer and to identify factors which influencing them.

Specific Objectives:

1. To determine the level of patients' knowledge towards diabetes foot ulcer.
2. To identify the factors associated with different level of knowledge and practices of foot ulcer
3. To examine the relationship between patients' knowledge & practices towards diabetes foot ulcer.

METHODOLOGY OF THE STUDY

1. Study design: This study was a non-experimental descriptive type of cross sectional study. It was used to examine the patients' knowledge and practices regarding diabetes foot ulcer.

2. Study area: This study was conduct two public hospital, one is Khulna medical college hospital and another one is diabetes hospital in Khulna.

3. TargetPopulation: The target populations of this study were patients' who were admitted in hospital.

4. Sample size & Sampling: A total 220 patients employed in surgical ward and dressing room of outpatient department (OPDs) who are directly involve in diabetes wound care management for more than 6 month will be recruit for the study. The participation will be entirety voluntary. Simple random sampling was used for data collection.

5. Sources of Data: Data were collected from primary and secondary sources.

6. Sources of primary Data: Primary data were collected from the respondent of the study area.

7. Sources of secondary Data: Secondary data were collected from the secondary sources.

8.Data collection tools/Instruments: The data collection tools were divided into three parts. Part one was patients' Demographic Data Form; Part two were patients' Knowledge regarding foot ulcer questionnaire; and Part three were Practice regarding foot ulcer questionnaire.

Part one: Patients' Demographic Data Form. The Patients' Demographic Data Form was used to collect patient personal information. It consists of seven items: gender, age, religion, and level of education, duration of diabetes foot ulcer of patients, personal experience of diabetes foot ulcer.

Part two & part three: The questionnaire was self-administered on randomly recruited 220 nurses. Permission was achieved from institutional authorities from selected hospital. The questionnaires were hand deliver to ensure a higher response rate. The complete questionnaires were collected on the same day within 4 hours of distribution to improve data quality. The investigators were checking all questions for completeness.

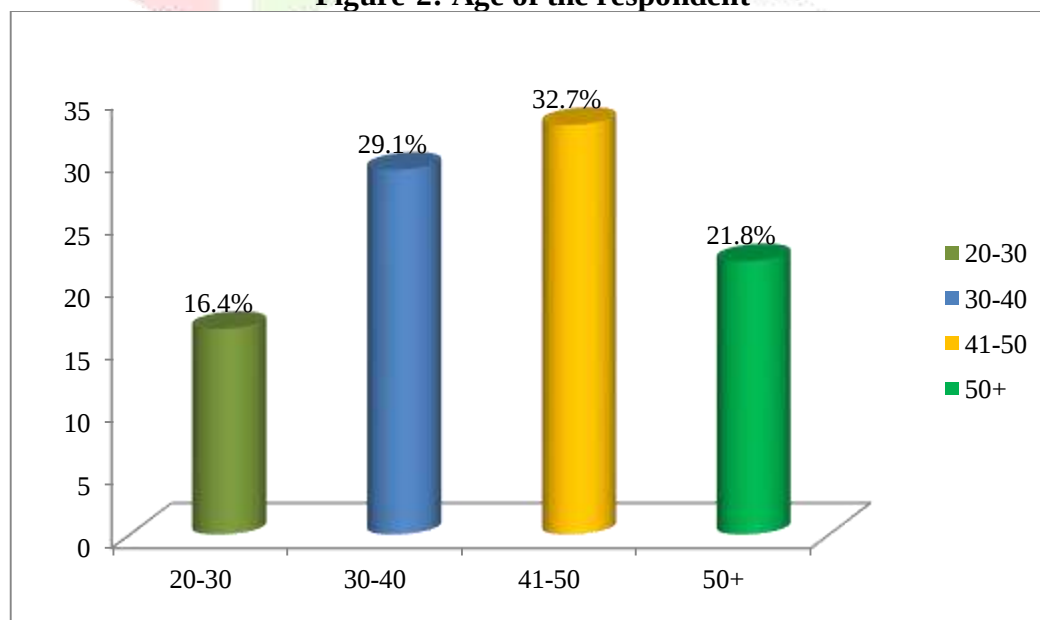
9. Data processing procedures: Data were analyzed by using Statistical Package for the Social Sciences (SPSS) version 21. Frequencies, Percentage, Means, and Standard deviations were used for demographic variables and to describe the scores of the study variables.

10. Inclusion criteria: Patients who have risk factors of diabetic foot syndrome.

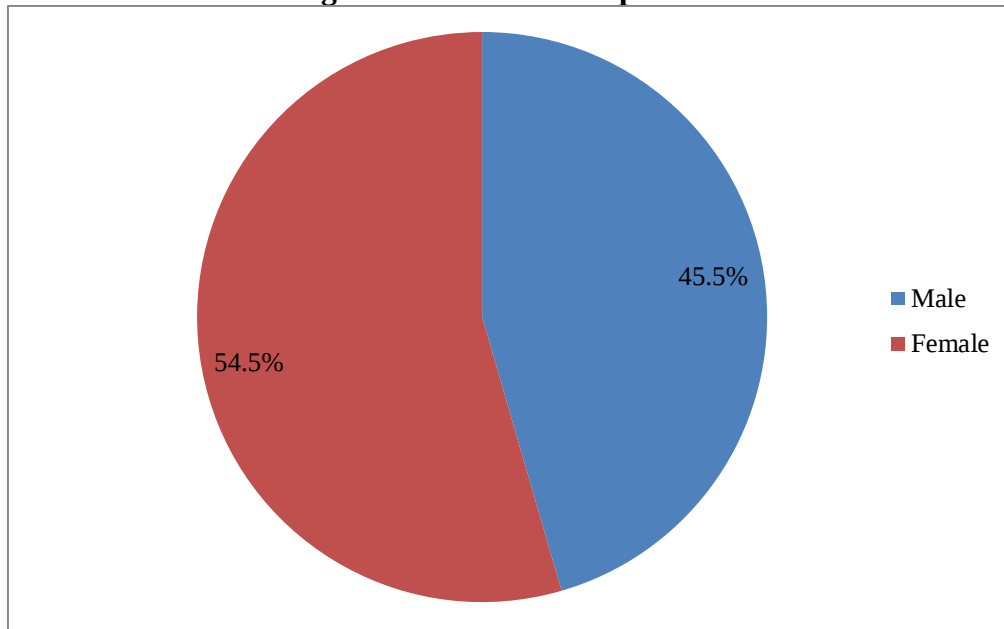
11. Exclusion criteria: Patients who have all risk factors of diabetic except foot syndrome.

RESULT OF THE STUDY

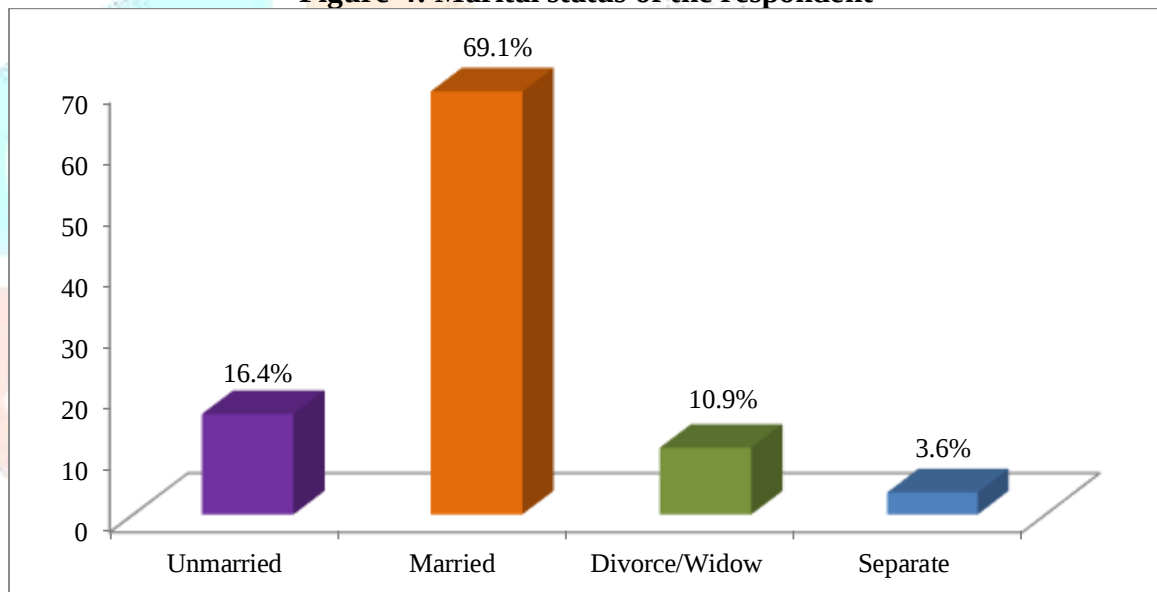
Figure-2: Age of the respondent



In the above figure 2 it was found that 16.4% respondent are 20-30 age, 29.1% respondent 30-40 age, 32.7% respondent are 41-50 and 21.8% respondent are 50+ age.

Figure -3: Sex of the respondent

In the above figure3 it was found that 45.5% respondents are male and 54.5% respondents are Female.

Figure-4: Marital status of the respondent

In the above figure 4 it was found that 16.4% respondent are unmarried, 69.1% respondent Married, 10.9% respondent are Divorce/Widow, 3.6% respondent are separate.

Table-1: Educational Status of the respondent

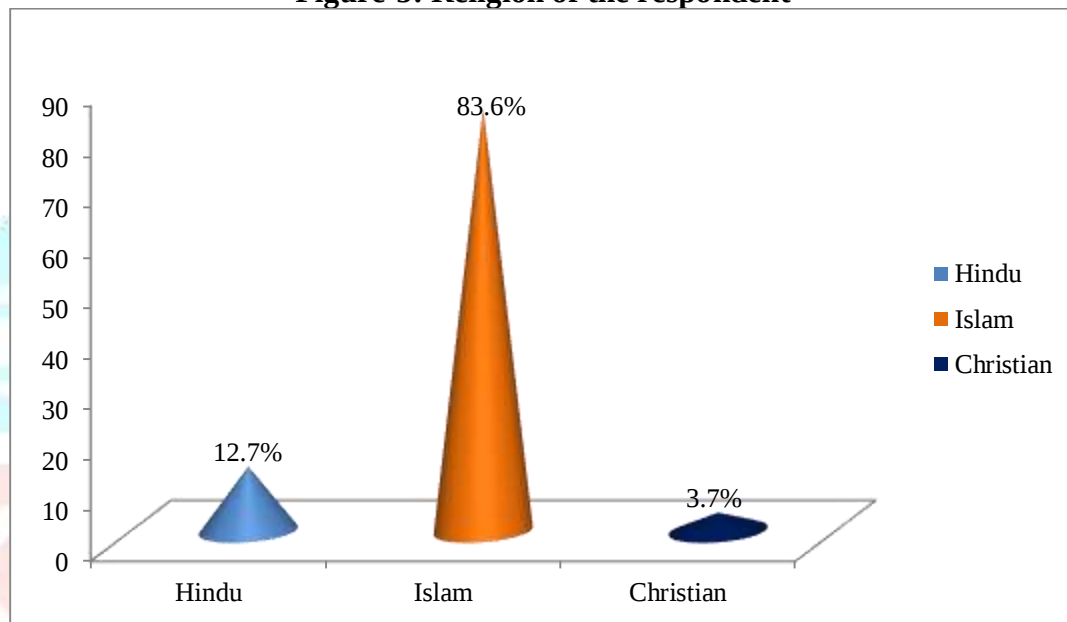
Particular	Frequency	Percentage
1-5 Class	64	29.1
6-10 Class	76	34.5
HSC-Graduate	16	7.3
Higher Degree	64	29.1
Total	220	100

In the table-1 it was found that 29.1% respondent educational status are 1-5 class, 34.5% respondent 6-10, 7.3% respondent are HSC-Graduate, 29.1% respondent are Higher Degree.

Table-2: Occupational Status of the respondent

Particular	Frequency	Percentage
Service Holder	40	18.1
Agriculture	78	35.5
Labour	28	12.7
House wife	40	18.2
Teacher	20	9.1
Others	14	6.4
Total	220	100

In the table-2 it was found that 18.1% respondent occupational status service holder, 35.5% respondent occupation agriculture, 12.7% respondent are labour, 18.2% respondent are house wife, 9.1% respondent occupation teacher, 6.4% respondent occupation is others. Most of the respondent occupation agriculture (35.5%).

Figure-5: Religion of the respondent

In the above figure 5 it was found that 12.7% respondent religion are Hindu, 83.6% respondent religion Islam and 3.7% respondent are Christian, Most of the respondent religion Islam.

Table-3: Monthly Family Income of the respondent

Particular	Frequency	Percentage
500 Tk.	12	5.6
1000 Tk.	8	3.6
2000 Tk.	24	10.9
3000 Tk.	12	5.5
4000 Tk.	8	3.6
4500 Tk.	4	1.8
5000 Tk.	24	10.9
6000 Tk.	8	3.6
7000 Tk.	4	1.8
8000 Tk.	4	1.8
9000 Tk.	4	1.8
10000 Tk.	20	9.1
12000 Tk.	8	3.6
15000 Tk.	16	7.3
16000 Tk.	4	1.8
17000 Tk.	4	1.8
20000 Tk.	36	16.4

Particular	Frequency	Percentage
25000 Tk.	12	5.5
30000 Tk.	4	1.8
60000 Tk.	4	1.8
Total	220	100

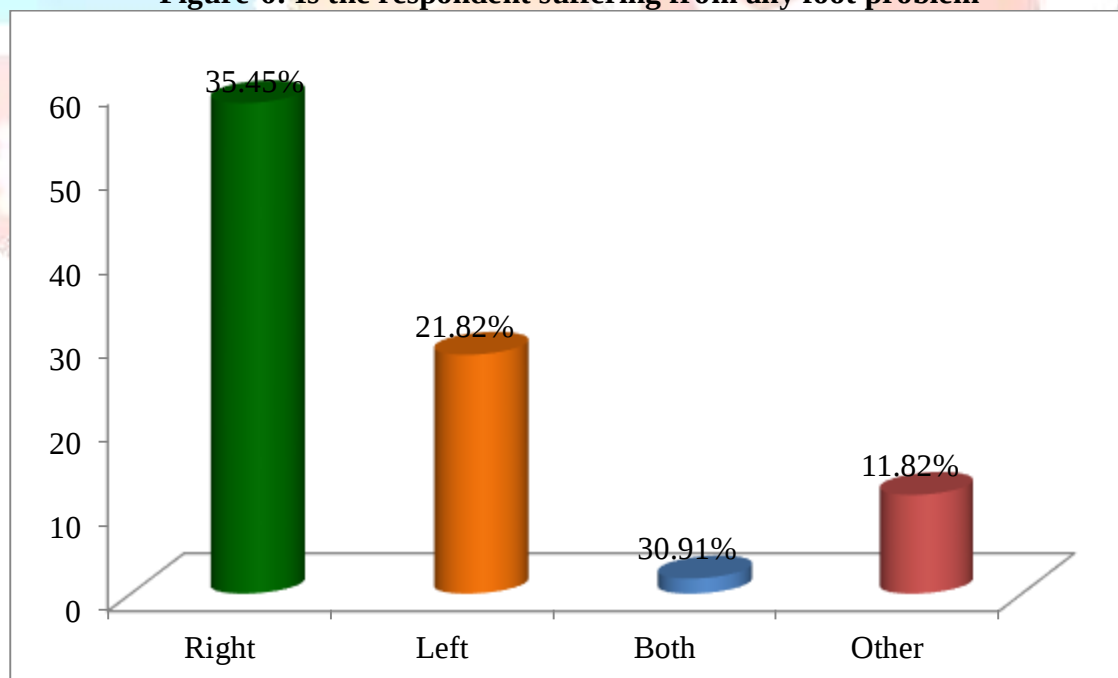
In the table-3 show 5.6% respondent monthly family income 500, 3.6% respondent family income 1000, 10.9% respondent income 2000, 5.5% respondent income 3000, 3.6% respondent income 4000, 1.8% respondent income 4500, 10.9% respondent income 5000, 3.6% respondent income 6000, 1.8% respondent monthly family income 7000, 1.8% respondent monthly income 8000, 1.8% respondent income 9000, 9.1% respondent family income 10000. 3.6% monthly family income 12000, 7.3% respondent family income 15000, 1.8% respondent monthly income 16000, 1.8% respondent income 17000, 16.4% respondent monthly family income 20000, 5.5% respondent income 25000, 1.8% respondent family income 30000 and 1.8% respondent monthly income 60000 taka.

Table-4: How long the respondent suffering from DM

Particular	Frequency	Percentage
0-5	60	27.3
6-10	80	36.3
11-16	44	20
17-25	36	16.4
Total	220	100

Among 60 respondents, 27.3% respondents are 0-5, 36.3% respondents are 6-10, 20% respondent are 11-16 and 16.4% are 17-25 suffering from D M. Most of the respondent suffering from DM 6-10.

Figure-6: Is the respondent suffering from any foot problem

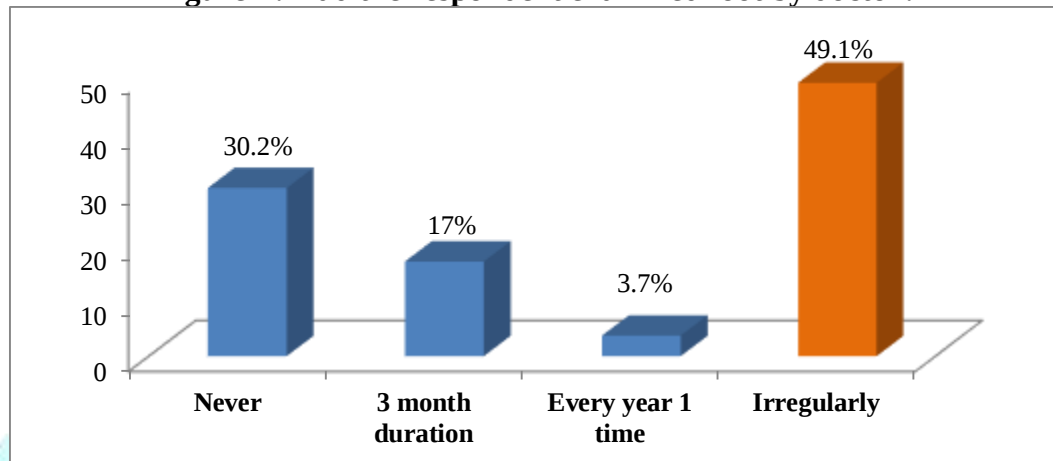


Among 220 respondents, 35.45% respondents are suffering from foot problem in right, 21.82% respondents are left, 30.91% respondent are both and 11.82% are other. Most of the respondent suffering from foot problem in right.

Table5: Any amputation of leg or toes had done for the respondent

Particular	Frequency	Percentage
Amputation	112	54%
Without Amputation	108	46%
Total	220	100

About amputation of leg or toes had done for the respondent 54% respondent are saying amputation and 46% respondent say without amputation. Most of the respondents say amputation (54%).

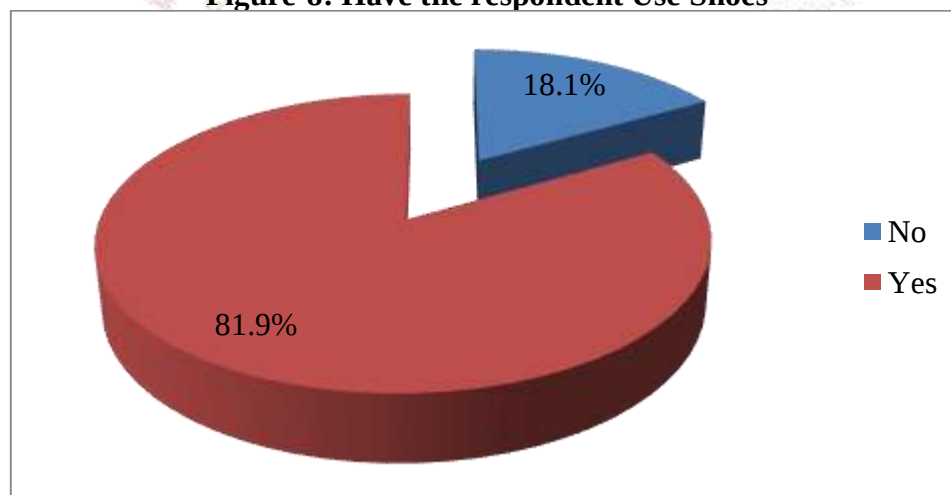
Figure-7: Had the respondent examined foot by doctor?

About examined foot by doctor, 30.2% respondent say never, 17% respondent 3 month duration, 3.7% respondent say every year 1 time and 49.1% respondent are say examined foot by doctor irregularly. So, most of the respondents say irregularly examined foot by doctor (49.1%).

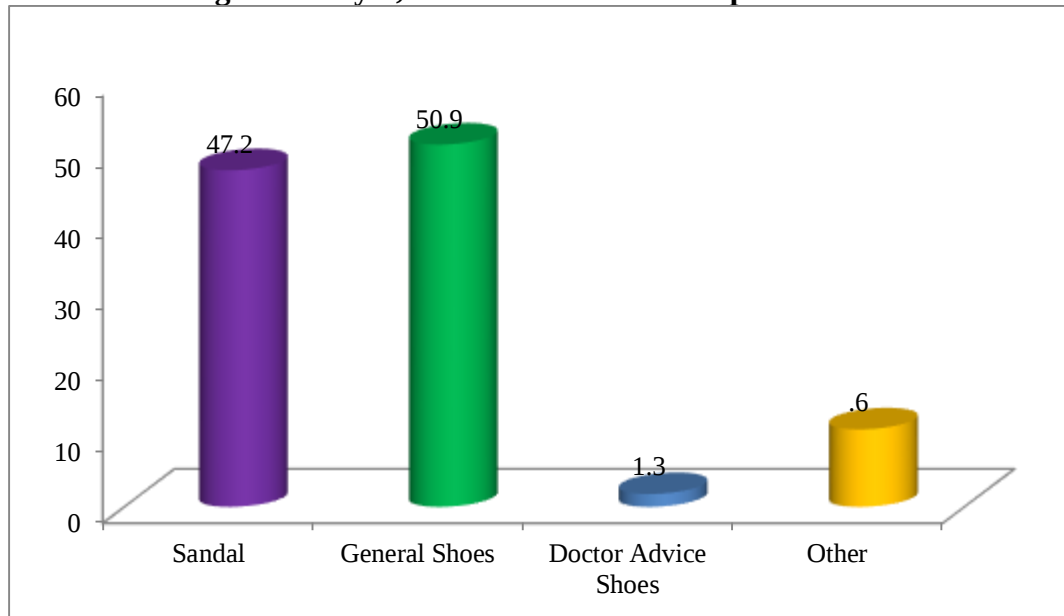
Table-6: Have the respondent had bad sensation filling

Particular	Frequency	Percentage
No	78	29.6
Yes	142	70.4
Total	220	100

Table-6 shows 29.6% respondent had no bad sensation filling, 70.4% respondent are say yes had bad sensation filling. So, it's positive about had bad sensation filling (70.4%).

Figure-8: Have the respondent Use Shoes

In the figure 8 it was found that 18.1% respondents say that they don't use shoes, 81.9% respondent say that they use shoes yes. Most of the respondent use shoes yes (81.9%).

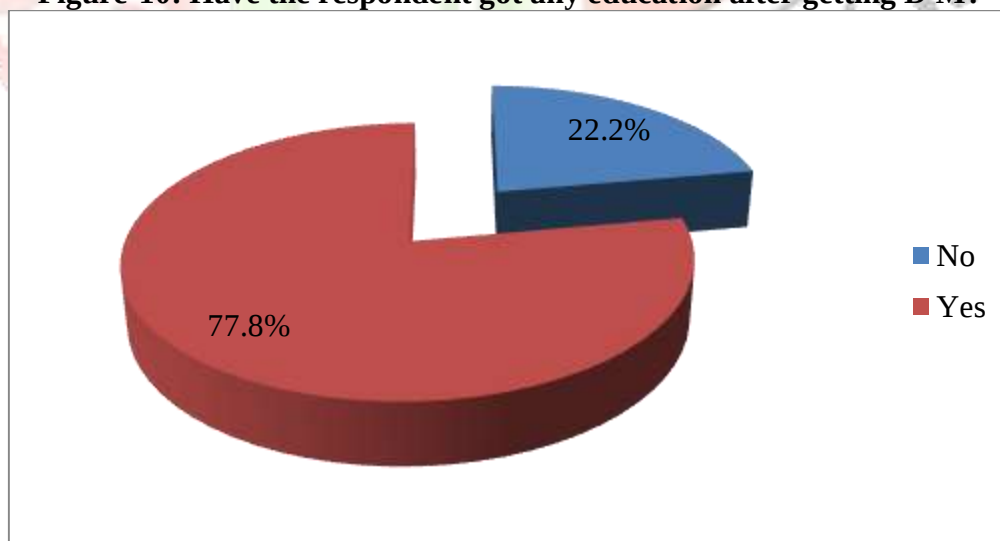
Figure-9: If yes, what kind of sandal respondent use

In the figure 9 it was found that 47.2% respondent use sandal, 50.9% respondent use general shoes, doctor advice shoes use 1.3% respondent, .6% respondent use others shoes. Most of the respondent use general shoes (50.9%).

Table-7: Is the sandal very hard and attached use by respondent

Particular	Frequency	Percentage
No	128	66.7
Yes	92	33.3
Total	220	100

Among 220 respondents of this research, only 33.3% respondent say yes sandal very hard and attached use, 66.7% respondent say no. So, most of the respondent says sandal very hard attached use (66.7%).

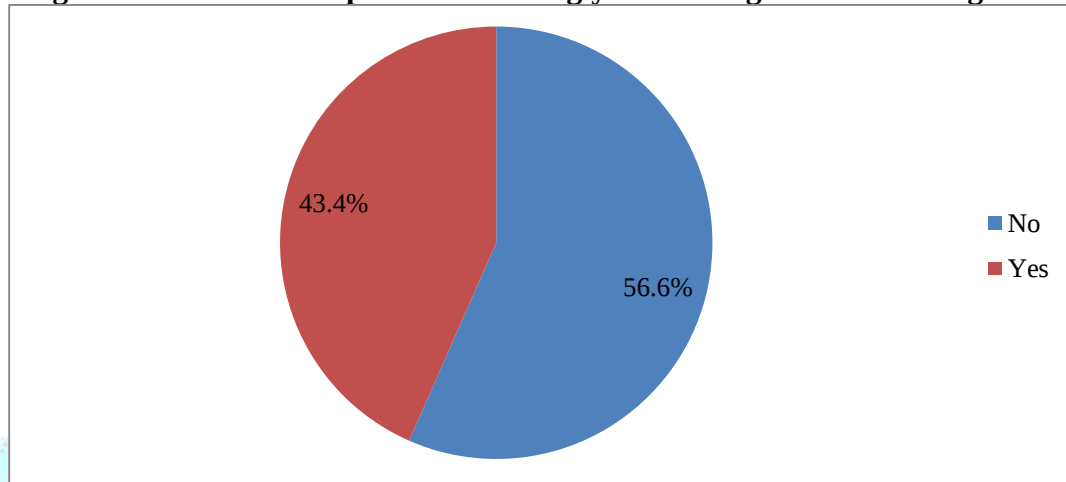
Figure-10: Have the respondent got any education after getting D M?

In the figure10 it was found that 22.2% respondents say no got education after carrying D M, 77.8% respondent says yes got education after carrying D M. Most of the respondent say yes got education after D M (77.8%).

Table-8: Is the respondent use to clean foot with hot water?

Particular	Frequency	Percentage
No	136	61.8
Yes	84	38.2
Total	120	100

Among 220 respondents, 61.8% respondents says that they don't use hot water to clean foot, and 38.2% respondents say yes to use hot water for clean foot.

Figure-11: Have the respondents use to glycerin at night after washing foot?

In the figure 11 it was found that 56.6% respondents say no use glycerin at night after washing foot and 43.4% respondents says yes use glycerin at night after washing foot. Most of the respondent says no use glycerin at night after washing foot (56.6%).

Table-9: Had the respondent use foot heel cracked?

Particular	Frequency	Percentage
No	76	33.3
Yes	144	66.7
Total	220	100

Among 220 respondents, 33.3% respondents say no had foot heel cracked, 66.7% respondent say yes had foot heel cracked. It is clear that, most of the respondent had foot heel cracked (66.7%).

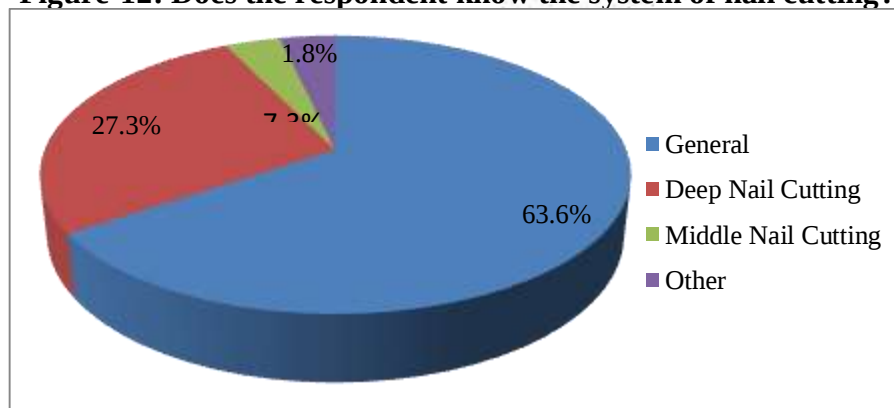
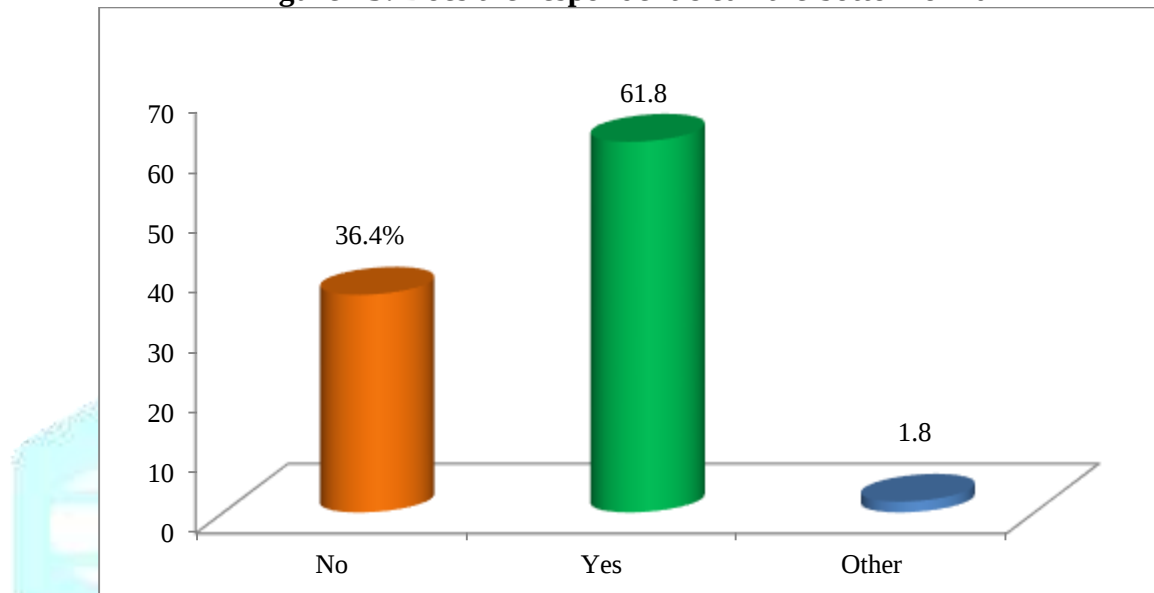
Figure-12: Does the respondent know the system of nail cutting?

Figure 12 represent that among 220 respondents, 63.6% respondents know the general system of nail cutting, 27.3% respondents known deep nail cutting system, 7.3% respondents know the middle nail cutting and 1.8% respondent know other system of nail cutting. It is clear that, most of the respondent know general system of nail cutting (63.6%).

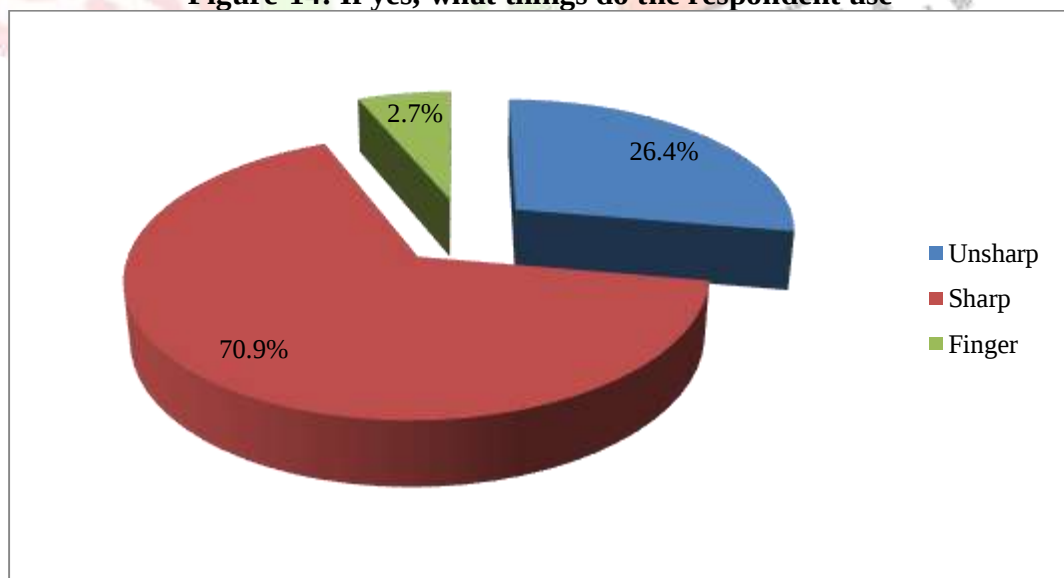
Table-10: Usually when the respondent cuts nail?

Particular	Frequency	Percentage
After bath	116	50.9
Dry nail	103	47.3
Other	1	1.8
Total	220	100

The respondents of 50.9% are usually cuts nail after bath, 47.3% respondents' cuts nail when it is dry, 1.8% respondents cut nail other time. Most of the respondent cuts nail after bath (50.9%).

Figure-13: Does the respondent clean the bottom of nail

The question was “Does the respondent clean the bottom of nail.” The result of the study was following: The respondents of 36.4% say clean the bottom of nail no, 61.8% respondent say yes clean the bottom of nail, 1.8% respondent days other. So, most of the respondents say yes clean the bottom of nail.

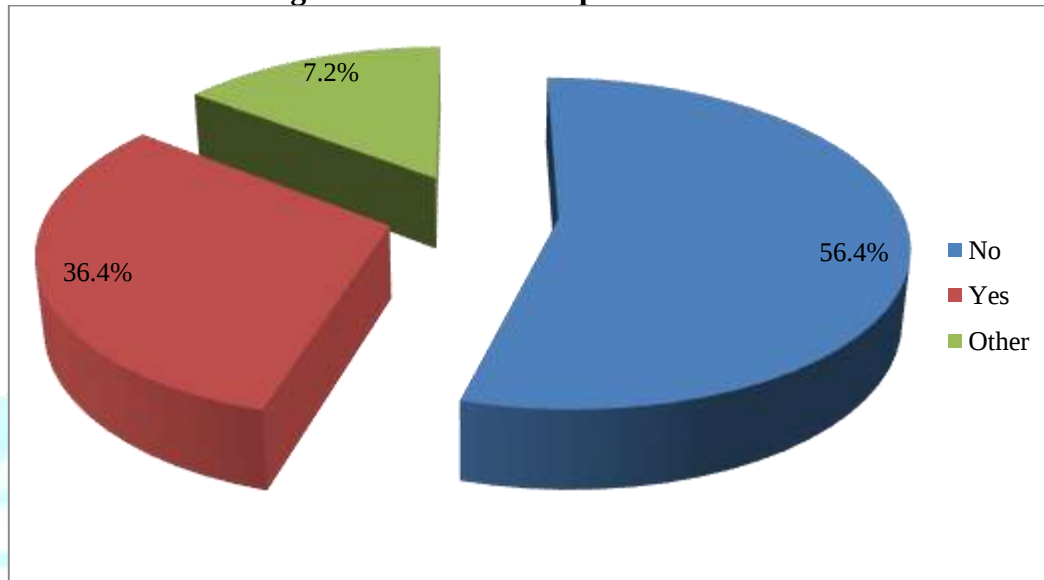
Figure-14: If yes, what things do the respondent use

The respondents of 26.4% are useunsharpforclean the bottom of nail, 70.9% respondent use sharp clean the bottom of nail, 2.7% respondent clean the bottom of nail finger.

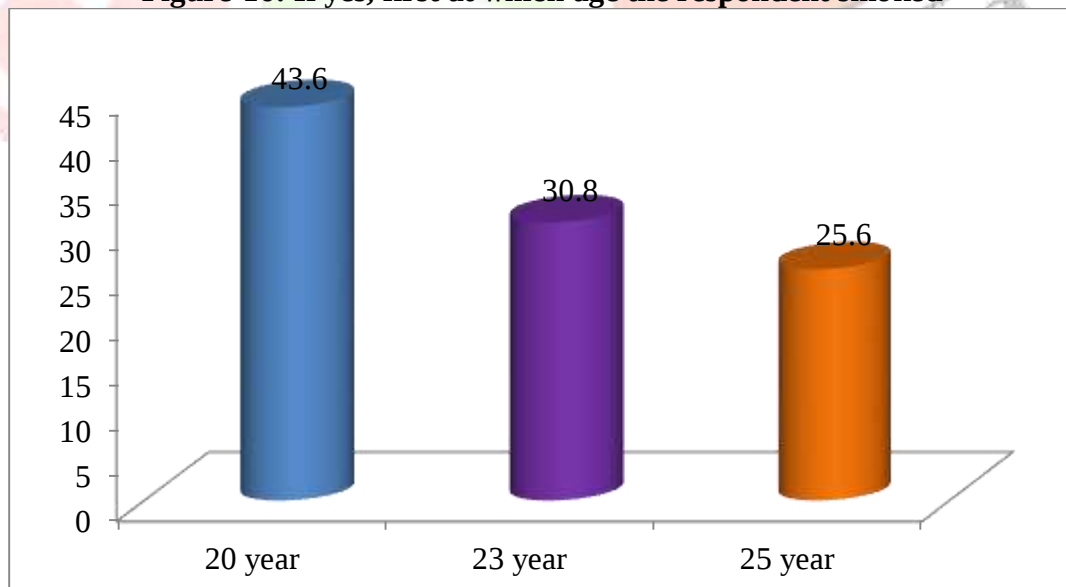
Table-11: Have the respondent trained any education about foot care after getting DM?

Particular	Frequency	Percentage
No	48	21.8
Yes	172	78.2
Total	220	100

Above Table-11 represent that among 220 respondents, 21.8% respondents no trained education about foot care after getting D M, 78.2% respondent trained education about foot care after getting DM. It is clear that, most of the respondent have training education about foot care after getting. (78.2%).

Figure-15: Does the respondent smoke?

From the above figure 15, we can see that the 56.4% respondent no smoke, 36.4% respondent smoke yes, and other 7.2% respondent are female they are does not smoke.

Figure-16: If yes, first at which age the respondent smoked

From the above figure 16 we can see that the 43.6% respondent mainly start smoked from 20 year, 30.8% respondent first smoked age 23 year, 25.6% respondent start smoked 25 year. Most of the respondent first smoked age 20 year (43.6%).

Table-12: Mainly What the respondent smoke?

Particular	Frequency	Percentage
Cigarette	50	22.8
Biri	36	16.3
Tobacco	12	5.4
Other (Female Respondent)	122	55.5
Total	220	100

From the above table 12, we can see that the 22.8% respondent mainly smoke cigarette, 16.3% respondent smoke Biri, 5.4% respondent smoke Tobacco. It is clear that, 55.5% respondent is female they are does not smoke.

Table-13: If the respondent getting any treatment for Diabetes of oral medicine?

Particular	Frequency	Percentage
Without Medicine	48	21.8
Medicine	172	78.2
Total	220	100

From the above table 13, we can see that the 21.8% respondent getting treatment without medicine, 78.2% respondent are say getting treatment for diabetes of oral medicine. Most of the respondents getting treatment medicine (78.2%).

Table-14: If medicine, which type the respondents taking?

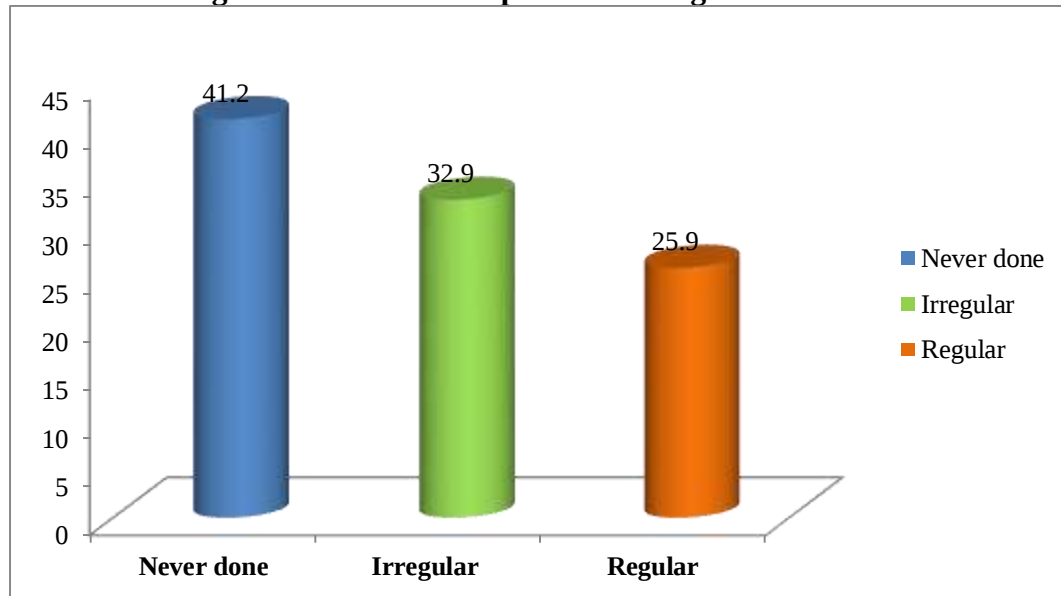
Particular	Frequency	Percentage
Oral medication	36	16.4
Oral medication+Insulin	144	65.4
Insulin	40	18.2
Total	220	100

From the above table 14, we can see that the 16.4% respondent taking oral medication, 65.4% respondent taking oral medication + insulin and 18.2% respondent taking only insulin. Most of the respondents taking oral medication+insulin (65.4%).

Table-15: If Insulin after how many years of getting diabetics?

Particular	Frequency	Percentage
1-5 years	72	32.7
6-10 years	56	25.5
11-15 years	32	14.5
15-20 years	36	16.4
20-25 years	24	10.9
Total	220	100

From the above table 15, we can see that the 32.7% respondents replied that diabetes occur after 1-5 years which was maximum but only 10.9% respondents replied that diabetes occur after 20-25 years which was minimum.

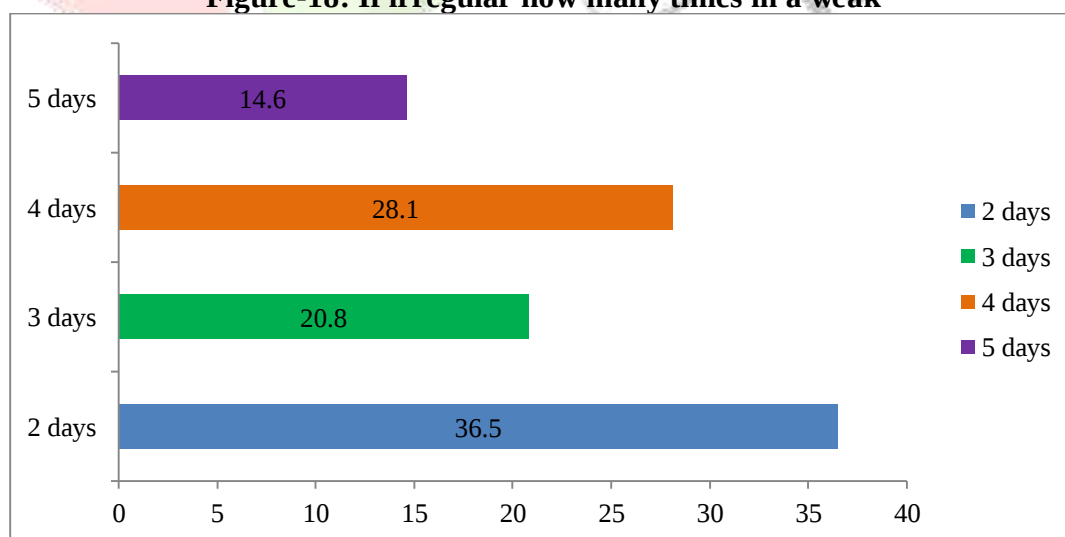
Figure-17: Does the respondent do regular exercise?

From the above figure 17 it was found that 41.2% respondent says never done do regular exercise, 32.9% respondent say irregular exercise and 25.9% respondent do regular exercise. Most of the respondents say never done do regular exercise.

Table-16: Best policy how long the respondent exercise

Particular	Frequency	Percentage
30 M	64	35.6
60 M	68	38.4
90 M	56	15.3
90 M+	32	10.7
Total	220	100

Here about best policy log the respondent exercise 35.6% of respondent say 30 M, 38.4% respondent 60 M, 15.3% respondent say best policy long exercise 90 M and 10.8% respondent are say best policy of log exercise 90 M+. Most of the respondent says 60M is best policy of long exercise.

Figure-18: If irregular how many times in a weak

From the above figure18it was found that 36.5% respondent are exercise irregular 2 days, 20.8% respondent is 3 days, 28.1% respondent is 4 days and 14.6% respondents say 5 days. So, from the above information it is clear that of the respondent is exercise irregular 2 days (36.5%).

Table-17: Does the respondent follow diet list of doctor

Particular	Frequency	Percentage
No	32	14.5
Some times	88	40.0
Always time	100	45.5
Total	220	100

The data in the table 17 described that majority 45.5% of the respondents follow diet list of doctor no, 40% respondent replied some times and 14.5% respondent follow diet list of doctors always time. So, most of the respondent are follow diet list of doctors always (45.5%).

CONCLUSION

This study, albeit small and with a large number of variables, has shown that maintaining good glycemic status along with adequate foot care and non-smoking habit is necessary for a diabetic patient to avoid foot complications of diabetes. The study findings already identified poor glycemic control, inappropriate foot care and smoking as important risk factors of diabetic foot ulcer. In terms of socio-demographic characteristics this study showed that residence, level of education, occupation, number of family members and monthly family expenditure were significantly different between cases and controls. The age and sex matched controls did not differ from cases in respect to religion and marital status. It was found in this study that most of the component parts of foot care were significantly associated with development of diabetic foot ulcer. Neither duration of foot examination at home nor presence of any foot complications before diabetes made any significant difference between the two groups for the development of diabetic foot ulcer. Smoking habit, early start of smoking along with increased duration was significantly associated with development of diabetic foot ulcer. Level of HbA_{1c}, measuring indicator for glycaemic status of the respondent in this study, was found significantly varied between the two study groups for the development of diabetic foot ulcer along with other influencing factors like types of diabetic management, regularity of treatment, exercise habit and food habit. Confounders like serum lipoproteins, BMI of the respondent and other diabetic complications were found insignificant except diabetic neuropathy. Finally, all the hypotheses have already been established through multivariate analysis and addressed the diabetic patients about risk factors of diabetic foot ulcer. As it is not possible to reverse the situation once this foot ulcer has been established, diabetic patients must be careful about the possible risk factors of diabetic foot ulcer.

RECOMMENDATION

Considering the findings of the present study, the following recommendations are given for consideration of the policy makers, preventive medicine specialists, future researchers and diabetic individuals –

1. Careful blood glucose management along with annual examination of the foot by a physician to determine the risk factors of diabetic foot ulcer and subsequent examination of high-risk foot at 3 monthly interval, patient's education about daily self-care of foot and giving up of smoking as early as possible are the key elements to prevent development of this foot ulcer.
2. A prospective study should be ensured as opportunity comes to minimize the limitations arising in this study and to quantify relative risks of possible factors.
3. A physician can play the most vital role by giving proper foot care education to the diabetic individuals about the risk factors and how to prevent them and early diagnosis of the problem along with prompt treatment to decrease the burden.
4. The government should allocate adequate resources and manpower to prevent or minimize the problem before it becomes out of control.

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