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Title of Manuscript: To Study the Awareness About the Complications of Diabetes among patients of Type 2 Diabetes in a Tertiary Health Care Centre.

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ABSTRACT

Objectives: To study the awareness about the disease related complications in the diabetic patients who are, as yet, not suffering from any long-term complication.

Methods: A cross-sectional observational study was conducted involving 389 patients of type 2 diabetes for a period of two years, from March 2018 to March 2020 in a tertiary care centre. The patients having disease diagnosed with in last five years and not suffering from any diabetic related complication were included in the study. The questions pertaining to the knowledge about complications related to eyes, kidneys, nerves, brain and heart were asked and recorded. The data was entered in MS EXCEL spreadsheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 21.0.

Results: The most common complication known was retinopathy (45.48%), followed by nephropathy (38,69%), peripheral neuropathy (33.42); cardiac complications (26.13%) and stroke (37.19%). The factors associated with good knowledge and awareness were advanced age, higher socioeconomic status, male gender and presence of positive family history of diabetes.

Conclusion: There is a wide gap in the knowledge of Diabetes and its related complications among the patients which may prevent them from taking good care about their glycaemic levels. It demands a bidirectional approach by the treating doctor and the patient himself to update the knowledge about the chronic debilitating nature of the disease to better the outcomes of the patients in terms of associated morbidity and mortality.

Keywords: Diabetes, complication. awareness, retinopathy, knowledge.

Introduction

Diabetes mellitus (DM) is being diagnosed at alarming rate throughout the world because of changes in diet, sedentary lifestyle and decreased physical activity. The global diabetes

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prevalence in 2019 was estimated to be 9.3% (463 million people), expected to increase by 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045.[1] Moreover, the one in two (50.1%) people living with diabetes do not know that they have diabetes. Although type 2 diabetes mellitus typically affects individuals older than 40 years but because of the epidemic of obesity and inactivity in children, Type 2 diabetes mellitus is now occurring at considerable younger age group. The cost of diabetes care is at least 3.2 times greater than the average per capita healthcare expenditure, rising to 9.4 times in presence of complications.[1,2]

Progression of diabetes, and especially poor glycemic control, leads to numerous potentially life-threatening complications.[2]All these complications along with the metabolic deterioration demands a large amount of patient's every day energy, planning and thought.[3]

Cardiovascular disease (CVD) is the major source of mortality in patients with type 2 diabetes mellitus. Approximately two thirds of people with diabetes die of heart disease or stroke. Men with diabetes face a 2-fold increased risk for CVD, and women have a 3- to 4-fold increased risk.[3]

Similarly, the diabetic nephropathy is one of the most significant long-term complications in terms of morbidity and mortality for individual patients with diabetes and the leading cause of chronic kidney disease being responsible for 30-40% of all end-stage renal disease (ESRD) cases.[4]

Neuropathy is estimated to be present in 7.5% of patients at the time of diabetes diagnosis. More than half of cases are distal symmetric polyneuropathy. Focal syndromes such as carpal tunnel syndrome (14-30%), radiculopathies/plexopathies, and cranial neuropathies account for the rest. The diabetic retinopathy is having a high prevalence of 28.5% among those with diabetes aged 40 years or older.[5]

Lack of awareness on diabetes complications is one of the main factors responsible for high rates of complications and creating awareness about the disease and its complications is the first step in facilitating prevention and control activities. In addition, adherence to treatment is also directly related to the awareness about nature and complication of the disease.[4-6]

Methods

A cross-sectional observational study was carried out in patients of type 2 diabetes for a period of two years, from March 2018 to March 2020 in a tertiary care centre after obtaining an ethical approval from Institutional Ethics Committee (Reference no: ASCOMS/IEC/RP&T/2017/228). The patients having disease diagnosed with in last five years and not suffering from any diabetic related complication were included in the study. Patients with type 1 diabetes mellitus, patients who were seriously ill and pregnant/lactating women were excluded from the study.

The sample size was calculated based on the study of Ambanna Gowda Durgad, et al[6] which observed that 55% did not know about the complications. Taking this value as reference, the minimum required sample size with 5% margin of error and 5% level of significance is 381 patients. To reduce margin of error, total sample size taken is 398.

After taking the informed consent, all the study subjects were explained about the study. The detailed demographic data regarding age, educational qualifications, socioeconomic status,

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and clinical data pertaining to the time since diabetes was diagnosed, family history of diabetes, were obtained.

The study participants were asked about their knowledge about diabetes complications of various organs which included eyes, kidneys, nerves, brain and heart. The source of information was also obtained from the participants. All data for the study was collected by the consultants and post graduate students sitting in the outpatient department of medicine. The data was entered in MS EXCEL spreadsheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 21.0.

Statistical analysis

Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean ± SD and median. Univariate and multivariate logistic regression was used to find out significant factors affecting knowledge of complications. A p value of <0.05 was considered statistically significant.

Results

The mean age of study subjects was 57± 7.4 years with 207 males (52.01%) and 191 females (47.99%). Regarding the socioeconomic status of the patients, 53.77% were from lower socioeconomic status (Lower class and Lower middle class) and 46.23 % were from middle and upper class. The educational qualifications of the patients showed that 53.27 had received high school or more of formal education whereas 46.73% were not educated (including the school dropouts). Family history of diabetes was present in 33.17% patients. Out of all the subjects included in the study, only 94 (23.63 %) were following the self-care advise regularly. The patients mainly consulted a local doctor in 45.23% cases, followed by qualified physician in 42.21% cases and only 12.56% were taking consultations from a specialized endocrinologist. Table 1 shows the demographic and clinical characteristics of the study population.

About the awareness of complications, the most common complication known to the diabetic patient was retinopathy (45.48%), followed by nephropathy (38,69%), peripheral neuropathy (33.42); cardiac complications (26.13%) and stroke (37.19%). In general patients had some information about the individual complication of the diabetes but in-depth knowledge was lacking. (Figure 1)

Those who were aware of their complications, 193 (48.49%) had received the information from the treating doctor, 89(22.36%) had heard from family member or friend and 116 (29.15%) were not aware about any complication of the disease. (Figure 2)

We assessed the independent variables that were associated with awareness by binary logistic regression.

For the knowledge of Retinopathy (eye complications), univariate logistic regression analysis showed that age, socioeconomic status, level of education, qualification of attending doctor and adherence with self-care practices were significantly associated with the knowledge, but, after adjusting for potential confounders in multivariable logistic analysis only advanced age[(61-70 and 71-80 years, AOR = 2.059(1.11-3.821) and 6.056 (1.472-24.915)] and higher

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socioeconomic status [AOR= 1.639 (0.909-2.954 for middle class and 2.238 (1>022 --4.9 for upper class)] were significantly associated with good knowledge. (Table 2)

For knowledge regarding nephropathy, male gender [AOR=2.35(1.4488-3.71)], socioeconomic status [for middle class AOR =1.447 (0.782-2.677) and for upper class AOR =1.562 (0.711-3.43)] and presence of positive family history [AOR =2.2029 (1.369-3.543)] were significantly associated with good knowledge. (Table 3)

For knowledge of cardiovascular complications, advanced age [71-80 years: AOR =2.043(1.185-3.522)], male gender [AOR =2.043(1.185-3.522)], higher socioeconomic status [AOR =1.079(O.511-2.277) for middle class and AOR =2.146(0.895-5.149 for upper class)] and positive family history [AOR =1.611(0.931-2.787)] were having significant association with presence of knowledge of complications. (Table 4)

For knowledge of peripheral neuropathy, only positive family history [AOR =5.21(3.169-8.566)] was significantly associated with more knowledge. (Table 5)

For cerebrovascular complication, again only positive family history [AOR= 9.33(5.624-15.482)] was a significant factor regarding knowledge. (Table 6)

Discussion

This is one of the first descriptive cross-sectional study conducted to assess the source and knowledge regarding the diabetes-related complications in the region of Jammu. The increasing prevalence of Diabetes imposes the need for increased awareness and knowledge among diabetics about the associated long-term debilitating complications which may serve as a guide for physicians and public health practitioners to deal with the public health problem in a more effective manner.[7]

In our study, the knowledge about diabetes-related complications was highest for the eye (45.48%). The previous study in India has reported a similar level of knowledge of 50% about the eye complications.[8] Compared to the Indian data, other countries such as USA, and Oman reported higher awareness rates of 52% and 75% respectively.[9,10] Studies in Saudi Arabia have reported a much higher level of knowledge about DR ranging from 64% to 88.2%.[11-15]

We found that increasing age (>60 years), upper class status and use of a self-care device was associated with a higher chance of more knowledge about the eye complications. The factors that were associated with increased knowledge as reported in other studies included male gender, diabetic control, regular self-check, adherence to the diabetic medications,[11] urban area residents,[7] higher education,[7,13,14] and duration of diabetes.[16] This suggests that different populations and communities can have different factors that may affect the knowledge attributing to the level of education the resources of a community, the qualification of the physicians, and information they provide.[11] In addition, it must be stressed here that DR is one of the most commonly studied complications with many awareness studies conducted per se for DR.[8-18] and secondly, it is one of the most common causes of blindness, thus making it of a public concern and accounting for a high awareness and knowledge about it among the diabetics.

Among the other complications, the trend in the knowledge was in decreasing order from kidney (38.69%), brain (37.19%), nerves (33.42%) and heart (26.13%). There have been few

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studies who analysed the knowledge about diabetes related complications for various organs. Al Bshabshe A et al,[7] reported a knowledge of 45.6% for renal, 42.9% for cardiac, 41.8% for nerves, 39.7% for brain (stroke), 37.6% for vascular disease and 36.9% for dermatological complications. Abdulaal AE et al,[17] reported knowledge of 63.6% for nephropathy, 45.5% for heart (coronary artery disease), 56.6% for neuropathy, 44.7% for brain (stroke), 31.2% for peripheral artery disease and 36.9% for dermatological complications. Among both these studies also, the highest knowledge was for eye complications as was seen in our study. In contrast, in the study by Saeedi P et al,[6] the percentage of patients unaware of diabetic complications like impotency was 76%, 53.2% stroke, 50% Heart attack, 49% eye disease and 46.8% with kidney disease. In their study, impotency was the commonest complication about which the patients knew and retinopathy was far behind in the list.

Among the various factors that could affect the knowledge of these complications, male gender, family history of diabetes, use of self-care device, education level and advice from an expert as compared to local doctor showed a significantly higher odds risk. Al Bshabshe A et al,[7] also assessed the overall factors affecting the awareness and found that university graduated patients, residents of urban areas, those visiting the hospital regularly had significantly more knowledge about Diabetes and complications. However, gender, age, career, and family members with DM or DM duration were statistically insignificant in their study as opposed to our study.

The knowledge concerning complications of diabetes is vital to confirm that the patients are driven to take caution of their health and commence preventive checks and compliance to the diabetic medications as advised. As seen from our study and various other studies, many factors influence the knowledge and awareness. However, important factors guarding the level of knowledge are the (1) source of information and (2) the treating doctor, since he is the first and the continuous point of contact for a patient during the follow up management. It becomes important for the treating physician to apprise the patients of the concerned complications in an attempt to make them more vigilant about their disease.

In our study, the source of information of the knowledge about diabetes related complications was the treating Doctor/media in 48.49% cases followed by acquaintance in 22.36%. Interestingly in 29.15% cases, there was no particular source of such information. The findings were in line with the studies by Abdulaal AE et al,[17] and Alsaidan AA et al,[11] who report that source of information was treating doctor in 44.9% and 55.1% respectively. Other sources being media, family friends and patient himself without any specifics.

In addition, studies also show that healthcare staff including doctors had wide gaps in their knowledge regarding diabetes[19,20]which was highlighted by less knowledge among the patients. This could be indirectly also associated with the fact that patients seldom visit a specialist like an endocrinologist for their Diabetes; rather they visit a local doctor who are not an expert and carry less knowledge as compared to the expert peers.

The study thus helps suggest a need for upgradation of the knowledge of the treating health staff members for better communication of essential information about diabetes related complications to promote better care among the patients.

The strengths of the study are that the study included a good sample size and investigated awareness of patients for all aspects in detail such as eye, heart, nerves, brain and kidneys.

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However, the study had limitations that it did not assess the overall knowledge about Diabetes. Also, during assessment of knowledge of patients on DM chronic complications, even though the interviewers carried out it carefully, respondents may have replied socially acceptable responses which may cause an overestimation of awareness of study participants.
Based on the study results, we recommend increasing the awareness of patients who had low awareness by certain institutional and government programs. Also, the patients should be motivated for regular follow ups and continuous screening at home as necessary. Future studies are recommended to increase the level of awareness about Diabetes and its complications among the treating physicians and the patients.

Conclusion

There is a wide gap in the knowledge of Diabetes and its related complications among the patients which may prevent them from taking good care about their glycaemic levels. It demands a bidirectional approach by the treating doctor and the patient himself to update the knowledge about the chronic debilitating nature of the disease to better the outcomes of the patients in terms of associated morbidity and mortality.

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Table 1: -Distribution of socio-demographic characteristics of study subjects.

Socio-demographic characteristics	Frequency	Percentage
Age(years)		
41-50	78	19.60%
51-60	162	40.70%
61-70	144	36.18%
71-80	14	3.52%
Mean ± Stdev	57.89 ± 7.4	
Median (IQR)	58(52-64)	
Range	41-78	
Gender		
Female	191	47.99%
Male	207	52.01%
Hypertension		
No	254	63.82%
Yes	144	36.18%
Socioeconomic status		
Lower class	112	28.14%
Lower middle class	102	25.63%
Middle class	134	33.67%
Upper class	50	12.56%
Education		
Educated	212	53.27%
Uneducated	186	46.73%
Family history		
No	266	66.83%
Yes	132	33.17%
Follow of self-care device		
No	161	40.45%
Sometimes	143	35.93%
Yes	94	23.62%
Qualification of doctor		
Endocrinologist	50	12.56%
Local doctor	180	45.23%
Physician MD	168	42.21%

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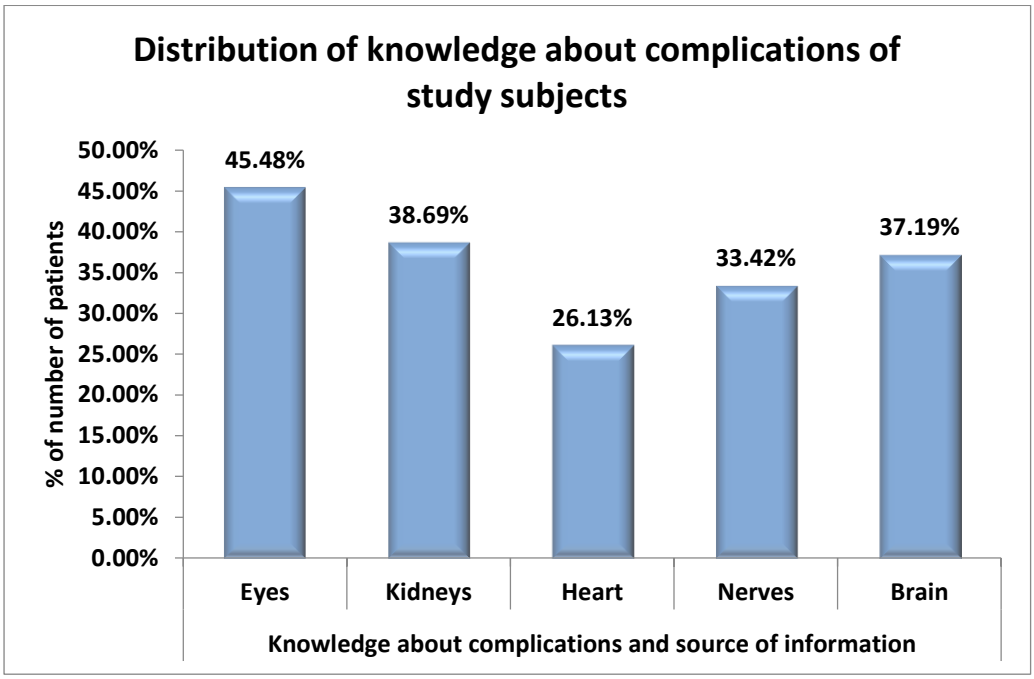

Figure 1: -Distribution of knowledge about complications of study subjects.

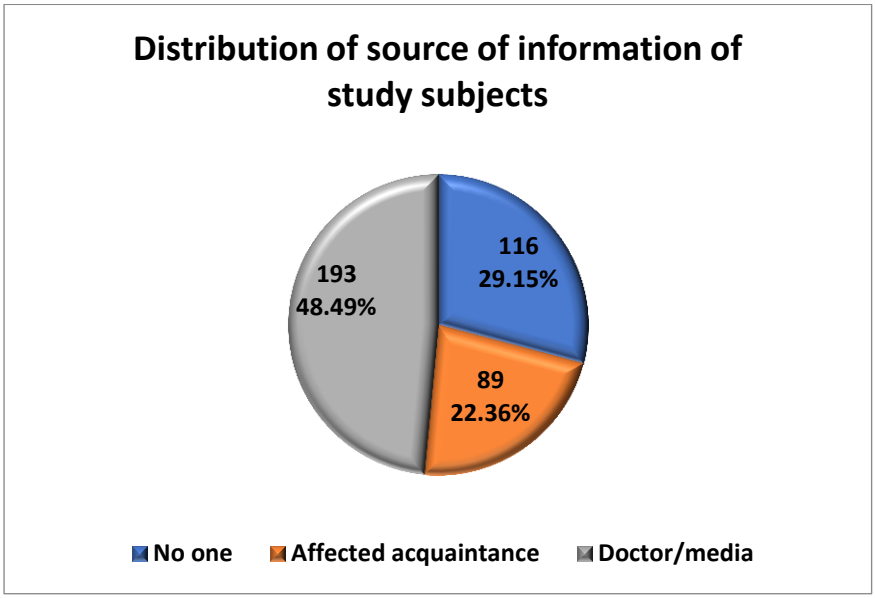

Figure 2: -Distribution of source of information of study subjects.

Table 2: -Univariate and multivariate logistic regression to find out significant factors affecting knowledge of eye complications.

Eyes	No(n=217)	Yes(n=181)	P value	Odds ratio(95% CI)	P value	Adjusted Odds ratio(95% CI)
Age(years)						
41-50	44 (20.28%)	34 (18.78%)		1.000		1.000
51-60	105 (48.39%)	57 (31.49%)	0.210	0.703(0.405-1.22)	0.488	0.806(0.437-1.485)
61-70	65	79	0.113	1.566(0.899-	0.022	2.059(1.11-

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	(29.95%)	(43.65%)		2.727)		3.821)
71-80	3 (1.38%)	11 (6.08%)	0.032	4.238(1.136-15.815)	0.013	6.056(1.472-24.915)
Gender						
Female	112 (51.61%)	79 (43.65%)		1.000		
Male	105 (48.39%)	102 (56.35%)	0.115	1.375(0.925-2.044)		
Socioeconomic status						
Lower class	72 (33.18%)	40 (22.10%)		1.000		1.000
Lower middle class	69 (31.80%)	33 (18.23%)	0.610	0.863(0.49-1.52)	0.817	0.931(0.508-1.707)
Middle class	58 (26.73%)	76 (41.99%)	0.001	2.341(1.398-3.92)	0.100	1.639(0.909-2.954)
Upper class	18 (8.29%)	32 (17.68%)	0.001	3.145(1.571-6.294)	0.044	2.238(1.022-4.9)
Education						
Educated	90 (41.47%)	122 (67.40%)		1.000		1.000
Uneducated	127 (58.53%)	59 (32.60%)	< 0.0001	0.345(0.228-0.52)	0.415	0.789(0.445-1.396)
Follow of self-care device						
Yes	30 (13.82%)	64 (35.36%)		1.000		1.000
No	113 (52.07%)	48 (26.52%)	< 0.0001	0.202(0.117-0.35)	0.001	0.314(0.154-0.639)
Sometimes	74 (34.10%)	69 (38.12%)	0.003	0.441(0.256-0.759)	0.039	0.53(0.29-0.968)
Qualification of doctor						
Endocrinologist	14 (6.45%)	36 (19.89%)		1.000		1.000
Local doctor	121 (55.76%)	59 (32.60%)	< 0.0001	0.195(0.098-0.387)	0.231	0.58(0.238-1.413)
Physician MD	82 (37.79%)	86 (47.51%)	0.012	0.417(0.21-0.826)	0.171	0.594(0.282-1.252)
Family history						
No	157 (72.35%)	109 (60.22%)		1.00		1.000
Yes	60 (27.65%)	72 (39.78%)	0.011	1.724(1.132-2.625)	0.242	1.324(0.828-2.119)
Hypertension						
No	145	109		1.000		

	(66.82%)	(60.22%)				
Yes	72 (33.18%)	72 (39.78%)	0.175	1.329(0.881-2.003)		

Table 3: -Univariate and multivariate logistic regression to find out significant factors affecting knowledge of kidney complications.

Kidneys	No(n=244)	Yes(n=154)	P value	Odds ratio(95% CI)	P value	AdjustedOdds ratio(95% CI)
Age(years)						
41-50	50 (20.49%)	28 (18.18%)		1.000		
51-60	99 (40.57%)	63 (40.91%)	0.667	1.131(0.646-1.979)		
61-70	87 (35.66%)	57 (37.01%)	0.601	1.164(0.658-2.059)		
71-80	8 (3.28%)	6 (3.90%)	0.606	1.355(0.427-4.295)		
Gender						
Female	137 (56.15%)	54 (35.06%)		1.000		1.00
Male	107 (43.85%)	100 (64.94%)	< 0.0001	2.359(1.556-3.576)	0.0002	2.35(1.488-3.71)
Socioeconomic status						
Lower class	78 (31.97%)	34 (22.08%)		1.000		1.00
Lower middle class	73 (29.92%)	29 (18.83%)	0.762	0.913(0.507-1.645)	0.811	0.925(0.487-1.756)
Middle class	70 (28.69%)	64 (41.56%)	0.006	2.082(1.23-3.522)	0.239	1.447(0.782-2.677)
Upper class	23 (9.43%)	27 (17.53%)	0.005	2.663(1.341-5.289)	0.267	1.562(0.711-3.43)
Education						
Educated	105 (43.03%)	107 (69.48%)		1.000		1.00
Uneducated	139 (56.97%)	47 (30.52%)	< 0.0001	0.334(0.218-0.512)	0.681	0.882(0.486-1.601)
Follow of self-care device						
Yes	33 (13.52%)	61 (39.61%)		1.000		1.00
No	125 (51.23%)	36 (23.38%)	< 0.0001	0.158(0.09-0.278)	0.003	0.346(0.17-0.702)
Sometimes	86	57	0.0002	0.362(0.211-	0.020	0.493(0.272-

	(35.25%)	(37.01%)		0.621)		0.894)
Qualification of doctor						
Endocrinologist	16 (6.56%)	34 (22.08%)		1.000		1.00
Local doctor	136 (55.74%)	44 (28.57%)	< 0.0001	0.156(0.079-0.309)	0.050	0.411(0.168-1.001)
Physician MD	92 (37.70%)	76 (49.35%)	0.006	0.396(0.203-0.77)	0.123	0.565(0.273-1.167)
Family history						
No	185 (75.82%)	81 (52.60%)		1.00		1.00
Yes	59 (24.18%)	73 (47.40%)	< 0.0001	2.812(1.827-4.327)	0.001	2.202(1.369-3.543)
Hypertension						
No	155 (63.52%)	99 (64.29%)		1.000		
Yes	89 (36.48%)	55 (35.71%)	0.884	0.969(0.637-1.475)		

Table 4:-Univariate and multivariate logistic regression to find out significant factors affecting knowledge of heart complications.

Heart	No(n=294)	Yes(n=104)	P value	Odds ratio(95% CI)	P value	Adjusted Odds ratio(95% CI)
Age(years)						
41-50	50 (17.01%)	28 (26.92%)		1.000		1
51-60	125 (42.52%)	37 (35.58%)	0.034	0.529(0.294-0.955)	0.189	0.612(0.294-1.274)
61-70	110 (37.41%)	34 (32.69%)	0.053	0.553(0.303-1.009)	0.508	0.78(0.374-1.626)
71-80	9 (3.06%)	5 (4.81%)	0.966	1.026(0.315-3.342)	0.841	1.156(0.281-4.758)
Gender						
Female	155 (52.72%)	36 (34.62%)		1.000		1
Male	139 (47.28%)	68 (65.38%)	0.002	2.092(1.316-3.325)	0.010	2.043(1.185-3.522)
Socioeconomic status						
Lower class	95 (32.31%)	17 (16.35%)		1.000		1

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Lower middle class	85 (28.91%)	17 (16.35%)	0.766	1.117(0.54-2.312)	0.949	0.973(0.42-2.256)
Middle class	90 (30.61%)	44 (42.31%)	0.002	2.683(1.435-5.018)	0.842	1.079(0.511-2.277)
Upper class	24 (8.16%)	26 (25.00%)	< 0.0001	5.903(2.775-12.557)	0.087	2.146(0.895-5.149)
Education						
Educated	121 (41.16%)	91 (87.50%)		1.000		1
Uneducated	173 (58.84%)	13 (12.50%)	< 0.0001	0.103(0.056-0.192)	0.002	0.296(0.139-0.63)
Follow of self-care device						
Yes	40 (13.61%)	54 (51.92%)		1.000		1
No	145 (49.32%)	16 (15.38%)	< 0.0001	0.084(0.044-0.162)	0.005	0.312(0.138-0.708)
Sometimes	109 (37.07%)	34 (32.69%)	< 0.0001	0.234(0.134-0.41)	0.001	0.353(0.187-0.664)
Qualification of doctor						
Endocrinologist	18 (6.12%)	32 (30.77%)		1.000		1
Local doctor	163 (55.44%)	17 (16.35%)	< 0.0001	0.061(0.029-0.13)	0.011	0.28(0.105-0.751)
Physician MD	113 (38.44%)	55 (52.88%)	0.0001	0.278(0.144-0.539)	0.029	0.437(0.208-0.92)
Family history						
No	212 (72.11%)	54 (51.92%)		1		1
Yes	82 (27.89%)	50 (48.08%)	0.0002	2.387(1.505-3.784)	0.088	1.611(0.931-2.787)
Hypertension						
No	181 (61.56%)	73 (70.19%)		1.000		
Yes	113 (38.44%)	31 (29.81%)	0.123	0.685(0.424-1.108)		

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Table 5:-Univariate and multivariate logistic regression to find out significant factors affecting knowledge of nerve complications.

Nerves	No(n=265)	Yes(n=133)	P value	Odds ratio(95% CI)	P value	Adjusted Odds ratio(95% CI)
Age(years)						
41-50	51 (19.25%)	27 (20.30%)		1.000		
51-60	111 (41.89%)	51 (38.35%)	0.619	0.865(0.488-1.532)		
61-70	93 (35.09%)	51 (38.35%)	0.916	1.032(0.579-1.838)		
71-80	10 (3.77%)	4 (3.01%)	0.727	0.803(0.234-2.758)		
Gender						
Female	136 (51.32%)	55 (41.35%)		1.000		
Male	129 (48.68%)	78 (58.65%)	0.063	1.491(0.979-2.27)		
Socioeconomic status						
Lower class	85 (32.08%)	27 (20.30%)		1.000		1
Lower middle class	74 (27.92%)	28 (21.05%)	0.579	1.189(0.645-2.193)	0.238	1.529(0.756-3.096)
Middle class	80 (30.19%)	54 (40.60%)	0.008	2.105(1.211-3.658)	0.240	1.5(0.763-2.95)
Upper class	26 (9.81%)	24 (18.05%)	0.003	2.874(1.423-5.805)	0.260	1.634(0.696-3.835)
Education						
Educated	113 (42.64%)	99 (74.44%)		1.000		1
Uneducated	152 (57.36%)	34 (25.56%)	< 0.0001	0.258(0.163-0.408)	0.105	0.591(0.312-1.117)
Follow of self-care device						
Yes	37 (13.96%)	57 (42.86%)		1.000		1
No	134 (50.57%)	27 (20.30%)	< 0.0001	0.133(0.074-0.239)	0.001	0.292(0.137-0.619)
Sometimes	94 (35.47%)	49 (36.84%)	< 0.0001	0.342(0.199-0.585)	0.021	0.487(0.264-0.898)
Qualification of doctor						

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Endocrinologist	24 (9.06%)	26 (19.55%)		1.000		1
Local doctor	146 (55.09%)	34 (25.56%)	< 0.0001	0.218(0.112-0.425)	0.615	0.788(0.312-1.991)
Physician MD	95 (35.85%)	73 (54.89%)	0.292	0.712(0.378-1.34)	0.703	1.154(0.552-2.412)
Family history						
No	213 (80.38%)	53 (39.85%)		1		1
Yes	52 (19.62%)	80 (60.15%)	< 0.0001	6.119(3.861-9.697)	< 0.0001	5.21(3.169-8.566)
Hypertension						
No	169 (63.77%)	85 (63.91%)		1.000		
Yes	96 (36.23%)	48 (36.09%)	0.987	0.996(0.646-1.537)		

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Table 6: -Univariate and multivariate logistic regression to find out significant factors affecting knowledge of brain complications.

Brain	No(n=250)	Yes(n=148)	P value	Odds ratio(95% CI)	P value	Adjusted Odds ratio(95% CI)
Age(years)						
41-50	50 (20.00%)	28 (18.92%)		1.000		
51-60	111 (44.40%)	51 (34.46%)	0.490	0.818(0.464-1.445)		
61-70	83 (33.20%)	61 (41.22%)	0.358	1.305(0.739-2.303)		
71-80	6 (2.40%)	8 (5.41%)	0.153	2.317(0.731-7.345)		
Gender						
Female	131 (52.40%)	60 (40.54%)		1.000		1
Male	119 (47.60%)	88 (59.46%)	0.023	1.61(1.067-2.429)	0.096	1.518(0.928-2.482)
Socioeconomic status						
Lower class	74 (29.60%)	38 (25.68%)		1.000		
Lower middle class	73 (29.20%)	29 (19.59%)	0.393	0.777(0.435-1.388)		
Middle class	77 (30.80%)	57 (38.51%)	0.172	1.436(0.854-2.414)		
Upper class	26 (10.40%)	24 (16.22%)	0.093	1.789(0.908-3.526)		
Education						
Educated	110 (44.00%)	102 (68.92%)		1.000		1
Uneducated	140 (56.00%)	46 (31.08%)	< 0.0001	0.357(0.233-0.547)	0.274	0.711(0.385-1.311)
Follow of self-care device						
Yes	39 (15.60%)	55 (37.16%)		1.000		1
No	126 (50.40%)	35 (23.65%)	< 0.0001	0.2(0.115-0.348)	0.019	0.397(0.183-0.86)
Sometimes	85 (34.00%)	58 (39.19%)	0.008	0.487(0.287-0.826)	0.286	0.705(0.371-1.34)
Qualification of doctor						
Endocrinologist	23 (9.20%)	27		1.000		1

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		(18.24%)				
Local doctor	134 (53.60%)	46 (31.08%)	0.0002	0.295(0.154-0.565)	0.511	0.73(0.285-1.869)
Physician MD	93 (37.20%)	75 (50.68%)	0.251	0.69(0.366-1.301)	0.918	0.961(0.449-2.056)
Family history						
No	214 (85.60%)	52 (35.14%)		1		1
Yes	36 (14.40%)	96 (64.86%)	< 0.0001	10.802(6.635-17.587)	< 0.0001	9.331(5.624-15.482)
Hypertension						
No	166 (66.40%)	88 (59.46%)		1.000		
Yes	84 (33.60%)	60 (40.54%)	0.165	1.347(0.885-2.05)		