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Prevalence of Diabetes Mellitus among Rural Population ;Medicine Adherence and Perceptions about Disease among Diabetic Persons in a Selected Rural Community, South 24 parganas, West Bengal

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Abstract
Background:*Diabetes Mellitus is fast becoming a disease of increasing concern with its prevalence being described as a global epidemic. It was reported in 2013 by the International Diabetes Federation that the current number of people diagnosed with diabetes was 371 million with this estimated to rise to 500 million by the year 2030.*
Materials and methods
A non experimental cross sectional descriptive study was conducted. In this study 3200 population of two villages were surveyed and 160 diagnosed diabetic persons were identified through checking of prescription, medicines. Treatment adherence and perception of diabetes mellitus were assessed from 120 diabetic persons only as there was 25 % non response rate due to unavailability of the sample.

Results*: Prevalence of diagnosed diabetes mellitus among the rural population was 5%; 62.5 % diabetic persons used to take medicines regularly; 35 % diabetic persons stop medicines when symptoms under control; 23.3 % diabetic persons faced difficulty in remembering to take medicines sometimes to all the time.*
Diabetic persons didn't have good perception of susceptibility and severity of worsening of diabetes; very less no of participants perceived diabetes can cause too many complications & severe health problems. In the area of perception of barriers and benefits, more no of participants perceived regular changing habit to manage diabetes as barriers and sticking to diabetes medication regularly to control diabetes as benefits. Adherence to treatment was statistically found to be correlated with perception of the disease and age of the participants.
Keywords:*Prevalence , Perception of Diabetes, treatment adherence*

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I. Introduction

Diabetes mellitus is a major public health problem and the most common metabolic disorder in the World which affects all age groups. According to IDF 425 million people in the world live with diabetes as of 2017. In most countries the number of individuals with diabetes is steadily increasing[1].

In 2019, Approximately 463 million adults (20-79 years) were living with diabetes; by 2045 this will rise to 700 million. The proportion of people with type 2 diabetes is increasing in most countries. 79% of adults with diabetes were living in low- and middle income countries. China has the largest number of people with diabetes in the World (114.4 million), followed by India with 72.9 million. The greatest number of people with diabetes were between 40 and 59 years of age. 1 in 2 (232 million) people with diabetes were undiagnosed[2.]

In India the prevalence rate of diabetes have increased dramatically since the time the first National survey was undertaken, in 1971. At that time the prevalence was 2.3% in the urban areas and 1.2% in rural areas. The most recent studies suggest prevalence rate 15-20% in urban areas and about half of that in rural areas[3]

In the last 20 yrs there has been a threefold increase in the prevalence of diabetes& today it is estimated that there are over 20 million diabetic patients in India. India's diabetes population now ranks first in the world[4].

Prevalence in rural Bengal is in between 3.5%-5.7%.Three district of west Bengal have high prevalence of Diabetes –Howrah(13.2%),Kolkata(12%),& Burdwan (8.7%).Prevalence is comparatively low in purulia (2.7%), Bankura(3%), Dinajpur east(3.6%) & west(3.5%)[5].

II. Material and Methods

A non experimental study was carried out among the 3200 rural population of randomly selected two villages out of seven villages of RadhanagarSubcentre of south 24th parganas, West Bengal from November 2018 to February 2019. A total 3200 adult subjects (both male and females) of aged ≥ 18, years were for in this study initially.

Study Design: Cross sectional descriptive community based study.

Study Location: This was a community based study done in Villages of Radhanagar subcenter of South 24parganas, West Bengal

Study Duration: November 2018 to February 2019

Sample size: Total 3200 community people were surveyed to identify the prevalence of diagnosed diabetic persons. Among them 160 diabetic persons were identified by total enumeration technique, but 120 diabetic persons were taken as sample to identify medication adherence & disease perception

Sample size calculation: Considering prevalence rate of diabetes mellitus as 08 % from the study conducted by Tripathy et.al[6], 95% desired level of confidence and 5% the acceptable margin of error, the calculated sample size was 114. Ultimately 120 diabetic persons were selected as sample.

Subjects & selection method: Two villages contained 1200 and 2000 population were selected randomly out of seven villages under Radhanagarsubcentre. Total 160 samples were identified as diabetic persons through door to door visit. But due to unavailability, 120 samples were selected through convenient sampling technique.

Inclusion criteria:

1. People who were diagnosed as diabetes
2. Aged ≥ 18 years,
3. People who were willing to participate in the study
4. People who were available during the study

Exclusion criteria:

1. People those were not interested in the study
2. People who were seriously ill

Procedure methodology

Institutional Ethical committee permission was sought.Administrative permission was taken from Block medical officer of health. Anonymity and confidentiality were maintained.

After written informed consent was obtained, one record analysis proforma and two well-designed interview schedules were used to collect the data of the recruited persons retrospectively. The interview schedules included socio-demographic characteristics such as age, gender, education, occupation etc; illness variables like type of diabetes,frequency of checking fasting blood sugar, PPBS, glycosylated hemoglobin, medicine adherence and perception of diabetes mellitus.

Tools were tested for face validity & content validity by seven experts. CVI was 0.96. Reliability was established by test retest method .Pearson product moment was calculated for scoring question in each part of the tool and ranged from 0.70 – 0.82 and Cohen's kappa was calculated for discrete data and ranged from 0.9 – 1. The tool was translated to Bengali and re translated to English by language experts. Hence the tool was found valid and reliable for the purposes of the study.

Statistical analysis

Data were analyzed using SPSS version 23. Frequency distribution was used to identify the prevalence of diagnosed diabetes mellitus and different illness variables. Mean and SD, frequency percentages were calculated in the different areas of perception about the diabetes mellitus & medicine adherence. In addition, Pearson r wascalculated to see the relationship of perception & selected variables.

III. Result

It was found that 5% population of the selected rural community were diagnosed as diabetic persons. The data presented in the table no 1 shows that 24.2% of the participants belonged to the age group of 40-45 yrs, and 2.4% of the participants were above 75 years; 57.5% participants were male and 42.5% participants were

female. All the participants were Hindu; 73.3% participants were married & 1.7% were divorced. The data also shows that 47.5% of the participants were home maker and rest of the participants were engaged in some type of income generating occupation for their livelihood. The data further reveals that 30% participants had per month family income Rs 2700/- and above; 20% of the participants had per capita per month income within Rs 2200/-Rs 2700/-.

The data presented in figure no1shows that 19.17% were illiterate, and only 17.5 % participants completed their education graduation and above

Table no 1 Frequency & Percentage distribution of Participants according to their Personal Characteristics

N=120

Sl no.	Sample Characteristics	Frequency	Percentage (%)
1.	**Age(yrs)**		
	• Below 40 yrs	15	12.5
	• 40-45	29	24.2
	• 46-51	16	13.3
	• 52-57	19	15.8
	• 58-63	10	08.3
	• 64-69	14	11.7
	• 70-75	14	11.8
	• Above 75	3	02.4
2.	**Sex**		
	• Male	69	57.5
	• Female	51	42.5
3.	**Religion**		
	• Hindu	120	100
4.	**Marital status**		
	• Married	88	73.3
	• Unmarried	16	13.3
	• Widow/Widower	14	11.7
	• Divorce	2	01.7
5.	**Occupation**		
	• Homemaker	57	47.5
	• Govt.Employee	3	02.5
	• Private employee	7	05.8
	• Business	14	11.7
	• Daily labour	21	17.5
	• Others	18	15.0
6.	**Per capita family Income per month (Rs)**		
	• Rs1000-Rs 1500	32	26.7
	• Rs 1600-2100	28	23.3
	• Rs2200-Rs2700	24	20
	• above Rs 2700	36	30

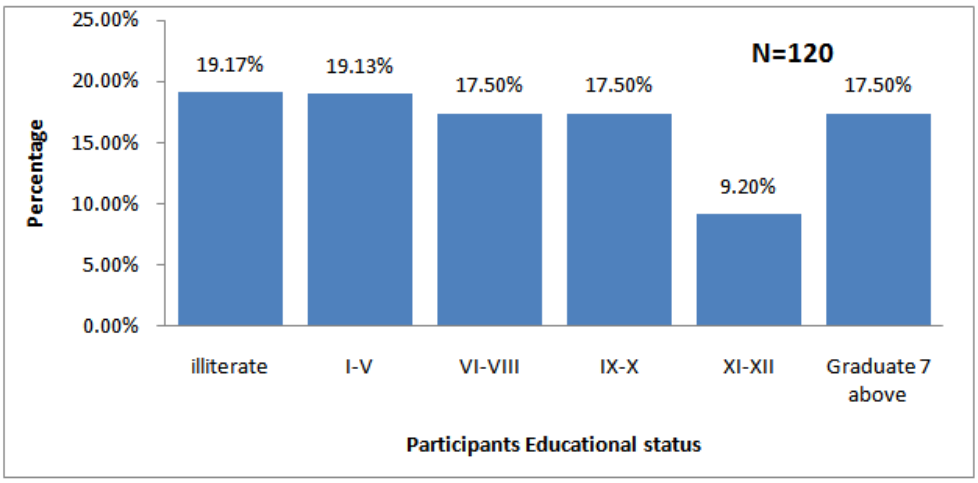


Figure 1 Percentagedistributions of participants in term of their Educational status

The data presented in the table no 2 shows that 97.5% of the participants were suffering from type II Diabetes mellitus and 2.5 % were suffering with Type I Diabetes mellitus. The data also reveals that 64% participants used to take oral hypoglycemic agent & 12. 5% participants were taking insulin; 10% participants were adopting regular exercise; 20 % participants followed dietary modification The data further highlights that 48.3% participants had hypertension; 2.5 % participants had asthma, 5.8 % participants had cardiac problems; 16.6 % participants had musculoskeletal problems; 8.33 % participants were suffering from kidney disease and 20.8% participants were having some other type of co morbid conditions.

The data presented in figure no 2 shows that 43% participants were suffering from Diabetes for 1-2 yrs and less participants i.e only 9 % participants were suffering from Diabetes more than 10 years.

Table no 2 Frequency & percentage distribution of participants according to their illness profile

N=120

Sl no	Sample characteristics	Frequency	Percentage (%)
1.	Type of Diabetes		
	• Type I	3	02.5
	• Type II	117	97.5
2.	Treatment Option		
	• Oral Hypoglycemic agent	77	64
	• Insulin	15	12.5
	• Dietary modification	24	20
	• Exercise	12	10
	• Others	18	15
3.	RISK FACTOR		
	• Habit of smoking	40	33.3
	• Habit of alcohol	21	17.5
4.	HISTORYOF CHRONIC DISEASE		
	• Hypertension	58	48.3
	• Asthma	3	02.5
	• Cardiac Disease	7	05.8
	• Musculoskeletal Disease	20	16.6
	• Kidney Disease	10	08.3
	• Others	25	20.8

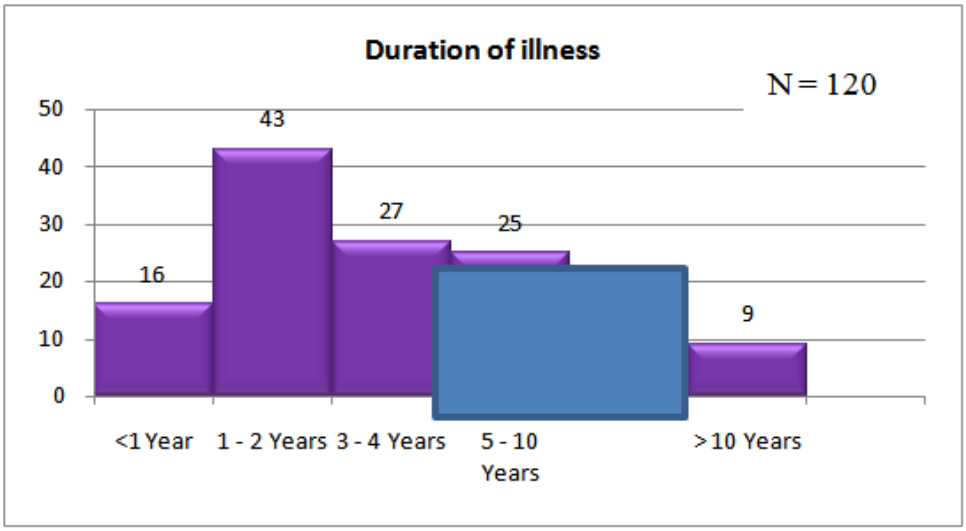


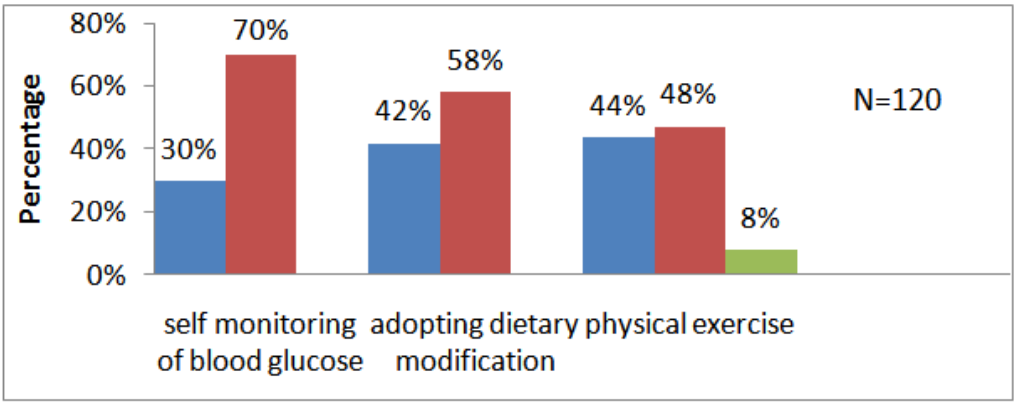
Figure no2 Distribution of participants according to Duration of illness

Table no 3 shows that that 62% of the participants checked fasting blood sugar(FBS) in last 6 months & 51% participants checked Post prandial blood sugar (PPBS) in last 6 months. Only 14 5 participants checked HB1c withing last 6 months.

The data presented in the figure no 3 indicates that 30% of the participants did self monitoring of their own blood sugar.; 42% participants adopted regular dietary modification The data also shows that 44% of the participants were performing inadequate exercise (less than 5 days per week), 48% participants were performing adequate exercise (5-7 days per week), & 8% were not performing any type of exercise.

Table no3 Frequency& percentage distribution of participants as per frequency of checking blood sugar
N = 120

	< 6 months		6 months to 1 year		> 1 year	
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
FBS	74	62	16	13	6	5
PPBS	61	51	16	13	6	5
$HB1_C$	17	14	Nil		Nil	



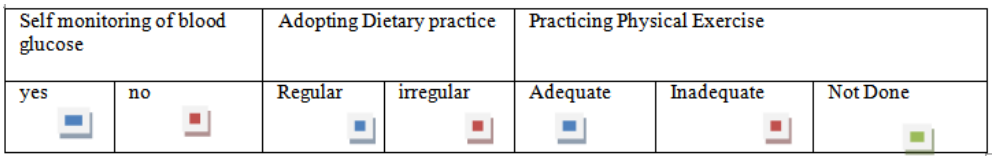


Figure -3 Percentage distribution of participants according to self care practices

Medicine adherence

Table no 4 shows that 50.8% of the participants never faced any difficulty to take medication, 5.83% were facing difficulty usually to take medication ; 7.5% were facing difficulty all the time to take medication. The data further reveals that 47.5% participants used to forget to take medication while travelling; 45% participants used to stop the medication when symptoms under control. 62.5% participants were taking the medication regularly. Half of the participants that is 50.8 % verbalized that they felt harassed about the treatment plan.

Table no 4 Frequency & percentage distribution of participants according to Medication adherence
N = 120

Sl no	Sample characteristics	Frequency	Percentage (%)
1.	Facing Difficulty in remembering to take medicine • Never • Once a while • Sometimes • Usually • All the time	 61 31 12 7 9	 50.8 25.8 10.o 05.8 07.5
2.	Forget to take medication while travelling or leaving Home	57	47.5
3.	Stopping of medicine when symptoms under control	54	45
4.	Regular taking of medicine	75	62.5
5.	Feel Hassled about treatment plan	61	50.8

Perception about Diabetes mellitus

Table no 5 shows the perception of diabetic persons in the area of perceived susceptibility& perceived severity of worsening of diabetes or diabetes complications. Apparently more no of diabetic persons perceived susceptibility (2.7±1.0) to develop complication of diabetes than susceptibility to shortened life span (2.0±1.1); more no of diabetic persons perceived Diabetes mellitus is the cause of physical harm & hampers daily activity (3.0 ±0.9) as severity of worsening of diabetes.

Table no 6 shows the perception of diabetic persons in the area of perceived internal control and external control of diabetes & its complications. Diabetic persons had good perception that self care would minimize diabetic complication or worsening of diabetes (4.24 ±0.8) followed by changing behaviors would control diabetes(3.82 ±0.7); Highest mean score found in the area of perception that diabetic complications could be avoided due to good care of family members.

Table no 7 shows the perception of diabetic persons in the area of perceived barriers and benefits of adopted management strategies of diabetes. High mean perception score (3.8±0.8) found in barriers of changing habit to control diabetes; low mean perception score (2.3±1.2) found in barriers of demotivation to take medicines regularly. More no of diabetic persons perceived benefit that sticking diabetes treatment helps to feel better(3.84±0.6).

Table no 5 Mean & Sd value of Perceived Susceptibility& perceived severity of worsening of Diabetes
N = 120

AREA	**Total Item**	**Max score**	**Mean**
SUSCEPTIBILTY	**2**	**10**	**5.3 ±1.8**
Susceptibility to develop complication of Diabetes or worsening the **diabetes**	1	5	2.7 ±1.0
Susceptibility to shortened life expectancy	1	5	2.0 ±1.1
SEVERITY	**4**	**20**	**11 ± 3**
Severity to major of diabetes in life	1	5	2.85 ±0.87
Diabetes develops too much complications	1	5	2.8 ±0.9
Severe health problem due to Diabetes Mellitus	1	5	2.8 ±1
Severity to cause physical harm & hamper daily activity	1	5	3.0 ±0.9

Each items were rated in 5 point scale (1 – 5 score), Higher mean value indicates more no of participants

Table no 6 Mean & Sd value Perceived Internal Control& External control of the Diabetes
N = 120

AREA	**Total Item**	**Max score**	**Mean**
INTERNAL CONTROL	**6**	**30**	**23.8 ±3.3**
Self care minimizing diabetic complications	1	5	4.24 ±0.8
Complication of Diabetes will minimized by own self	1	5	4.02 ±0.6
Complications of Diabetes avoided by individuals effort	1	5	3.9 ±0.7
Changing Behavior controlling the Diabetes	1	5	3.82 ±0.7
Diabetes mellitus is controlled by right action	1	5	3.9 ±0.8
Diabetes is controlled by doing something for own self	1	5	3.94 ±0.8
EXTERNAL CONTROL	**5**	**25**	**18 ±3.3**
Regular contact of diabetic people avoid the complications	1	5	2.71 ±1.1
Family has lot to do with minimizing the complications	1	5	3.81 ±0.8
Diabetic complications are avoided due to good care of family member	1	5	3.88 ±0.8
Diabetes is under control due to good care of my friends & family members	1	5	3.82 ±0.9
Family member have lot to do for controlling the diabetes	1	5	3.7 ±0.9

Table no7 Mean& Sd of Perceived barrier & perceived benefit of adopting diabetes management strategies
N = 120

AREA	**Total Item**	**Max score**	**Mean**
BARRIER	**5**	**25**	**15.1±3.5**
Difficulty facing in taking regular medication	1	5	3.14±1.2
Family problem make difficult to taking medication	1	5	2.82±1.3
Regular changing habit to control diabetes	1	5	3.8±0.8
Taking Diabetes medication interfere normal life	1	5	3.11±1.0
Feel demotivated to take diabetes medication regularly	1	5	2.3±1.2
BENEFIT	**4**	**20**	**14.8 ±2.2**
Sticking to Diabetes treatment help to prevent disease & disease related complication	1	5	3.68±0.7
Sticking to Diabetes treatment helps regularly to control Diabetes	1	5	3.53±0.83
Sticking Diabetes treatment helps to feel better	1	5	3.84±0.6
Sticking to diabetes treatment helps live longer	1	5	3.71±0.8

Table no 8 shows Mean score Percentages of perception of diabetes in different areas of perception. Highest mean percentage score (79%) found in the area of perception of benefits of adoption of diabetes management/ treatment plan and Internal control of prevention worsening of diabetes and lowest mean percentage score (53 %) found in the area of perception of Susceptibility to worsening of diabetes or to have diabetes complications

Table no 8 Mean scorePercentages of perception of diabetes in different areas.

N = 120

Sl no	**Different areas of perceptions**	**Items**	**Max score**	**Mean score**	**Mean score percentages**
1	Susceptibility to worsening of diabetes or to have diabetes complications	2	10	5.3	53
2	Severity of worsening of diabetes or diabetes complications	4	20	11	55
3	Internal control of prevention worsening of diabetes	6	30	23.8	79
4	External control of prevention worsening of diabetes	5	25	18	72
5	Barriers of adoption of diabetes management/ treatment plan	5	25	15.1	60
6	Benefits of adoption of diabetes management/ treatment plan	4	20	14.8	79

The data presented in the table no 9 indicates that significant relationship existed between perceived severity and age ,perceived external control and age ,perceive barriers and age ,perceived benefits and age (r =0.51,0.54,0.31,0.34 respectively). The data presented in table further reveals that the significant relationship existed between perceived severity and medication adherence , perceived external control and medication adherence, perceived barrier and medication adherence ,perceived benefit and medication adherence (r = 0.51,0.54.0.31,0.34 respectively)

Table no 9 Calculated r between perception with selected factor
N=120

Perceptions	**AGE**	**DURATION OF ILLNESS**	**MEDICATION**	**DIET**	**EXERCISE**	***df***	**Alpha level**	**Table value**
Susceptibility	0.12	-0.01	-0.11	-0.06	0.05			

Severity	0.51*	0.13	0.51*	0.12	-0.11	119	0.05	0.178
Internal Control	0.01	0.15	0.01	0.04	0.03			
External Control	0.54*	0.15	0.54*	-0.05	0.11			
Barriers	0.31*	0.10	0.31*	0.22*	0.22*			
Benefits	0.34*	0.12	0.34*	0.40*	0.17*			

IV. Discussion

In the present study, reveals that 5% of rural community people are diagnosed with diabetes mellitus. This study findings are consistent with the study conducted by Suman kanungo et al who conducted a cross sectional study on Diabetes scenario in a backward rural district in Malda among rural population (aged > 18 yrs) were taken by interviewing & testing for capillary blood sugar. Result showed that 6% population were suffering from diabetes,47% of the diagnosed cases were controlled, maximum population 62.8% were belonged to 18-40 yrs age group[7].

In the present study, it has been seen that diabetic persons have less perception towards susceptibilityand severity of worsening of diabetes or developing complications of Diabetes and good perception towards perceived benefit to adopt treatment plan. This study findings are consistent with the study conducted by AbbasaliDehghani-Tafti et al. They conducted a study to measure the perceived benefits, barriers, severity, susceptibility, self-efficacy, social support and self-care behaviors related to diabetes among the 110 diabetic patients in Iran and it reveals that participants had good perceptions towards benefits (mean score of 18.38 with SD of 2.18) and social support (mean score of 53.76 with SD of 6.62) and moderate perceived barriers (mean score of 26.1 with SD of 3.68). Patients had high scores for perceived severity (mean score of 41.9 with SD of 2.79) and low scores on self-care behavior (mean score was 36.3 with SD of9.77)[8].

V. Conclusion

On the basis of the findings of the present study, it can concluded that 5% of the rural population are diagnosed with Diabetes mellitus. Diabetic persons have good perception about the benefits of sticking to treatment plan and less perception of susceptibility & severity of worsening of diabetes.

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Conflict of interest: None

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