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Research Article

Identification of Responsible Socioeconomic Variables for the Prevalence of Disability Among Patients of High Normal and Hypertensive Blood Pressure

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Abstract

The study was based on data collected from 995 adults of ages 18 years and above residing in both rural and urban areas of Bangladesh. Among these adults, there were 175 patients of high normal and hypertensive blood pressure, and there were 48 disabled adults. Disability was observed in 8 patients of high normal and hypertensive blood pressure. The plan of the study was to discriminate these 8 patients from the remaining 987 adults. During discrimination the variables duration of diabetes, age, body mass index, education, and sedentary activity were identified as responsible factors for the simultaneous prevalence of disability and high normal and hypertensive blood pressure. Out of these variables the duration of diabetes was the most responsible one for discrimination followed by age, body mass index, and others. Significantly higher prevalence rate (3.6%) against the overall rate 0.8 was noted in elderly people of ages 50 years and above. The same features were also noted in illiterate people, in obese adults, in adults involved in sedentary activity, and in diabetic patients suffering for 10 -15 years.

Keywords: Disability, Discriminant analysis, High normal blood pressure, Hypertensive blood pressure, Socioeconomic variable.

Introduction

One of the non-communicable diseases is disability and it is seen in human beings by birth, and due to the prevalence of some other non-communicable diseases, especially, due to the prevalence of obesity, diabetes, and hypertension. The problem of disability is many folds, some of the disabled persons cannot work in a normal way like the work done by a healthy person, cannot walk normally, cannot talk normally, cannot see normally, cannot solve the problem, cannot move normally [1-8]. Sometimes a diabetic person, though not physically handicapped, becomes disable in performing normal work [9-16]. As the prevalence of non-communicable diseases is in increasing trend the phenomenon disability is also in increasing trend and disability is observed more among people, especially among elderly people [17-21]. Beside old age, the other causes of disability are obesity, hypertension, and prevalence of arthritis [22-31].

Around one billion people of the world are disabled and most of them live in developing countries [32]. Bangladesh is a developing country, and it was reported that 90% of the Bangladeshi diabetic patients were disabled [33]. Again, reported risk factors for diabetes were old age, illiteracy, physical inactivity, sedentary activity, hypertension, lifestyle, obesity, and food habit [34]. The discussion above indicated that disability is associated with obesity, diabetes, hypertension, and many other factors including some disabilities by birth. In this paper an attempt was made to study the risk factors for disability among adult patients of high normal and hypertensive blood pressure and this group was discriminated from other adults.

Methodology

According to the objective of the study the data were recorded from 995 Bangladeshi adults of ages 18 years and above from both urban and rural areas. These adults were visiting some diagnostic centres for their blood and urine screening test. The centres were in both urban and semi-urban areas of Bangladesh. The nurses and medical assistants working in the centres were requested to collect the information from the visiting adults through a pre-

designed and pre-tested questionnaire in the session 2018 – 19. It had a plan to collect the data from both males and females. It was also decided to cover males and females in the ratio 50.1:49.9 as this ratio had prevailed in the country during the survey period [35]. The data were collected through the prepared questionnaire asking questions to each of the visited adults who were willing to provide their sociodemographic, economic, and personal data on prevalence of any of the non-communicable diseases. The persons suffering from diseases were also provided the information on duration of disease(s), the stages of treatment by doctors/ medical assistants working in the localities. The respondents also provided information on monthly family income (in 000 taka) and monthly family expenditure (in 000 taka), and they were classified into four groups according to their income and expenditure. The 4 groups were

I. adults of lower economic condition (if monthly income was < Tk.50 and expenditure was < Tk.40,

II. adults of medium economic condition (if income was 50 – 100 and expenditure was 40 - 80),

III. adults of upper medium economic condition (if income was 100 – 150 and expenditure was 80 – 120), and

IV. adults of higher economic condition (if income was 150 and above and expenditure was 120 and above).

There were four groups of adults according to their Body Mass Index [BMI, weight in kg divided by height in centimetre2]. These groups were

(i) underweight (BMI < 18.5),

(ii) normal (18.5 ≤BMI < 23.0),

(iii) overweight (23.0 < BMI < 27.5), and

(iv) Obese (BMI ≥ 27.5) [36,37].

The Blood Pressure (BP mmHg) of each respondent was measured and all the respondents were classified into 4 groups. The groups were

(i) respondents of optimum blood pressure (if BP < 120/80),

(ii) respondents of normal blood pressure (if BP < 130/85),

(iii) respondents of high normal blood pressure (if BP < 140/90), and

(iv) the respondents of hypertensive blood pressure (if BP≥ 140/90) [38-40].

The number of disabled adults of different levels of blood pressure were shown below: (Table 1)

Table 1: Distribution of Adults by Disability Status and Level of Blood Pressure.

Disease	Level of Blood Pressure			Total
Disability	Optimum	Normal	High normal and hypertensive	
Number of adults	21	19	8	48

These 8 disabled adults of high normal and hypertensive blood pressure were considered as patients' group, and they were discriminated from the remaining 887 respondents so that the responsible variables for the discrimination were identified. The most responsible variable is one for which the correlation coefficient of the variable with discriminant function score is highest [41-43]. The risk ratio for the prevalence of disability in patients of high normal and hypertensive blood pressure was calculated for any level of a socioeconomic characteristic if for the level the prevalence rate was maximum [2]. Most of the collected information were qualitative in nature, these were transformed to nominal scale for ease of analysis. According to the variable age (in years), the adults were classified into 4 classes; these classes were < 25, 25 - less than 40, 40 - less than 50, and 50 and above. Adults were also classified into 5 classes based on duration of suffering of the patients from diabetes. These 5 classes were

(i) did not arise,

(ii) < 5 years,

(iii) 5 to < 10 years,

(iv) 10 to < 15 years, and 15 years and above.

The calculations were done using SPSS Version 25.

Results

Among the investigated adults 50.1% were males, the prevalence rate of disability in male patients of high normal and hypertensive blood pressure was 1.2% against the overall prevalence rate 0.8% in sample adults and against the rate 0.40 in females [Table 2]. The prevalence rates in males and in females were not statistically different [X^2 =2.008, p-value=0.156]; but males had 199% more risk of prevalence [R.R.= 2.99, C.I. (0.61, 14.63)]. There were 531 rural respondents, the prevalence rate in them was 1.3% against the rate 0.2% in urban adults. The rate of prevalence in rural adults was almost significantly higher than it was in urban people [X^2 = 3.776, p-value = 0.052]. The rural people had 6.12 times risk compared to the risk of urban people [R.R.=6.12, C.I. (4.02, 8.22)]. The Muslim respondents were 85.2%; all the 8 disabled patients of high normal and hypertensive blood pressure were Muslims. The prevalence rate in them was 0.9. This rate was significantly higher than the overall prevalence rate in sample adults [Z=7.30, p-value = 0.000]. None of the non-Muslim adults was suffering from these diseases. The married adults were 93.1% and prevalence rate in them was 0.9%. This rate was significantly higher than the rate prevailed in all sample adults [z= 7.19, p-value= 0.000]. None of the single adult was affected by the diseases under study. There were 19.6% elderly

people of ages 50 years and above and prevalence rate in them was 3.6%. This rate was significantly higher than the rate prevailed in adults of other ages [X^2 = 24.059, p-value= 0.000]. Elderly people had 28.72 times risk of prevalence [R.R.= 28.72, C.I. (4.81, 140.95)]. The percentage of illiterate people in the sample was only 6.5; the prevalence rate in them was 4.6%. This rate was significantly higher compared to the rate prevailed in adults of other levels of education [X^2 = 15.414, p – value =0.001.]. The risk of prevalence in illiterate people was 8.58 times compared to the risk of adults of other levels of education [R.R.=8.58, C.I. (2.09, 35.16]. The percentage of farmers in the sample was 10.5; the prevalence rate in them was 1.9%. The farmers had 2.86 times risk of prevalence than the risk of other adults [R.R.=2.86, C.I. (O,58, 13.99)]. But the prevalence rates in adults of other professions were not significantly different [Among the investigated adults 50.1% were males, the prevalence rate of disability in male patients of high normal and hypertensive blood pressure was 1.2% against the overall prevalence rate 0.8% in sample adults and against the rate 0.40 in females [Table 2].

The prevalence rates in males and in females were not statistically different [X^2 =2.008, p-value=0.156]; but males had 199% more risk of prevalence [R.R.= 2.99, C.I. (0.61, 14.63)]. There were 531 rural respondents, the prevalence rate in them was 1.3% against the rate 0.2% in urban adults. The rate of prevalence in rural adults was almost significantly higher than it was in urban people [X^2 = 3.776, p-value = 0.052]. The rural people had 6.12 times risk compared to the risk of urban people [R.R.=6.12, C.I. (4.02, 8.22)]. The Muslim respondents were 85.2%; all the 8 disabled patients of high normal and hypertensive blood pressure were Muslims. The prevalence rate in them was 0.9. This rate was significantly higher than the overall prevalence rate in sample adults [Z=7.30, p-value = 0.000]. None of the non-Muslim adults was suffering from these diseases. The married adults were 93.1% and prevalence rate in them was 0.9%. This rate was significantly higher than the rate prevailed in all sample adults [z= 7.19, p-value= 0.000]. None of the single adult was affected by the diseases under study. There were 19.6% elderly people of ages 50 years and above and prevalence rate in them was 3.6%. This rate was significantly higher than the rate prevailed in adults of other ages [X^2 =24.059, p-value= 0.000]. X^2 = 24.059, p-value= 0.000]. X^2 = 3.996, p-value= 0.407]. The percentage of respondents of families of high economic condition was 12.6; the prevalence rate in them was 1.6%. This rate was highest compared to the rates prevailed in adults of other economic condition. But the rates were not statistically different [X^2 = 4.385, p-value = 0.223]. Even then, the respondents of families of higher economic condition had 132 % more risk of prevalence [R.R.=2.32, C.I. (0.47, 11.35)].

There were 33.1% smoker adults, the prevalence rate in them was 0.6 against the rate 0.9 observed in non-smoker adults. The analysis indicated that smoking habit was independent of prevalence of disability in adults of high normal and hypertensive blood pressure [X^2 = 0.237, p-value= 0.626]. There were 44.4% adults involved in sedentary activity, the prevalence rate in them was 1.6% against the rate 0.2% observed in adults not involved in sedentary activity. These two rates were significantly different [X^2 = 6.062, p-value= 0.014]. The adults involved in sedentary activity had 8.79 times of risk of prevalence [R.R.= 8.79, C.I. (1.08, 71.58)]. The percentage of adults habituated in taking process food was 36.5 and prevalence rate in them was 1.1% against the rate (0.6%) prevalent in adults not preferred process food. But these two rates were statistically similar [X^2 = 0.636, p-value= 0.425]. However, process food consumers had 74% more risk of prevalence [R.R.= 1.74, C.I. (0.44, 1.48)]. There were 51.7% physically inactive respondents, the prevalence rate in them was only 0.3% which was very low compared to the rate 1.0 observed in physically active adults. These two rates were not statistically different [X^2 = 0.647, p-value= 0.421]. Physically inactive adults had only 0.56 times risk of prevalence [R.R. = 0.56] (Table 2).

Table 2: Classification of patients suffering simultaneously from disability and high normal and hypertensive blood pressure according to socioeconomic characteristics.

Socioeconomic Characteristics	Prevalence of Disability Among Patients of High Normal and Hypertensive Blood Pressure				Total	
	Yes		No			
	Number	%	Number	%	Number	%
Gender						
Male	6	1.2	492	98.8	498	50.1
Female	2	0.4	495	99.6	497	49.9
Total	8	0.8	987	99.2	995	100
Residence						
Rural	7	1.3	524	98.7	531	53.4
Urban	1	0.2	463	99.8	464	46.6
Religion						

Muslim	8	0.9	840	99.1	848	85.2
Non-Muslim	0	0	147	100	147	14.8
Marital status						
Married	8	0.9	918	99.1	926	93.1
Single	0	0	69	100	69	6.9
Age (in years)						
< 25	0	0	196	100	196	19.7
25 – 40	0	0	401	100	401	40.3
40 – 50	1	0.5	202	95.5	203	20.4
50+	7	3.6	188	96.4	195	19.6
Education						
Illiterate	3	4.6	62	95.4	65	6.5
Primary	2	1.7	119	98.3	121	12.2
Secondary	0	0	237	100,0	237	23.8
Higher	3	0.5	569	99.5	572	57.5
Occupation						
Farming	2	1.9	102	98.1	104	10.5
Business	1	0.4	233	99.6	234	23.5
Service	1	0.3	304	99.7	305	30.7
Retire	2	1.6	120	98.4	122	12.3
Housewife	2	0.9	228	99.1	230	23.1
Economic condition						
Low	5	1.3	380	98.7	385	38.7
Medium	1	0.2	423	99.8	424	42.6
Upper medium	0	0.9	61	100	61	6.1
High	2	1.6	123	98.4	125	12.6
Smoking habit						
Yes	2	0.6	327	99.4	329	33.1
No	6	0.9	660	99.1	666	66.9
Habit of taking restaurant food						
Yes	4	1.1	359	98.9	363	36.5
No	4	0.6	628	99.4	632	63.5
Habit of doing physical work						
Yes	5	1	476	99	481	48.3
No	3	0.3	511	99.7	514	51.7
Body mass index						
Underweight	0	0	38	100	38	3.8
Normal	0	0	233	100	233	23.4
Overweight	1	0.2	423	99.8	424	42.6
Obese	7	2.3	293	97.7	300	30.2
Involvement in sedentary activity						
Yes	7	1.6	435	98.4	442	44.4
No	1	0.2	554	99.2	555	55.6
Duration of diabetes (in years)						
Did not arise	0	0	328	100	328	33

< 5	0	0	291	100	291	29.2
5 – 10	0	0	206	100	206	20.7
10 – 15	6	6.1	93	93.9	99	9.9
15+	2	2.8	69	97.2	71	7.1
Total	8	0.8	987	99.1	995	100

The prevalence rates in males and in females were not statistically different [X^2=2.008, p-value=0.156]; but males had 199% more risk of prevalence [R.R.= 2.99, C.I. (0.61, 14.63)]. There were 531 rural respondents, the prevalence rate in them was 1.3% against the rate 0.2% in urban adults. The rate of prevalence in rural adults was almost significantly higher than it was in urban people [X^2 = 3.776, p-value = 0.052]. The rural people had 6.12 times risk compared to the risk of urban people [R.R.=6.12, C.I. (4.02, 8.22)]. The Muslim respondents were 85.2%; all the 8 disabled patients of high normal and hypertensive blood pressure were Muslims. The prevalence rate in them was 0.9. This rate was significantly higher than the overall prevalence rate in sample adults [Z=7.30, p-value = 0.000]. None of the non-Muslim adults was suffering from these diseases. The married adults were 93.1% and prevalence rate in them was 0.9%. This rate was significantly higher than the rate prevailed in all sample adults [z= 7.19, p-value= 0.000]. None of the single adult was affected by the diseases under study. There were 19.6% elderly people of ages 50 years and above and prevalence rate in them was 3.6%. This rate was significantly higher than the rate prevailed in adults of other ages [Among the investigated adults 50.1% were males, the prevalence rate of disability in male patients of high normal and hypertensive blood pressure was 1.2% against the overall prevalence rate 0.8% in sample adults and against the rate 0.40 in females [Table 2]. The prevalence rates in males and in females were not statistically different [X^2=2.008, p-value=0.156]; but males had 199% more risk of prevalence [R.R.= 2.99, C.I. (0.61, 14.63)]. There were 531 rural respondents, the prevalence rate in them was 1.3% against the rate 0.2% in urban adults. The rate of prevalence in rural adults was almost significantly higher than it was in urban people [X^2= 3.776, p-value = 0.052]. The rural people had 6.12 times risk compared to the risk of urban people [R.R.=6.12, C.I. (4.02, 8.22)]. The Muslim respondents were 85.2%; all the 8 disabled patients of high normal and hypertensive blood pressure were Muslims.

Results of Discriminant Analysis

Among the respondents 8 were patients of disability isn addition to high normal and hypertensive blood pressure. One of the objectives of the analysis was to discriminate these 8 patients from the remaining 987 adults. The discrimination was done using the variables residence, religion, gender, marital status, age, education, occupation, economic condition, body mass index, smoking habit, habit of taking process food, habit of doing physical work, involvement in sedentary activity, and duration of diabetes. The preliminary results of the analysis indicated that the discrimination was satisfactory [Wilk's Lambda = 0.947, χ^2= 53.496, p-value= 0.000]. The two groups of adults were also significantly different in terms of variability of variables [Box's M= 285.554, p-value=0.024]. The other results were presented in (Table 2) above. It was seen that the absolute value of correlation coefficient of duration of diabetes and discriminant function score was highest (0.618). This result indicated that duration of diabetes was most responsible in discriminating the patients' group from other adults. The second most responsible variable was age followed by body mass index, education, and involvement in sedentary activity. Residence was also an important variable for discrimination of two groups (Table 3).

Table 3: Results of discriminant analysis.

Socioeconomic Variables	Correlation Coefficient	Discriminant function Coefficient	Wilk's Lambda	F	p-Value
Duration of diabetes	0.618	0.289	0.979	21.148	0
Age	0.561	0.361	0.983	17.148	0
Body mass index	0.408	0.35	0.991	9.223	0.002
Education	-0.385	-0.466	0.991	8.539	0.004
Sedentary activity	0.325	0.239	0.994	6.087	0.014
Residence	-0.261	-0.205	0.996	3.782	0.052
Gender	-0.19	-0.402	0.998	2.008	0.157
Religion	-0.159	-0.186	0.999	1.397	0.237

Habit of doing physical work	0.108	0.077	0.999	0.646	0.422
Habit of taking process food	0.107	0.221	0.999	0.635	0.426
Marital status	-0.104	-0.114	0.999	0.6	0.439
Smoking habit	0.065	0.368	1	0.237	0.627
Economic condition	-0.02	0.031	1	0.022	0.883
Occupation	-0.005	-0.032	1	0.001	0.973

Discussion

Disability in human beings is observed in many cases in both home and abroad. Some people are disabled by birth, and some are affected due to suffering from other non-communicable diseases, especially from obesity and diabetes. Because obesity increases the limitations in normal activities and diabetic people at old age loss the capacity of normal work [7,20,21,45,46]. Among Bangladeshi adults the responsible factors for prevalence of disability in addition to obesity and diabetes were age, marital status, occupation, physical inactivity, involvement in sedentary activity, and duration of diabetes [23,46,21]. The present study was to identify some of the socioeconomic variables for the prevalence of disability among high normal and hypertensive adults. It was observed that each of the variables' age, education, body mass index, sedentary activity, and duration of diabetes was significantly increasing the prevalence rate of disability in presence of high normal and hypertensive adults. Among these variables the most responsible variable was duration of diabetes for this prevalence. Beside these variables the risk of prevalence was too high among rural people, among males, among farmers, and among adults of families of high economic condition though the related variables were not significantly associated with prevalence.

Conclusion

The study was based on information collected from 995 adults of 18 years and above living in both rural and urban areas. The overall prevalence of disability in adults of high normal and hypertensive blood pressure was 0.8%. The corresponding rates in rural adults was more than 5 times and they were 53.4% in the sample. All patients were Muslims. None of non-Muslim person was affected simultaneously by these 3 non-communicable diseases. Male respondents were 50.1% and risk of prevalence for them was 199% more. The diseases prevailed only in married persons. There were 19.6% elderly people of ages 50 years and above. This group had 28.72 times risk compared to the risk of other adults. Younger adults of ages less than 40 years were free of suffering from simultaneous prevalence of these 3 diseases. There were only 6.5% illiterate people. For them the risk of prevalence was 8.58 times. Farmers had 186% more risk of prevalence. Businesspersons and service persons were less affected by the diseases under consideration. Even the housewives were less affected. Economic condition was not a risk factor for the prevalence, but adults of families of higher economic condition had 132% more risk of prevalence. There were four lifestyle factors under consideration; these were smoking habit, process food consumption, physical activity, and sedentary activity. Except sedentary activity, no other factors had any adverse influence on prevalence rate. Involvement in sedentary activity created a higher risk of prevalence by an amount 8.79 times. Around one-third of the respondents were obese. This group had 16.22 times risk of prevalence. None of underweight and normal weight adults was affected by the diseases. Early stage of diabetes was also not risking level for prevalence of the diseases. The risk was too high for the diabetic patients who were suffering for 10 -15 years. Economic activities are increasing in all countries in the world and hence people's lifestyle is also changing in upward direction. As a result, more people are becoming physically inactive, sedentary activists, and more of them are running towards fast food. These three are the causes of many non-communicable diseases. The situation is turning towards adverse impact in health condition. This situation is to be tackled by adopting the new plan for the health sector so that action can be taken in arresting the spread of non-communicable diseases. Both public and private sector can do a lot in improving the health situation of the country and its residents.

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Conflict of Interest

The authors declare that there are no conflicts of interests

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