

# Barriers to Physical Activity among Patients with Diabetes Mellitus

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## Abstract

**Aim:** One of the most underappreciated parts of type 2 diabetes management is physical activity. The purpose of this study was to determine the barriers to physical activity among diabetic patients.

**Methods:** A cross-sectional study design was done in BIHS hospitals among 401 diabetic patients to see by face to find out the barriers to physical activity by face interview and analysis was done by SPSS version 16.

**Results:** A moderate type of physical exercise was done by 99.4%. The mean day of a week for exercise was 5.9(±1.6). Recommended level of physical exercise in a week was done by 69.1% respondents. The BMI, mean waist and hip circumference were 26.4 (±4.1) kg, 92±10.9 cm and 98.7±12.2 cm respectively. Male (25.4%) were at risk (≥ 90 cm) whereas female (71.6%) were at risk (≥ 80 cm). More than half of the respondents (57.2%) felt too tired to do physical activity. Study found that 85.8% of the respondent's family members encouraged physical activity, (60.8%) of the respondent's relatives or neighbors encouraged physical activity, and 47.4% of the respondent's friends encouraged physical activity. Majority of the respondents (95.3%) depended on outdoor facilities for their physical activities. Regarding presence of favorable neighborhood characteristics 69.5% had good road facilities, 63.5% and 63% had enjoyable scenery and sidewalks, 49.9% had security, 43.9% had not any vehicle on the street, 27.4% had access to shady roads.

**Conclusion:** Health care professionals should give emphasis on educational intervention on health benefits of physical activity.

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**Keywords:** Physical activity, educational intervention, physical barriers, psychological barriers.

## INTRODUCTION:

Various chronic conditions have increased dramatically in the global population during the last few decades.<sup>1-3</sup> Diabetes is a significant public health concern. It is now a public health crisis.<sup>4</sup> Diabetes affects 246 million people worldwide. with that number anticipated to increase to three hundred million by the middle of this decade.<sup>5</sup> Diabetes cases are increasing due to population growth, obesity, aging, and physical inactivity. In terms of disease, it is the 4th most significant death-causing disease worldwide.<sup>6</sup> Both developed and developing countries have a high prevalence of the disease.<sup>7</sup> Diabetes prevalence has increased 12.1% in India, 11.1% in Pakistan. Diabetes cases have also noticeably risen in China (6.1 percent).<sup>8-10</sup> Diabetics cases in Southeast Asia are estimated to be 385 million. Bangladesh is a country in the process of developing & has an increasing number of Diabetes mellitus (DM) cases, with an urban prevalence of 8.1 percent and a rural prevalence of 2.3 percent.<sup>11</sup> The financial cost of having these diseases has a significant role in the public health budget.

Due to a slew of co-morbidities resulting from its development, Diabetes may be the most common chronic condition with higher expenses. In the United States, the economic expenses of T2DM problems were predicted to reach more than US\$130 billion in 2002.<sup>12</sup> A situation comparable to that of poor countries.<sup>13</sup> Meta-analysis has demonstrated that physical activity helps us improve our glycemic management.<sup>14</sup> This decrease in HbA1c could lessen microvascular problems. Cardiovascular disease causes most death among Diabetes patients & physical exercise could lower the risk of getting it.<sup>15</sup> Physical inactivity could also cause Coronary heart disease.<sup>16</sup> Physical inactivity is linked to a three- to four-fold more significant risk of death from any cause during an eight-year study.<sup>17</sup> Physical exercise aids in the prevention of coronary heart disease & improves our glycemic control.<sup>18-19</sup>

In addition, physical activity reduces Diabetes cases.<sup>20-22</sup> Physical activity has numerous health benefits. People with Diabetes should engage in at least 150 minutes of moderate physical exercise and at least 90 minutes of vigorous physical exercise per week. Physical exercise should be spaced out over at least three days per week, with no more than two days spent doing nothing.<sup>24</sup> Physical activity is essential in preventing and managing Diabetes.<sup>25</sup> Physical activity is underappreciated in most type 2 diabetes management cases.<sup>26</sup> There has only been one report that specifically tackles impediments to physical activity among type 1 diabetes patients.<sup>27</sup> However, there has been a limited study about this in our country. Therefore, in this

study, we have assessed physical activity difficulties in diabetic individuals. The study findings will help us give necessary data on the prevailing barriers to physical activity of the study population that will be helpful for policy planners for planning appropriate strategies to address physical activity-related issues of patients with Diabetes.

## METHODOLOGY:

The study was a Cross-sectional study done among 401 diabetic patients both men and women diagnosed as diabetes mellitus (type 1 and type 2) selected purposively and attending BIHS hospital. Data was collected by using a pre-tested semi structured interviewer administered questionnaire. Statistical package for social science (SPSS) version 16.0 was used to analyze the collected data. Ethical approval for this study was taken from the Ethical Review Committee of Bangladesh University of Health Sciences. Written informed consent was taken from each respondent before the interview. Anonymity of the respondents and confidentiality of their information were ensured. The participants were given freedom to withdraw themselves from the study at any time during the interview and they were free to refuse to answer any question of the questionnaire. The respondents were not paid for their time.

## RESULTS

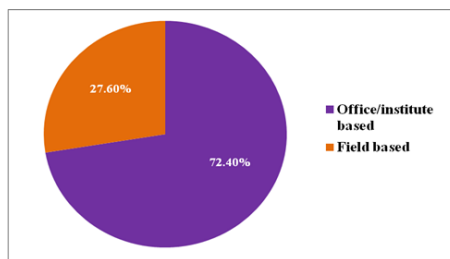
A group of 401 diabetic patients were analyzed for the barriers of their physical activity and the findings are given below in Table 1. The mean ( $\pm$ SD) age of the respondents was 53.6( $\pm$ 11.7). It also shows that in case of the educational status of the respondents, 27.9% respondents were illiterate, whereas, 25.2%, 22.4%, 9.7%, 9.5% and 5.2% respondents had completed their Secondary level, Primary, Higher secondary, Graduation and Masters and above respectively. The mean ( $\pm$ SD) monthly income was 17854( $\pm$ 22208) of the respondents. **(Table 1)**

**Table 1: Distribution of the respondents according to the socio economic characteristics (n=401)**

Variables	Frequency(n) Percent (%)	Mean $\pm$ SD
<b>Sex</b>		
Male	111(27.7%)	
Female	290(72.3%)	
<b>Age</b>		
20-39 years	39(9.7%)	
40-59 years	233(58.1%)	53.6 $\pm$ 11.7
60-79 years	118(29.4%)	

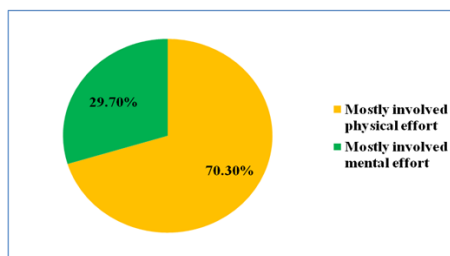
80+ years	11(2.7%)	
<b>Education</b>		
Illiterate	112(27.9%)	
Primary (Class I-V passed)	90(22.4%)	
Secondary (VI-SSC passed)	101(25.2%)	
Higher Secondary (XI-HSC passed)	39(9.7%)	
Graduation (after HSC-Degree passed)	38(9.5%)	
Masters and above	21(5.2%)	
<b>Monthly income (BDT)</b>		
<5000 Tk	149(37.2%)	
5001-10,000 Tk	79(19.7%)	
10,001-20,000 Tk	63(15.7%)	17854±22208
20,001-30,000 Tk	47(11.7%)	
>30,001 Tk	63(15.7%)	

**Figure 1** shows that 72.4% respondents' pattern of works were office/institute based where 27.6% were field based.



**Figure 1: Distribution of the respondents according to the Pattern of work of the respondents**

**Figure 2** shows that 70.3% respondents' effort at their job place was physical effort whereas 29.7% had mental effort.



**Figure 2: Distribution of the respondents according to their nature of work (n=401)**

Among the total respondents most (82.5%) of the respondents did their physical exercise regularly. More than four fifth 82.3% of the respondents followed the recommended level (150 minutes exercise in a week) whereas

17.7% respondents did not follow the recommended level of physical exercise. (Table 2)

**Table 2: Distribution of the respondents according to their physical exercise (n=401)**

Variables	Frequency(n) Percent (%)	Mean±SD
<b>Physical exercise</b>		
Yes	249(62.%)	
No	152(38.0%)	
<b>Mean days of a week for exercise</b>		5.9±1.6
<b>Recommended Physical Activity</b>		
Yes	172(69.1%)	
No	77(30.9%)	

The mean (±SD) height and weight of the respondents were 153.2(±7.5) and 61.8(±9.4) where the mean (±SD) BMI was 26.4 (±4.1). The mean (±SD) waist circumference of the respondents was 92±10.9. The mean hip circumference of the respondents was 98.7±12.2 whereas the mean (±SD) for waist hip ratio was 0.93(±0.1). The mean (±SD) systolic and diastolic blood pressures of the respondents were 125.4±12.9 and 81.6±8.3 mmHg. (Table 3)

**Table 3: Distribution of respondents according to their Physical and Biochemical Measurement (n=401)**

Variables	Frequency(n) Percent (%)	Mean±SD
<b>Physical Measurement</b>		
<b>Height (cm)</b>		153.2±7.5
<b>Weight (kg)</b>		61.8±9.4
<b>Mean BMI(kg/m<sup>2</sup>)</b>		26.4±4.1
<b>*BMI category(kg/m<sup>2</sup>)</b>		
Underweight (<18.5)	7(1.7%)	
Normal(18.5 to 23)	70(17.5%)	
Overweight (23 to 27.5)	181(45.1%)	
Obese(>27.5)	143(35.7%)	
<b>Waist circumference of the respondents</b>		92±10.9
<b>Male</b>		
High(≥ 90 cm)	50(45.0%)	
Normal(≤90 cm)	61(55.0%)	
<b>Female</b>		
High(≥ 80 cm)	260(89.7%)	
Normal(≤80 cm)	30(10.3%)	
<b>Hip circumference (cm)</b>		98.7±12.2
<b>Mean Waist hip ratio (WHR)</b>		0.93±0.1
<b>Male</b>		
High WHR (≥ 0.9)	102(91.9%)	
Normal WHR(≤0.9)	9(8.1%)	
<b>Female</b>		
High WHR (≥ 0.8)	287(99.0%)	
Normal WHR(≤0.8)	3(1.0%)	

Biochemical Measurement		
<b>BP status</b>		
Hypertensive ( $\geq 140/90$ mmHg)	135(33.7%)	
Normotensive	266(66.3%)	
<b>Systolic mean blood pressure, (mmHg)</b>		125.4 $\pm$ 12.9
<b>Diastolic mean blood pressure, (mmHg)</b>		81.6 $\pm$ 8.3

\*BMI – Asian cut off has been used

More than half of the respondents (57.2%) faced physical barriers for their physical activity due to feeling too tired. More than one third (37.9%) due to not in good health, more than one fourth (28.7%) due to lack of safe place, more than one fourth (26.1%) due to lack of proper motivation and also for no time, almost one fifth (21.3%) due to fear of injury and only (10.9%) due to lack of company faced physical barriers for their physical activity. The table also shows that more than four fifths (85.8%) of the respondent's family members encouraged physical activity. More than three fifth 68.8% respondents did not get any company from the family members during exercise. More than three fifths (60.8%) of the respondent's relatives or neighbors encouraged physical activity. Almost two third (61.6%) respondents did not get any company from their relatives or neighbors during exercise. Almost half (47.4%) of the respondent's friends encouraged physical activity but 70.6% respondents did not get any company from the friends during exercise. **(Table 4)**

**Table 4: Distribution of the respondents according to physical barriers and psychological barriers for their physical activity (n=401)**

Variables	Number(n)	Percent (%)
<b>Physical barriers</b>		
Feel to tired	199	57.2
Not in good health	132	37.9
No safe place	100	28.7
Don't have time	91	26.1
No motivation	91	26.1
No energy	74	21.3
Fear of injury	48	13.8
Lack of company	38	10.9
Feel too old	31	8.9
Do not like exercise	27	7.8
Lack of money	3	0.9
<b>Total</b>	<b>834</b>	<b>239.7</b>
<b>53 missing cases; 348 valid cases</b>		
<b>Psychological barriers</b>		
<b>Not encouraged by family members for physical activity</b>		
No	344	85.8%
Yes	57	14.2%
<b>Company not given by a family member to exercise</b>		
No	125	31.2%
Yes	276	68.8%
<b>Not encouraged by relatives or neighbors for physical activity</b>		
No	244	60.8%
Yes	157	39.2%
<b>Company not given by at least one relatives or neighbor during exercise</b>		

No	154	38.4%
Yes	247	61.6%
<b>Not encouraged by the friends for physical activity</b>		
No	190	47.4%
Yes	211	52.6%
<b>Company not given by at least one friend for exercise</b>		
No	118	29.4%
Yes	283	70.6%

Majority (95.3%) respondents depended on outdoor facilities for their physical activities. It also shows that more than two third (69.5%) of total respondents had good road facilities as favorable neighborhood characteristics for physical activities. More than three fifths (63.5%) and (63%) of the respondents had enjoyable scenery and sidewalks as favorable neighborhood characteristics for physical activity. Almost half (49.9%) of the respondents had security for physical activities. More than two fifths (43.9%) respondents had not any vehicle on the street. Almost one third (27.4%) of the respondents had access to shady roads whereas 9.7% respondents had street lights facilities. **(Table 5)**

**Table 5: Distribution of the respondents according to specific access and favorable neighborhood for doing physical activity (n=401)**

Specific access of place do physical activity	Number(N)	Percent (%)
Indoor	19	4.7%
Outdoor	382	95.3%
Both	0	0%
<b>If outdoor</b>		
Neighborhood streets	229	67.4%
Walking/jogging trail	129	37.9%
Park	49	14.4%
Play ground	20	5.9%
Gym	3	0.9%
Treadmill	3	0.9%
<b>Presence of favorable neighborhood characteristics for physical activity</b>		
Good road	244	69.5%
Enjoyable scenery	223	63.5%
Sidewalks present	221	63.0%
Presence of security	175	49.9%
Lack of vehicle on street	154	43.9%
Shady road	96	27.4%
Streetlights	34	9.7%
No street dogs	25	7.1%
Heavy traffic	7	2.0%
<b>Total</b>	<b>1179</b>	<b>335.9%</b>

*\*multiple responses are counted here*

## DISCUSSION

A group of 401 diabetic patients was analyzed for their physical activity barriers, and the findings are given below. The composition of male and female were 27.7% and 72.3% respectively. The mean ( $\pm$ SD) age of the respondents in this study was 53.6( $\pm$ 11.7), which agrees with the study done in Scotland that the mean age was 56.5 years<sup>28</sup>. It indicates that the majority of the study population is in the economically productive age group. The mean ( $\pm$ SD) monthly income was 17854( $\pm$ 22208). It seems that the monthly household income of the respondents is three times higher than the national household income of Tk 11, 480<sup>29</sup>. Among the total respondents, two-third (62.0%) of the respondents did their physical exercise regularly, where only 38.0% of respondents did not do any physical exercise. This was comparable to a study done in Southern Missouri, Tennessee. 102 people (37.2%) did not engage in regular exercise, but 136 individuals (49.6%) had regular exercise<sup>30</sup>, which is lower than this study. These findings of our study certainly indicate that the study population might get more counseling regarding exercises. More than four-fifths 82.3% of the respondents followed the recommended level (150 minutes of exercise in a week), whereas 17.7% did not follow the recommended physical exercise level. These findings contradict recent findings that persons with DM were less inclined to partake in recreational activities<sup>31</sup>. Diabetes was linked to a reduced chance of maintaining a healthy lifestyle, which included regular exercise.<sup>31-34</sup> This difference might be because healthcare professionals advised improving their lifestyle, which needs to be further evaluated. Also, in this study, the higher rate may be because it was done on a smaller sample size. The mean ( $\pm$ SD) height and weight of the respondents were 153.2( $\pm$ 7.5) and 61.8( $\pm$ 9.4), where the mean ( $\pm$ SD) BMI was 26.4 ( $\pm$ 4.1). Our study was comparative with the study found among African-Americans and whites with diabetes where the mean BMI was 30.6  $\pm$  6.5 kg/m<sup>2</sup>.<sup>35</sup> Our study findings suggest that the high waist circumference in the case female was ( $\geq$  90 cm) (89.7%) more than male was ( $\geq$  90 cm) (45.0%). One-fourth (25.4%) of the total male respondent's waist-hip ratio was at risk ( $\geq$  90 cm), whereas almost three fourth (71.6%) of the total female respondent's waist-hip ratio was at risk ( $\geq$  80 cm). A study revealed that in Bangladesh between 1996-2006, the cases of obesity have risen from 2.7 percent to 8.9 percent.<sup>36</sup> These findings of our study certainly indicate that female is more obese which is a risk to their healthy life and demands necessitate public health attention. The mean ( $\pm$ SD) diastolic and systolic blood pressures of the respondents were 125.4 $\pm$ 12.9 and 81.6 $\pm$ 8.3 mmHg. In a meta-analysis, hypertension was reported to be prevalent in 11.3 percent of adult Bangladeshi.<sup>37</sup> In a study done by Sayeed MA et al., Diastolic



& systolic hypertension were prevalent in 9.1% & 14.4% of the population, respectively. <sup>38</sup> In our study, the higher rate is possible since the study subjects are not the general population. They are urban, mostly having sedentary professions who are physically inactive. Physical exercise was not performed by 57.2%, 37.9%, 28.7%, 26.1%, 21.3%, and 10.9% due to them feeling too tired, not in good health, lack of a safe place, and lacked proper motivation due to fear of injury, lack of company respectively. Moreover, 8.9%, 7.8%, and 0.9% of respondents did not do any physical exercise due to feeling too old, not liking to exercise, and lack of money, respectively. In other studies, for senior diabetic individuals, insufficient exercise was associated with a loss of self-efficacy, fatigue, and even being diverted by tv programs. These characteristics were equally significant in younger diabetic individuals, lack of physical activity, while fear of diabetes increasing, limited time, adverse weather, and sadness were also significant reasons. <sup>30</sup> People with diabetes' physical activity involvement may be influenced by their beliefs, attitudes, and self-motivation toward disease control. <sup>34</sup> We can see that some barriers are also present for doing physical exercises even though the respondents' physical activity level is high. In this study, it seems that four-fifths (85.8%) of the respondents were encouraged more by their family members for physical activity. Still, more than one-third, 38.4%, got company by at least relatives or neighbors during exercise. Setting small but attainable targets and assisting them with activity are both helpful in modifying habits. <sup>39</sup> In recent times, initiatives to treat people with diabetes with activity counseling appeared promising. Very few (4.7%) respondents had indoor facilities for physical activity, where the rest of all (95.3%) depended on outdoor facilities for their physical activities. Both (indoor and outdoor) facilities were not found for anyone. About two-third, 67.4% respondents had neighborhood Streets, 37.9% had Walking/Jogging Trails, 14.4% respondents had Park, 5.9% respondents had playgrounds, and 0.9% respondents had gyms and treadmills access for physical activity, according to multiple responses. The utilization of parks, recreation facilities, jogging tracks, schools, and health clubs was more common among those who reported daily exercise. <sup>28</sup> It seems that the study found that emphasis on the construction of parks and playgrounds should be given priority as people are more focused on outdoor facilities for physical activity. More than two-thirds (69.5%) of respondents had good road facilities as favorable neighborhood characteristics for physical activities. More than three-fifth (63.5%) and (63%) of the respondents had lovely scenery and sidewalks as favorable neighborhood characteristics for physical activity. Almost half (49.9%) of the respondents had security for physical activities. More than two-fifths (43.9%) of respondents had not any vehicle on the street. Almost one-third (27.4%) of the respondents had access to shady roads, whereas 9.7% had street lights

facilities. 7.1% of respondents did not face any street dogs, whereas 2% of respondents were free from heavy traffic. Jogging track, locations for physical activity in the neighborhood, local tree-lined streets, the existence of walking places, a well-maintained garbage-free community were all linked to frequent exercise.<sup>29</sup> Services and activities conducted in open spaces, green zones, and informal places should be considered vital components of a neighborhood's facilities that might aid in promoting regular exercise.

## CONCLUSION:

Awareness programs should be introduced more for physical activity. Local governments must examine the expense and accessibility of physical exercise facilities in their communities. Organized clubs may aid mutual incentive for physical activity. Diabetes organizations may need to devote more time to counseling and education about the social aspects and the health advantages of physical exercise. Diabetic care professionals should emphasize educational intervention on the health benefits of physical activity.

### Authors' Contributions

All authors have given their intellectual participation in concept development and designing of the study, done credible literature review and data collection and analysis. The final manuscript has been reviewed and approved by all the authors.

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