An Evaluation of the Frequency and Severity of Erectile Dysfunction in Hypertensive Married Men Compared with Normotensive Married Men

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To cite this article:
Kabirul Hasan Bin Rakib, Afroja Alam, Md. Atikur Rahman, Nazim Al Azad, Akm Habibullah Bahar, Nazmul Hoque Munna, Rabeya Bosri, Shaheen Lipika Quayum, Md. Abul Kalam Azad. An Evaluation of the Frequency and Severity of Erectile Dysfunction in Hypertensive Married Men Compared with Normotensive Married Men. Cardiology and Cardiovascular Research. Vol. 4, No. 3, 2020, pp. 85-91. doi: 10.11648/j.ccr.20200403.12

Received: April 22, 2020; Accepted: May 21, 2020; Published: June 9, 2020

Abstract: Background: Erectile dysfunction (ED) exerts a major burden on the quality of life of the patients and their sexual partners. It has been identified as an independent risk factor for cardiovascular disease. Hypertension is a well-established risk factor for ED. Both hypertension and erectile dysfunction has age dependent relationship. Objective: To evaluate the frequency and severity of erectile dysfunction in hypertensive married men compared with normotensive married men of similar demographic characteristics attending a tertiary care hospital of Bangladesh during the period from June 2017 to March, 2018. Methodology: This cross-sectional comparative study includes 75 hypertensive and 75 normotensive young and middle-aged married men (31–59 years) those visited our outpatient clinic. From them, 75 patients had hypertension and 75 were normotensive. Erectile dysfunction was evaluated with pre validated Bengali version of the International Index of Erectile Function (IIEF-5) questionnaire. Results: Erectile dysfunction (ED) was found in 61.3% of patients with hypertension compared with 37.3% of normotensive subjects. ED is more common and more severe among hypertensive patients than normotensive counterparts. Hypertension duration, hypertension severity and age were found positively correlated with erectile dysfunction. Taking regular medication and control of BP gave positive influence upon erectile status. No association was found between ED and smoking but a weak negative correlation of increased body mass index (BMI) and decreased ED was found in both hypertensive and normotensive group. Conclusion: Hypertensive patients present with erectile dysfunction more frequently than age matched normotensive individuals. As erectile dysfunction is a matter of embarrassment, doctors should be motivated to discuss such issue. Control of blood pressure seems to confer good influence upon the prevalence of erectile status. We need further studies to authenticate such observation and to unveil other risk factors of ED in our country and to go for appropriate management.
Keywords: Erectile Dysfunction (ED), Cardiovascular, Hypertension, Body Mass Index (BMI)

1. Introduction

Erectile dysfunction is a common clinical problem. It interferes with a man’s self-esteem, interpersonal relationships and sense of wellbeing. ED affects the quality of life of both patients and their sexual partners. Essential hypertension is widely accepted as a risk factor for erectile dysfunction. Erectile dysfunction is currently considered to be due to atherosclerotic lesions of the penile arteries. It is considered to be a forerunner of Ischemic heart disease and a risk factor of IHD along with Hypertension and others. In Bangladesh life expectancy is increasing day by day. Beta blockers (i.e. bisoprolol, atenolol, carvedilol and metoprolol), which were practiced for the treatment of hypertension patients in coronary artery disease patients expressed ED in 13% to 28% of patients but nebivolol was found to have less (10%) impact upon ED [1]. Some studies revealed calcium channel blockers have low association with ED [2]. The incidence of erectile dysfunction is minimal with ACE inhibitors. Bate et al [3] revealed ED for the angiotensin converting enzyme (ACE) inhibitors was less than 1%. Some data propose that sexual function and ED may improve through treatment with Angiotensin receptor blockers (ARB) [4]. The favorable effects of angiotensin II antagonists (AIIAs) on sexual function may be related to their ability to block angiotensin II (ANG II), which has been shown to terminate spontaneous erections when administered exogenously in an experimental model of penile function [5]. According to the World Health Organization WHO (2017) [6], life expectancy in Bangladesh is 71.1 years in male and 74.4 years in female and the total life expectancy is 72.7 years. As Hypertension and sexual dysfunction has age-dependent relationship, an outbreak in their prevalence is likely to take place over the next decades. Both duration and severity of hypertension have significant role upon erectile function. Erectile dysfunction is more common and severe in patients who have hypertension for longer duration (> 5-6 years) [7]. Similarly, patients with severe hypertension suffer from severe ED [8]. The effects of erectile dysfunction are profound. It interferes with a man’s confidence and sense of wellbeing [9]. Erectile dysfunction and cardiovascular disease are thought to have some shared pathways on the basis of animal and human models [10]. It can be considered as a symptom of vascular endothelial damage [11]. Endothelial dysfunction is thought to be the common denominator in the pathophysiology of both CVD and ED [12]. The “artery-size hypothesis” of Montorsi et al [13] suggests that on an average, ED occurs three (3) years prior to a subsequent cardiovascular event. Erectile dysfunction has been identified as an independent risk factor for cardiovascular disease. The hazard ratio is 1.45 which is equal or greater compared to traditional risk factors like hyperlipidemia, smoking, positive family history [14]. But more than 70% of erectile dysfunction remains undiagnosed [15]. The physicians’ reluctance to ask about such abnormalities is the main cause of it. Inadequate training and misperceptions of medical practitioners may also contribute. ED is almost ignored by the Bangladeshi researchers. But it can be easily detected by having male patients’ complete standardized questionnaires IIEF-5. Rosen et al [16] which consists of items 1, 2, 3, 4, 5 and 15 from the full-scale IIEF-15; a sum score of 24 or less indicates the presence of ED. A study conducted in 2015 described ED to be very high (53.98%) in Bangladeshi diabetic men. But there is no study in Bangladesh among hypertensive population addressing this important issue.

2. Objectives

a) General objective:
1. To compare the frequency and severity of erectile dysfunction among hypertensive and normotensive married men attending a tertiary care hospital of Bangladesh.

b) Specific Objectives:
1. To find out the frequency of erectile dysfunction among hypertensive and normotensive married men attending in a tertiary care hospital of Bangladesh.
2. To find out the severity of erectile dysfunction among hypertensive and normotensive married men attending in a tertiary care hospital of Bangladesh.

3. Methodology and Materials

It was a cross sectional comparative study. The study was done in the Department of Internal Medicine, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka. The study was done from date of IRB approval (June 2017 to March, 2018). The protocol was approved by the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University (BSMMU) Dhaka. A total of 150 patients were selected as a study population. Purposive sampling was applied to collect the sample as per inclusion and exclusion criteria. The study was conducted in accordance with the principles of the Helsinki declaration after approval by institutional review board. Subjects were taken when they gave informed consent, and the procedures were followed in accordance with institutional guidelines. An informed written consent was obtained; procedure was followed according to institutional guidelines. Secondary hypertension was excluded by history, clinical examination and documented laboratory investigations. A data collection sheet containing details of patient’s demographic data along with detailed information regarding hypertension severity, hypertension duration, medication etc. Erectile dysfunction was evaluated by a standardized questionnaire. After collecting the data, it was checked and rechecked for omission, inconsistencies and
improbabilities. Data analysis was performed by Statistical Package for Social Science (SPSS), version-22. The frequency and severity of erectile dysfunction and other categorical variables were reported as proportion with 95% confidence interval. The categorical data were compared by chi-square test followed by logistic regression analysis as a significant level of 0.05%. Logistic regression analysis was employed to determine the factors related to erectile dysfunction.

1. Inclusion Criteria
   a) Age of 20 years to 59 years
   b) Gender: male
   c) Married state and active sexual relationship with wife or wives for at least the past 6 months
   d) Known hypertensive for at least 6 months
   e) Agree to participate and sign the informed consent (irrespective of medication and status)
   f) Capable to answer a self-applied questionnaire

2. Exclusion Criteria
   a) Any known disease of the male genitalia
   b) Known secondary hypertension
   c) Known diabetes mellitus
   d) A history of substance or drug abuse

4. Results

Analysis was done with the data of 150 cases. Out of the total 150 cases 75 were hypertensive and 75 were normotensive. The respondents were further sub grouped into an age matched manner. Though selection criteria included 20 to 59 years of age; none was found in the range of 20 to 29 years age. So the study subjects were subdivided into 30 -39 years, 40- 49 years and 50 – 59 years. The predominant respondent age group was 40 to 49 years which included 57.3% and 49.3% in population and 70% in hypertensive population. Few subjects indulging in smoking and tobacco leaf chewing. Table 1 shows the association of BMI with blood pressure in hypertensive and normotensive population. Among 75 normotensive study subjects 28 (37.3%) persons had erectile dysfunction (ED) and the rest 47 (62.7%) persons had not ED. Concomitantly among the 75 hypertensive sample 46 (61.3%) had ED and the remaining 29 (38.7%) didn’t have ED (Table 2). The study subjects were categorized on the basis of their International Index of Erectile Function (IIEF-5) score. Nobody was found in the range of severe ED (IIEF-5 score 0-6) both in hypertensive and normotensive group. In the moderate to severe range (IIEF-5 score 7-12) hypertensive is 5 (6.7%) and the normotensive is 0 (0%) out of 75 in each group. In the mild to moderate categories (IIEF-5 score 13-18) the hypertensive study subjects have more ED. The mild group (IIEF -5 score 19-24) were difference in between the groups [13 (17.3%) in normotensive population and 14 (18.7%) in hypertensive population. The normotensives had significantly much more number of subjects with no ED in comparison to hypertensive (47 vs 29) (Table 3). Forty-nine (49) hypertensive persons were taking different antihypertensive medications. Out of them thirty-three (33) subjects were on regular medications 16 (48.5%) of which were suffering from ED and 17 (51.5%) were not. Of the 16 known hypertensive men who were taking medicines in an irregular manner 14 (87.5%) had ED and only 2 (12.5%) had not (Table 4). Subjects who had controlled BP had highly significantly less ED than those of uncontrolled BP (Table 5). The study population was further analyzed by making some subgroups on the basis of age at a range of 30 -39 years, 40 -49 years, and 50-59 years to find out any correlation of age. Both numerically and statistically no association was found in the age group of 30-39 years and in 40-49 years of age group. But in the age group of 50 to 59 years the variation was significant (Table 6). The normotensive men aged 50-59 years didn’t found to be associated with significant risk factors for ED (Table 7).

### Table 1. Demographic characteristics of the study subjects (n=150).

| Demographic variables | Normotensive (n=75) No. (%) | Hypertensive (n=75) No. (%) |
|-----------------------|-----------------------------|-----------------------------|
| Age group (in years)  |                             |                             |
| 30-39                 | 20 (26.7)                   | 16 (21.3)                   |
| 40-49                 | 42 (56.0)                   | 42 (56.0)                   |
| 50-59                 | 13 (17.3)                   | 17 (22.7)                   |
| Total                 | 75 (100.0)                  | 75 (100.0)                  |
| Mean±SD               | 42.6±5.53                   | 44.0±7.4                    |
| Range                 | (33-55) yrs.                | (30-59) yrs.                |
| Residence             |                             |                             |
| Urban                 | 14 (18.7)                   | 22 (29.3)                   |
| Rural                 | 61 (81.3)                   | 53 (70.0)                   |
| Occupational status   |                             |                             |
| Unemployed/Dependent  | 1 (1.3%)                    | 1 (1.3%)                    |
| Farmer                | 2 (2.7%)                    | 4 (5.3%)                    |
| Businessman           | 17 (22.7%)                  | 17 (22.7%)                  |
| Government jobs       | 3 (4.0%)                    | 6 (8.0%)                    |
| Private service       | 43 (57.3%)                  | 37 (49.3%)                  |
| Workers               | 6 (8.0%)                    | 7 (9.3%)                    |
| Other                 | 3 (4.0%)                    | 4 (5.0%)                    |
| Level of education    |                             |                             |
### Demographic variables

|                           | Normotensive (n=75) | Hypertensive (n=75) |
|---------------------------|---------------------|---------------------|
| Illiterate                | 6 (8.0%)            | 6 (8.0%)            |
| Primary                   | 24 (32.0%)          | 18 (24.0%)          |
| Secondary                 | 14 (18.7%)          | 11 (14.7%)          |
| Higher secondary          | 11 (14.7%)          | 12 (16.0%)          |
| Graduate                  | 12 (16.0%)          | 21 (28.0%)          |
| Post Graduate             | 8 (10.7%)           | 7 (9.3%)            |
| Lower income group (<5000 Tk/month) | 51 (68.0%) | 50 (66.7%) |
| Middle income group (5000-50000 Tk/month) | 17 (22.7%) | 14 (18.7%) |
| Upper income group (>50000 Tk/month) | 7 (9.3%) | 14 (18.7%) |
| Smoking and tobacco leaf chewing Yes | 31 (41.3%) | 29 (38.7%) |
| No                        | 44 (58.7%)          | 46 (61.3%)          |
| Underweight (<18.5)       | 2 (2.7%)            | 1 (1.3%)            |
| Normal weight (18.5-24.99) | 59 (78.7%) | 48 (64.0%) |
| Overweight (25-29.99)     | 12 (16.0%)          | 24 (32.0%)          |
| Obese (>30)               | 2 (2.7%)            | 2 (2.7%)            |

Data were expressed as frequency and percentage. Chi-square test was done to see the association of personal habits between groups.

### Table 2. Presence of erectile dysfunction among hypertensive and normotensive individuals (n=150).

| Status of blood pressure | N | Status of ED | Present | Absent |
|--------------------------|---|--------------|---------|--------|
| Normotensive (n=75) No. (%) | 75 | 28 (37.3%) | 47 (62.7%) |
| Hypertensive (n=75) No. (%)  | 75 | 46 (61.3%) | 29 (38.7%) |

Data were expressed as frequency and percentage. Chi-square test was done to see the association of personal habits between groups.

### Table 3. Distribution of the study subjects according to erectile dysfunction severity (n=150).

| Severity of ED (range of IIEF-5 score) | N | Moderate to severe (7-12) | Mild to moderate (13-18) | Mild (19-24) | No (25-30) |
|----------------------------------------|---|--------------------------|--------------------------|-------------|------------|
| Normotensive                           | 75 | 0 (0.0%)                 | 15 (20.0%)               | 13 (17.3%)  | 47 (62.7%) |
| Hypertensive                           | 75 | 5 (6.7%)                 | 27 (36.0%)               | 14 (18.7%)  | 29 (38.7%) |

Data were expressed as frequency and percentage. Chi-square test was done to see the association of severity of erectile dysfunction between groups.

### Table 4. Effect of regular of medication on erectile dysfunction (n=49).

| Status of taking medication among hypertensive subjects | N | Presence of ED | Present (n=75) No. (%) | Absent (n=75) No. (%) |
|--------------------------------------------------------|---|----------------|------------------------|-----------------------|
| Regular                                                | 33 | 28 (37.3%)   | 47 (62.7%)             |
| Irregular                                              | 16 | 46 (61.3%)   | 29 (38.7%)             |
| Total                                                  | 49 | 30 (51.0%)   | 19 (42.9%)             |

Data were expressed as frequency and percentage. Fisher Exact test was done to see the association of severity of erectile dysfunction with status of taking medication regularly or irregularly.

### Table 5. Association of blood pressure control with erectile dysfunction (ED) status (n=75).

| Control of BP | N | Presence of ED | Present (n=46) No. (%) | Absent (n=29) No. (%) |
|---------------|---|----------------|------------------------|-----------------------|
| Controlled    | 49 | 24 (49%)      | 25 (51%)               |
| Uncontrolled  | 26 | 22 (84.6%)    | 4 (15.4%)              |
| Total         | 75 | 46 (100%)     | 29 (100.0%)            |

Data were expressed as frequency and percentage. Chi-square test done to see the association of severity of erectile dysfunction with status of taking medication.

### Table 6. Association of severity of erectile dysfunction (ED) with different age group. (n=75).

| Age group Severity of ED (IIEF-5 score) (in year) | Group | Normotensive No. (%) | Hypertensive No. (%) |
|---------------------------------------------------|-------|----------------------|----------------------|
| 30-39 Moderate to severe (7-12)                    |       | 0 (0.0%)             | 1 (6.3%)             |
| 30-39 Mild to moderate (13-18)                     |       | 3 (15.0%)            | 4 (25.0%)            |
| 30-39 Mild (19-24)                                 |       | 5 (25.0%)            | 6 (37.5%)            |
| 30-39 No (25-30)                                  |       | 12 (60.0%)           | 5 (31.5%)            |
| Total                                             |       | 20 (100.0%)          | 16 (100.0%)          |
Data were expressed as frequency and percentage. Chi-square test done to see the association of severity of erectile dysfunction with different age group.

### Figure 2. Bar diagram showing the severity of erectile dysfunction (ED) according to blood pressure. (n=150).
Hypertension, dyslipidemia, diabetes, and smoking predict the risk of developing vascular disease and erectile dysfunction [24]. The studied hypertensive participants with smoking and tobacco leaf chewing habits had no significant association. Smoking and/or tobacco leaf chewing was explored among the study subjects who didn’t have significant variation between the normotensive and hypertensive group. There are many recent observational studies on smoking and risk of erectile dysfunction (ED). The evidence available on the association between smoking and ED is inconclusive [25]. A literature review concluded that smokers are 1.5 times more likely to suffer from erectile dysfunction than non-smokers [26]. In the baseline sample of the MMAS, smoking was not independently associated with erectile dysfunction, but it exacerbated the effects of heart disease, high blood pressure and antihypertensive medication [27]. Smoking was not associated with ED in the whole follow-up sample. [28] The association between smoking and/or tobacco leaf chewing with ED was not analyzed in this study. Obesity has been shown to increase the prevalence of ED in some studies [29-31] Obese patients also have an increased prevalence of vascular risk factors [32]. In the MMAS, obesity was an independent predictor of ED [33]. Multiple cross-sectional studies have shown that overweight (body mass index [BMI] 25 to 30 kg/m²) and obese (BMI >30 kg/m²) men have an incremental increase in the risk of ED with the relative risk ranging from 1.5 to 3.0-fold[34]. A randomization was done in a prospective study by Esposito et al upon 55 men with ED to healthy behaviors (caloric reduction and consistent exercise) vs. control. After a follow-up of two years, the treatment arm averaged 15 kg of weight loss with 31% regaining normal erectile function compared to 2% in the control arm. Obesity in itself may not be a direct risk factor, but can induce vasculogenic impotence through increasing risk of chronic diseases including diabetes, hypertension, heart disease and hyperlipidemia. A weak negative correlation of increased BMI with decreased erectile functionality was found in both Hypertensive and normotensive study subjects.

6. Limitations of the Study

Being a hospital-based study, finding of this study are not generalized. It didn’t include all the targeted population. Certainly, it cannot reflect the actual scenario regarding the frequency and severity of ED among hypertensive and normotensive population of the whole country.

7. Conclusion and Recommendations

The study indicated that the severity of erectile dysfunction was greater in hypertensive individuals than in age matched normotensive individuals. Anti-hypertensive drug administration and life style modification through dieting and other measure was positively related to erectile function. Controlling of BP gave a good outcome on erectile function. Taking regular anti-hypertensive medication was found to be a good practice and had positive influence upon the erectile function. Presence of ED in hypertensive patients should not be recognized instantly to any antihypertensive medications. All other causes of ED should be considered.

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