

A cross-sectional study of hypertensive outpatients to determine the necessity of asking about erectile dysfunction symptoms

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Abstract

Background: Erectile dysfunction (ED) is common amongst hypertensive men. Hypertensive patients often attribute it to antihypertensive drugs, although conflicting evidence linking ED with antihypertensive medication exists. The objectives were to determine the prevalence and severity of ED, the type of treatment sought, and the risk factors for ED among hypertensive men.

Method: A cross-sectional survey conducted over six months from June to November 2008 at University Kebangsaan, Malaysia Medical Centre, Kuala Lumpur. Inclusion criteria included hypertensive men above 30 years old, with essential hypertension for at least three months. We excluded diabetics, a history of pelvic surgery and known psychiatric illnesses. The International Index of Erectile Function-5 (IIEF-5) assessment was used with a standardised checklist. We analysed data using SPSS, to assess the prevalence and association of ED with selected variables.

Results: Of the 200 participants screened, 35.5% perceived that they had ED. However, prevalence increased to 69% after screening using an IIEF-5 questionnaire. Forty-eight per cent were reported to have moderate-to-severe ED. ED was significantly associated with age (p -value = 0.0001). No significant associations were found between ED and the duration of the hypertension (p -value = 0.505), hypertension control (p -value > 0.05), smoking status (p -value = 0.858) or number of antihypertensive medication taken (p -value > 0.05). Among perceived and proven ED patients, traditional medicines were mainly used for treatment (18.3% and 17.2% respectively).

Conclusion: ED is a problem among hypertensive patients. It was associated with age but not with hypertension duration, control, number of antihypertensive drugs or smoking. Physicians should enquire about ED symptoms in hypertensive patients, as most of them resorted to self-treatment with traditional medicines.

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Introduction

Erectile dysfunction (ED) is defined as the “inability to attain or maintain penile erection sufficient for satisfactory sexual performance”.¹ The prevalence of ED is increasing, and it is estimated that 322 million men worldwide will be affected by 2025, with the largest projected increase occurring in developing countries.² The prevalence of ED varies from 6.4-70.1%, and the wide variation is mainly due to the difference in assessment tools used, and the populations studied.³⁻⁸

Physiologically, normal erection is maintained by a complex interplay between vascular and neurological events. Any condition that affects the vascular supply or the neuronal pathways to the penis, whether medical or psychological in origin, may cause ED.^{1,9,10} Studies have shown that the prevalence of ED is significantly associated with age, the presence of co-morbid conditions and smoking.^{3,4,6} Millions of men are affected by ED, often suffering in silence, while experiencing significant mental and psychological stress that affects their familial relationships and their social lives.

Current research on ED focuses on the high prevalence among men who have cardiovascular disease.¹¹ Hypertension is an important risk factor for ED.^{1,3,4} Emphasising the correlation between ED and hypertension allowed for opportunistic screening, i.e. cardiovascular risk assessment, of this problem, which would have not been addressed voluntarily by patients with ED symptoms.¹¹

To date, there have been few studies that have actively screened for and detected the presence of ED among hypertensive patients. With the rise in prevalence of hypertension, the burden of illness and treatment costs pose problems in terms of long-term healthcare planning and budgeting. The wide range of options available for ED treatment allows for early and appropriate intervention to improve the quality of life of these men. Our study aims to determine the prevalence of ED among hypertensive patients, and the factors associated with this condition.

Method

A cross-sectional study was conducted at the University Kebangsaan Malaysia Medical Centre (UKMMC) in Kuala Lumpur, Malaysia, for a period of six months, from June–November 2008. A total of 200 male hypertensive patients aged 30 and above, attending the UKM Primary Care Centre and the medical outpatient clinic at UKMMC, were recruited during the study period. There was a 100% response rate. Patients with concomitant diabetes mellitus, a previous history of pelvic surgery and psychiatric illness were excluded because these conditions are associated with ED.

Two sets of questionnaires were used in this study. The first consisted of a checklist on demographic data, hypertensive profiles and other cardiovascular risk factors. In this questionnaire, the patients' perceptions of having ED were assessed in a "yes" or "no" format. Information regarding intervention, or on remedies taken for the perceived condition, was also recorded. This included either drugs, or traditional remedies, used in the preceding six months.

The second questionnaire was the International Index of Erectile Function-5 (IIEF-5), an abbreviated version of the International Index of Erectile Function (IIEF). This was used to assess the level of ED. The original IIEF contains 15 items that evaluate five distinct domains of male sexual function: erectile functionality (questions 1, 2, 3, 4, 5 and 15), orgasmic function (questions 9 and 10), sexual desire (questions 11 and 12), intercourse satisfaction (questions 6, 7 and 8), and overall satisfaction (questions 13 and 14). The IIEF-5 contains only five of the original 15 questions, namely questions 2, 4, 5, 7 and 15. Each question has five different answer options that carry marks of 0-5, bringing the total score to 25 points. Scores for ED severity are categorised as none (score 22-25), mild ED (score 17-21), mild-to-moderate ED (score 12-16), moderate ED (score 8-11) and severe ED (score 1-7). A validated Malay-version IIEF-5 questionnaire

was used concurrently.¹² Missing or incomplete data on the patients' clinical profiles and recent special investigation results were extracted from the patients' medical records.

Ethical approval was obtained from the medical and ethics committee of the UKMMC. Informed consent was obtained by the researcher after the participants fully understood the aims and the nature of the study. All interviews were conducted privately by the researcher herself. The confidentiality and anonymity of the participants were maintained throughout the study. Data extracted from the patients' medical records were computerised, and were not linked to any identifying information. The data were kept in electronic copy form, and were only accessible by the researcher. Access to identification information was restricted to the researcher and the study coordinator. All the participants received standard care for their hypertension. Those identified as having ED were appropriately treated and/or referred.

Statistical analysis

Data were analysed using SPSS (Statistical Program for Social Sciences) software, version 12.0.1. Pearson's chi-square was used to determine the association between two categorical variables. Student's t-test and analysis of variance (ANOVA) were used to determine significant differences between the means of two or more groups. All tests were carried out using a priori level of significance of 0.05.

Results

Demographic and clinical characteristics

The socio-demographic characteristics of the participants are recorded in Table I.

The mean age of the participants was 58.4 ± 8.9 years (range 37-80 years), with 75% in the 51-70-year-age group.

The mean blood pressure was 136.0 ± 15.9 mmHg systolic, and 80.9 ± 9.9 mmHg diastolic. Regarding blood pressure control, 52% had systolic readings of less than 140 mmHg, and 75% recorded a diastolic pressure of less than 90 mmHg.

The mean total cholesterol level was 5.23 ± 0.98 mmol/l, the mean low-density lipoprotein (LDL) cholesterol was 3.14 ± 0.84 mmol/l, and the mean high-density lipoprotein (HDL) cholesterol was 1.36 ± 0.36 mmol/l.

Prevalence of actual and perceived erectile dysfunction

The prevalence and severity of ED based on the IIEF-5 scores are listed in Tables II and III.

Our study demonstrated that 35.5% (71/200) of the participants perceived that they had ED. However, 69% (138/200) of the same cohort had actual ED based on the

Table I: Socio-demographic characteristics

Ethnicity	n (%)
Malay	105 (52.5)
Chinese	86 (43.0)
Indian	8 (4.0)
Others	1 (0.5)
Marital status	
Married	185 (92.5)
Single	5 (2.5)
Divorced	4 (2.0)
Widower	6 (3.0)
Smoking status	
Non-smoker	99 (49.5)
Ex-smoker (stopped ≤ three months)	72 (36.0)
Current smoker	29 (14.5)
Types of antihypertensive medications	
Beta blockers	87 (43.5)
Diuretics	77 (38.5)
Calcium-channel blockers	79 (39.5)
Angiotensin-converting enzyme inhibitors	32 (16.0)
Alpha blockers	3 (1.5)

Table II: ED prevalence among hypertensive patients: perception of having ED and proven ED

Perception	ED present n (%)	No ED n (%)	Total	Pearson's χ^2
Yes	64 (90.1)	7 (9.9)	71	$\chi^2 = 23.00$ df = 1 p = 0.0001
No	74 (57.4)	55 (42.6)	129	
Total	138	62	200	

Table III: ED prevalence among hypertensive patients: perception of having ED and proven ED by severity group

Perception	Severity of ED n (%)					Total	Pearson's χ^2
	Severe	Moderate	Mild to moderate	Mild	No ED		
Yes	29 (40.8)	2 (2.8)	16 (22.5)	17 (23.9)	7 (9.9)	71	$\chi^2=29.174$ df=4 p = 0.0001
No	39 (30.2)	0 (0.0)	10 (7.8)	25 (19.4)	55 (42.6)	129	

Table IV: Treatment taken by patients with perceived and proven ED

Perception of ED	Modern medicines n (%)	Traditional medicines n (%)	Modern and traditional medicines n (%)	None n (%)	Total n (%)
Yes	8 (11.3)	13 (18.3)	5 (7.1)	45 (63.4)	71 (35.5)
No	-	-	-	-	129 (64.5)
Total					200 (100.0)
^aProven ED					
Yes	5 (7.8)	11 (17.2)	5 (7.8)	43 (67.3)	64 (100.0)
No	2 (28.6)	2 (28.6)	0	3 (42.9)	7 (100.0)

a = $\chi^2 = 7.142$, df = 3, p-value = 0.068

IIEF-5 score. The overall degree of ED severity was severe (34%), moderate (1%), mild to moderate (13%) and mild (21%). The remaining 31% did not have any ED.

In terms of perception and having actual ED, 57.4% (74/138) who perceived themselves as "normal" had proven ED based on the IIEF-5 scores. A highly statistical significant association was found between the perception of having ED and proven ED based on the IIEF-5 scores ($\chi^2 = 23$, df = 1, p-value = 0.0001).

Treatments taken for ED

Our study showed that slightly more than two-thirds of the patients proven to have ED did not seek any form of treatment for their condition. The details of the types of treatment taken for either perceived, or actual, ED are listed in Table IV.

Erectile dysfunction and associated factors

Our study demonstrated that there was a significant association between ED and the age of the respondents (p-value < 0.05) (Table V), although the number of antihypertensive medications taken was not associated with the presence of ED ($\chi^2 = 0.253$, df = 2, p-value = 0.881) (Table VI). There was no significant association between ED and total cholesterol and HDL cholesterol control levels. A post hoc test was carried out to further analyse the association between LDL cholesterol control and ED (Table IV). Taken together, the results suggest that LDL cholesterol control levels do not have an effect on ED.

Table V: ED and age

Age (years)	n (%)	IIEF-5 mean \pm SD	p-value
30-40	9 (4.5)	20.22 \pm 3.35	0.0001
41-50	25 (12.5)	18.16 \pm 6.79	
51-60	77 (38.5)	15.81 \pm 8.33	
61-70	73 (36.5)	12.29 \pm 9.06	
> 70	16 (8.0)	6.13 \pm 7.31	

Table VI: ED and number of medications

Total number of medications	ED present (% within medication group)	No ED (% within medication group)	p-value
1	51 (67.1)	25 (32.9)	0.881
2	57 (30.5)	25 (30.5)	$\chi^2 = 0.253$, df = 2)
3 or more	30 (71.4)	12 (28.6)	
Total	138 (69.0)	62	

Discussion

Our study demonstrated that many Malaysian men with hypertension are unaware that they might have ED. This illustrates the enormous extent of the problem. In our study, only one in two respondents realised that they were suffering from varying degrees of ED. It also demonstrated that participants with perceived ED, and those with actual ED, resorted to traditional remedies to resolve their problems.

The significant difference in the prevalence of perceived and actual ED might be due to Asian values, and community perception of this condition. Studies have shown that Asian men are sexually conservative, and that their perception of and attitude towards ED influences their willingness to report and discuss it.^{7,13,14} In a study by Doumas et al on hypertensive Greek patients residing in the Mediterranean area, a similar observation was made, as erectile functionality was considered to be a matter of honour, and was not easily discussed with a doctor.¹⁵ This may suggest that ED is still considered by men to be a private matter.

We hypothesise that there is a possibility that patients with ED might openly approach their doctors to discuss their condition. Their partners' sexual dissatisfaction and needs would prompt these men to seek medical help,¹⁶ and if these issues were not addressed by the couple, it may be unlikely that ED is perceived to be a problem. From the literature, we also note that Malaysian men are more likely to discuss their ED problem with a friend or relative, prior to seeing a doctor.⁶ Problems would arise if this person were unreliable and provided information that could result in complications, for example drug-related interactions or toxicity.

A qualitative study by Low et al found that although ED was perceived as an important loss in a person's life, some people learned to cope with it, rather than seek help.¹⁷ Older

men attributed a reduction in their sexual capacity and impaired erectile functionality to ageing. They conditioned themselves to accept it.¹³

Our opinion is that doctors need to regularly enquire about sexual functionality, and screen patients by using the IIEF-5 to detect the presence of ED. Another equally important issue that should be addressed is physicians' reluctance to address these issues, and treat patients with ED. From the literature, it can be noted that most Malaysian general practitioners assume a passive role when diagnosing or managing the problem, and only discuss it if the patient raises the topic.¹⁸ These socio-cultural factors affect both the patient and his doctor, and may account for the low prevalence of perceived ED in our study population.

The rationale for offering treatment to a patient who perceives that he does not have ED may be questioned. However, we are of the opinion that engaging in a discussion about ED may resolve fears and encourage discussion in patients who do not have the courage to ask their physicians about ED. The final decision on whether or not to treat the patient would depend on the impact of the condition on the patient's life and sexual relationship, as well as what is agreed between the patient and his physician.

In our study, the prevalence of ED among hypertensive patients was similar to that found in studies carried out by Burchardt et al in the USA, which showed the prevalence of ED to be 68.3% among hypertensive outpatients.¹⁹ A similar study by Giuliano et al observed an ED prevalence of 67% among patients with hypertension, diabetes or both conditions.²⁰ However, studies by Doumas et al¹⁵ and Jensen et al²¹ found a lower prevalence of ED, 35.2% and 26.7% respectively, among hypertensive patients. The available literature suggests that ED is strongly associated with hypertension.

There are several mechanisms that explain the pathogenesis of ED in hypertensive patients. ED can be considered to be a symptom of vascular endothelium damage.²² The synthesis of nitric oxide is necessary for smooth muscle relaxation to occur, causing a rise in blood flow, and resulting in an erection. Severe hypertension is associated with endothelial dysfunction and reduced nitric oxide production by the endothelium.²³ However, in our cohort, we noted that hypertension control was not related to ED. The mean blood pressure of the cohort, as well as the proportion of patients achieving treatment targets, may account for the weak association between ED and blood pressure control (p-value = 0.398, p-value = 0.377).

Medical practitioners do not hesitate to discontinue or change antihypertensive agents when newly diagnosed hypertensive patients present with ED symptoms.¹⁵ Feldman et al pointed out that 25% of ED cases related to the adverse effects to medication, and antihypertensive drugs are the most implicated class.³ Our study did not demonstrate

an association between ED and antihypertensive drugs, and this is similar to the findings of the Treatment in Mild Hypertension Study (TOHMS), which reported that long-term ED sequelae were not associated with antihypertensive treatment.²⁴

Almost all types of antihypertensive agents have been implicated as a cause of ED. Studies such as the Trial of Antihypertensive Interventions and Management (TAIM)²⁵ and TOMHS²⁴ have provided data on the effects of thiazide diuretics and beta blockers, which worsen ED. However, our findings did not demonstrate an association between ED and beta blockers or thiazides. The absence of beta-blocker influence on ED concurs with the review paper by Ko et al, which concluded that there was a lack of substantial evidence of sexual dysfunction with beta-blocker use.²⁶ Similarly, our study was not able to detect any other antihypertensive groups that may have had an influence on ED. It is our suggestion that the presence of ED in hypertensive patients should not be attributed immediately to any antihypertensive medications. All other organic or non-organic causes should be considered.

Current literature highlights the increasing awareness of the high prevalence of ED among men with coronary artery disease. This is due to the fact that LDL cholesterol production causes the destruction of endogenous nitric oxide synthetase (NOS), resulting in endothelium vascular damage and subsequent ED.²⁷ Post hoc analysis of our study population did not show any association between ED and LDL cholesterol. This is similar to a study among Turkish patients that did not detect any association between ED and dyslipidaemia or hypercholesterolaemia.²⁸ On the other hand, a case-control study carried out by Nikoobakht et al found that total cholesterol and LDL cholesterol levels showed a negative correlation with IIEF scores.²⁹ However, we acknowledge the fact that the well-controlled lipid levels in our population could have resulted from the use of lipid-lowering agents, such as statins or fibrates, or both, which have been known to affect steroid hormone synthesis.³⁰ This suggests that dyslipidaemia or hypercholesterolaemia per se are not risk factors for ED.

Smoking has been identified as a risk factor for many prevalence-type studies. Our study suggests that smoking is not associated with the prevalence of ED. However, the Massachusetts Male Ageing Study showed that cigarette smoking did not have an effect on the incidence of ED,³¹ but doubled the risk for developing ED in patients without any cardiovascular risk factors.³²

A moderate, negative correlation was found to exist between ED and patients' age. Elderly persons had lower erectile functionality as scored by the IIEF-5 ($r = -0.367$, $p\text{-value} > 0.05$). The finding was consistent with other major population studies which reported that the prevalence of ED increased with age.⁵⁻⁷ However, in recent years, there seems to have been a momentous shift in how men view

sexual activity. As the ageing population increases around the world, better health and quality of life issues have been highlighted in the media. This includes interest in sexual behaviour and sexual problems in the middle-aged and elderly populations. Contrary to the popular belief that sexual activity reduces with ageing, many studies have proven that sexual interest and activity persist in these age groups.^{13,33}

In terms of seeking treatment for ED, our cohort preferred the use of traditional remedies for ED, as these were easily available in the local setting. Traditional remedies are often marketed as "health supplements", and can be purchased easily without a prescription, which would avoid unnecessary embarrassment. The choice of traditional remedies for ED among our patients contrasted with findings of the Asian Men's Attitudes to Life Events and Sexuality (MALES) study, which reported that the Malaysian population preferred to take modern medications.⁶ However, the Asian MALES study was a population-based study, and did not focus on hypertensive patients who were already taking medication for their condition. Despite this, the majority of our patients (62.9% for perceived ED, 67.3% for proven ED) did not seek any treatment for their ED, and this concurs with the findings of the Asian MALES Study.⁶ Further research exploring the reasons why hypertensive patients choose to take traditional medicines to treat ED, needs to be carried out.

We propose that longitudinal studies be carried out in hypertensive men who develop ED while undergoing treatment, and to more closely examine the risk factors and treatment-seeking behaviour of hypertensive patients with ED. We also recommend that doctors should routinely enquire about ED, and use the IIEF-5 to diagnose it, since this study has found that there is a significant difference between patients' perceptions and actual erectile functionality. Recording the history leading to the development of ED should be as important as monitoring vital signs during a routine clinical visit. Any report of ED as a side effect of antihypertensive medications should prompt the doctor to investigate further before attributing it to the medication alone.

Conclusion

ED was found to be highly prevalent among hypertensive patients. Patients were willing to discuss ED if the physicians initiated the discussion. The majority of patients with either perceived ED, or those with confirmed ED, used traditional remedies to rectify the problem. ED was associated with age, but not with hypertension duration and control, use of antihypertensive medication, hypercholesterolaemia or smoking.

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Competing interests

The authors declare that they have no competing interests.

Authors' contributions

AFAA participated in the design and coordination and drafted the manuscript.

NS conceived the study, carried out the clinical trial, performed the statistical analysis and helped to draft the manuscript.

ZMZ provided content expertise and helped to draft the manuscript.

NAA, HMZA and AFAA participated equally in the discussion.

SEWP participated in the design of the study and statistical analysis.

All authors read and approved the final manuscript.

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