

Erectile Dysfunction among Yemenis: Does Chewing Khat Play a Role?

Yemenlilerde Erektel Disfonksiyon: Khat Çiğneme Bir Rol Oynuyor mu?

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Abstract

Objective: Khat, a type of plant that grows in Yemen and some African countries like Somalia, Ethiopia and Kenya, is considered to be addictive and contains some stimulating substances that may affect different body organs. This study was conducted to identify the causes of erectile dysfunction (ED) and to investigate the effect of chewing Khat on this disease in Yemenis.

Materials and Methods: A total of 236 patients who were treated at University of Science and Technology Hospital and complained of ED were examined with penile Doppler ultrasonography (US). Biodata and health data were collected from the patients' records and via mobile interviews.

Results: The causes of ED were psychological causes (72%), venous leakage (19%) and arterial disease (9%). Psychological ED was most common in 15-29-year-olds, while pathological ED increased with increasing age ($p=0.041$). Heart diseases and diabetes showed a significant association with pathological ED ($p<0.05$). Although 81% of the ED patients in this study chewed Khat, there was no significant association between chewing Khat and either pathological or psychological ED ($p>0.05$).

Conclusion: Psychological problems are the main causes of ED among Yemenis especially in the younger age group. It is too early to exclude Khat as a factor contributing to this health problem, and this topic warrants further case-control studies with a larger sample size.

Key Words: Erectile dysfunction, penile Doppler US, Khat, Yemen

Özet

Amaç: Khat, Yemen ve Somali, Etiyopya ve Kenya gibi bazı Afrika ülkelerinde yetişen, bağımlılık yapan ve farklı vücut organları etkileyen, uyarıcı maddeler içeren bitki türüdür. Bu çalışma, erektil disfonksiyon (ED) nedenlerini belirlemek ve Khat çiğnemenin Yemenlilerde bu hastalık üzerindeki etkisini araştırmak amacıyla yapılmıştır.

Gereç ve Yöntem: Yemen Bilim ve Teknoloji Üniversitesi Hastanesi'nde tedavi gören ve ED şikayeti olan toplam 236 hasta penil Doppler ultrasonografi (US) ile incelendi. Anamnez ve sağlık verileri, hasta kayıtları ve mobil görüşmeler aracılığıyla toplanmıştır.

Bulgular: ED nedenleri; psikolojik nedenler (%72), venöz kaçığı (%19) ve arter hastalığı (%9) idi. Patolojik ED artan yaş ile artarken, Psikolojik ED en yaygın 15-29 yaşındakilerdeydi ($p=0,041$). Kalp hastalıkları ve diyabet patolojik ED ile anlamlı ilişki ($p<0,05$) göstermiştir. Bu çalışmada ED hastaların %81'i Khat çiğnemiş olsa da, Khat çiğneme ve patolojik veya psikolojik ED arasında anlamlı bir ilişki saptanmamıştır ($p>0,05$).

Sonuç: Psikolojik ED sorunları, özellikle genç yaş grubundaki Yemenliler arasında yaygındır. Bu sağlık sorunu katkı sağlayan bir faktör olarak Khat'ı hariç tutmak için henüz çok erken olduğunu ve daha büyük bir örneklem büyüklüğü ile bu konuyu başka vaka-kontrol çalışmaları ile desteklemek gerektiğini düşünmekteyiz.

Anahtar Kelimeler: Erektel disfonksiyon, penil Doppler US, Khat, Yemen

Introduction

Penile erection is a complex process including an interaction between the nervous, arterial, venous and sinusoidal systems. Erectile dysfunction (ED), which is defined as inability to generate or maintain a penile erection of sufficient rigidity for sexual intercourse, is caused by interruption of one or more of the previous systems [1]. The common causes of ED include heart disease, atherosclerosis, high cholesterol, high blood pressure, diabetes, obesity, Parkinson's disease, multiple scler-

osis, low testosterone, Peyronie's disease, tobacco use, alcoholism and treatments for prostate cancer or enlarged prostate. Erectile dysfunction that has an organic origin is worse if combined with psychological factors. However, stress and mental health problems can be the sole cause of ED [1, 2].

ED affects all age groups and has a significant impact on quality of life. The worldwide prevalence was estimated to be 152 million men in 1995 and is expected to reach 322 million men in 2025 [3]. The future trend of ED is aggravated by the high prevalence of diabetes and cardiovascular diseases

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as well as the increasing life expectancy across the Western world because the prevalence of ED increases with age. In a survey conducted in Massachusetts on 1709 men aged 40-70 years, the overall prevalence of ED was 52% with 17%, 25% and 10% as mild, moderate and complete ED, respectively. In the same study, a total of 847 men without ED were followed prospectively for 6-8 years. The crude incidence rate of ED was estimated to be approximately 26 cases per 1.000 man-years and this rate increased with age [4]. A cross-sectional study was conducted on 3921 Canadian men aged 40-88 years in primary care facilities. Of 3921, 50% had ED and this increased rate was associated with cardiovascular disease or diabetes after adjustment for age and other confounders [5].

In Yemen, there is a noticeable increase in the number of patients who complain of erectile dysfunction. Like other erectile dysfunction patients throughout the world, Yemeni patients complain of this disease due to chronic diseases like hypertension and diabetes or due to drug addiction. Yemenis have another possible cause for ED, which is chewing Khat, a type of plant that grows in Yemen and some African countries. Chewing Khat is considered a cause of psychosis because Khat contains some stimulating elements that may affect ED. Therefore, this study was conducted to discover the causes of erectile dysfunction among Yemeni patients and to evaluate whether there is a relationship between chewing Khat and ED.

Materials and Methods

Study subjects

All patients who complained of erectile dysfunction and were referred to undergo Penile Doppler US in either UST Hospital or in First Scan Centre, Sana'a, Yemen, in the period from 2010 to 2012, were enrolled in this study. Bio and demographic data and the clinical history, including chronic diseases such as heart diseases and diabetes and a history of chewing Khat, were collected from the patient records and through phone interview questions. Participation was voluntary and the study protocol was approved by the ethical committee of Faculty of Medicine and Health Sciences, University of Science and Technology, Yemen.

Methods

All patients were examined with real time ultrasonographic color doppler using a high frequency transducer. A high frequency linear (7-10 MHz) probe was used. In a quiet dark room, the corpus cavernosum near the base of the penis of one side was injected with 30 mg of papaverine and 10-20 µgm of prostaglandin E1 (PGE1). Both cavernosal arteries were scanned for the peak systolic velocity (PSV) and end diastolic velocity (EDV) every 3 min. The patient provided information about a prolonged erection. The study followed

Table 1. Characteristics of patients with Erectile Dysfunction (n=236)

Variable	n (%)
Age (Years)	
15-29	114 (48)
30-44	57 (24)
45-75	65 (28)
Needle used	
Quadmix	124 (52.5)
Papervine	112 (47.5)
Chewing Khat	
Yes	190 (81)
No	46 (20)
Taking medicine	
Yes	40 (17)
No	196 (83)
Hypertension	
Yes	38 (16)
No	198 (84)
Heart disease	
Yes	6 (2)
No	230 (98)
Diabetes	
Yes	15 (6)
No	221 (94)
Causes of Erectile Dysfunction	
Venous leakage	44 (19)
Arterial disease	22 (9)
Psychological	170 (72)

the International Index of Erectile Function (IIEF) for assessing erectile dysfunction.

Statistical Analysis

Data analysis was performed with the statistical Package for Social Sciences for Windows (SPSS) version 11.5. Data were treated as categorical variables and cross-tabulated. The associations between variables were tested using the Pearson's Chi Square test and Fisher's Exact test where applicable. The level of significance was defined as $p < 0.05$.

Results

This study was conducted on 236 patients who suffer from erectile dysfunction. The majority of the patients

Table 2. Factors associated with Erectile Dysfunction among Yemeni patients

Variables	Erectile Dysfunction		χ^2	p value
	Pathological	Psychological		
Age (Years)				
15-29	24 (21)	90 (79)	6	0.041
30-44	15 (26)	42 (74)		
45-75	25 (39)	40 (61)		
Needle used				
Quad-Mix	26 (21)	98 (79)	5	0.025
Papaverine	38 (34)	74 (66)		
Chewing Khat				
Yes	54 (28)	136 (72)	0.8	>0.05
No	10 (22)	36 (78)		
Taking medicine				
Yes	12 (30)	28 (70)	0.2	>0.05
No	52 (26.5)	144 (73.5)		
Hypertension				
Yes	12 (32)	26 (68)	0.45	>0.05
No	52 (26.5)	146 (74)		
Heart disease*				
Yes	4 (67)	2 (33)		0.048
No	60 (26)	170 (74)		
Diabetes				
Yes	9 (60)	6 (40)	9	0.003
No	55 (25)	166 (75)		

*The association was tested using the Fisher's Exact Test

(48%) were in the younger age group (15-29-year-olds). Hypertension, heart disease and diabetes were observed in 16%, 2% and 6%, respectively. Approximately 81% of patients chew Khat. Penile Doppler US identified that 19%, 9% and 72% of patients with ED were due to venous leakage, arterial disease and psychological causes, respectively (Table 1).

According to univariate analysis, psychological ED is more prevalent in the younger age group than pathological ED, which is more common among old patients ($p < 0.05$). Although hypertension is the most prevalent chronic disease in the study population, it is not significantly biased to either psychological or pathological ED. The study showed a significant association between pathological ED and diabetes ($p = 0.003$) as well as heart disease ($p = 0.048$). Psychological ED had an approximately equal distribution among patients who do or do not chew Khat while pathological ED was slightly higher among patients who chewed Khat (Table 2).

Discussion

The current study showed that 48% of ED patients were 15-29-year-old men. This finding contradicts the international reports showing that ED increases proportionally with age [6-10]. The Massachusetts Male Aging Study (MMAS), the first cross-sectional study on ED, which was conducted in Boston, USA, reported that the prevalence of ED was 52% among men aged 40-70 years of age [6]. An epidemiological survey, conducted on Cologne's males in Germany, found that the prevalence of ED was 53.4% in men in their 70's compared to 2.3% in men in their 30's [7]. The same trend of ED was also reported in five Asian countries [10]. A Korean epidemiological survey, conducted by the Korean Society for Sexual Medicine and Andrology (KSSMA), reported a rapid increase in ED with increasing age where the prevalence of ED was 4% in men in their 40's and 41% in men in their 70's [9]. Although ED has been traditionally described as the disease of older

males, new studies have recently reported ED in younger men [11].

The classification of ED in the present study, using penile doppler US, showed that pathogenic ED increases with increasing age, which is consistent with the previous reports. We also found that psychogenic ED decreased with increasing age. This may explain the deviation of the ED trend in Yemen compared to the trend in other countries; psychogenic ED represented 72% of ED cases in the current study. The association between psychogenic problems and ED is well known [12-14]. The predominance of psychogenic ED among Yemeni patients could be attributed to socio-economic factors such as low income and the lack of a proper sexual education. Psychogenic ED may also be aggravated by the social perception of ED and the perception of the inferiority of patients with ED. Men practice sexual intercourse with their partners under stress, especially the first time after marriage.

We found that 81% of patients with ED chewed Khat, a plant grown in Yemen that contains cathinone and cathine, compounds that are structurally related to amphetamine, on a daily basis [15]. Khat may cause psychosis among Khat chewers, but this effect is dose-related (according to the amount chewed per day) and more likely to occur in people with predispositions [16-18]. We hypothesized that chewing Khat in Yemen may contribute to the high prevalence of psychogenic ED especially among young men. However, our statistical analysis did not reveal a significant association between chewing Khat and psychogenic ED in this study. It seems too early to exclude chewing Khat from contributing to the morbidity of ED, and a community-based, case-control study on this topic should be implemented in the future.

The present study showed a significant association between pathological ED and diabetes. This finding is not surprising because diabetes is an independent predictor of ED in several studies [5, 6, 9, 19, 20]. In the present study, there was a significant association between pathological ED and heart disease, which is in agreement with previous studies [21-23]. On the other hand, ED has been considered a significant risk factor for developing cardiovascular disease [24-26].

In conclusion, erectile dysfunction is a public health problem in Yemen, wherein psychological ED is more common than pathological ED. Psychological ED had affected a higher proportion of younger men with a decreasing prevalence in older men. It is too early to exclude that chewing Khat contributes to this dilemma, and additional community-based, case-control studies on this topic are warranted.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of University of Science and Technology Faculty of Medicine, Sana'a Yemen.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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