

Bother index can be used in deciding how the symptom nocturia itself is important

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Aim: To report the prevalence of nocturia. Associated risk factors and bother in various age groups (by decade) were evaluated in order to determine the characteristics of individuals who may need medical help.

Materials and methods: To estimate the extent to which patients were bothered relative to nocturia in various age groups (by decade), a descriptive figure, the “bother index,” was used. The bother index was calculated by dividing the number of individuals reporting a bother score higher than a symptom score by the number of individuals reporting a bother score lower than a symptom score in the same age and sex group.

Results: Data from 940 women and 2073 men were analyzed. The overall prevalence of nocturia was 65%, with an increasing proportion in the older groups in both sexes ($P < 0.001$). In light of the bother index, nocturia was better tolerated in women than in men (0.0271 vs. 0.074, respectively), and patients with a higher frequency of nocturia also reported a higher bother score ($P < 0.001$). The highest bother index value was seen in the third decade (0.080), and it decreased as the decades progressed.

Conclusion: Nocturia is better tolerated in women and elderly populations. The bother index may be a useful indicator of the bother of nocturia and may help in deciding whether an individual with nocturia needs medical help.

Key words: Bother, nocturia, prevalence

“Bother index” noktürinin tek başına ne kadar önemli olduğuna karar vermede kullanılabilir

Amaç: Tedaviye ihtiyaç duyabilecek bireylere özgü özellikleri tanımlamak için noktürinin prevalansını, ilişkili risk faktörleri ve dekatlara göre verdiği rahatsızlık.

Yöntem ve gereç: Noktürinin dekatlarda verdiği rahatsızlığı tahmin edebilmek için tanımlayıcı bir model olan “bother index” kullanıldı. Bother index aynı yaş ve cinsiyet grubundaki bireyler sayısal olarak bölünerek, rahatsızlık skoru semptom skorundan fazla olan ve rahatsızlık skoru semptom skorundan düşük olanlar şeklinde hesaplandı.

Bulgular: 940 bayan 2073 erkekten toplanan veriler analiz edildi. Noktürinin genel prevalansı her iki cinsiyette yaşla artmakla beraber % 65’i ($P < 0,001$). Bother index ışığında noktürinin bayanlarda erkeklere göre daha iyi tolere edildiği gözlemlendi (sırası ile 0,0271’e karşı 0,074) ve noktüri sıklığı daha fazla olan hastalar daha yüksek rahatsızlık skoru bildirdi ($P < 0,001$). En yüksek “bother index” değeri 3. dekatta görüldü (0,080) ve dekat arttıkça azaldığı izlendi.

Sonuç: Noktüri bayanlarda ve yaşlı bireylerde daha iyi tolere edilir. “Bother index” noktürinin verdiği rahatsızlığı tahmin etmede yararlı bir belirteç olabilir ve medikal tedaviye ihtiyacı olan noktürüli bireyleri saptamada yararlı olabilir.

Anahtar sözcükler: Bother, noktüri, prevalans

Received: 23.02.2011 – Accepted: 29.09.2011

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Introduction

With an ageing population, urinary symptoms are increasingly becoming a major health issue (1). Nocturia is considered to be the most common lower urinary tract symptom (LUTS) and is increasingly recognized as a clinical entity (2). The International Continence Society (ICS) defines nocturia as “waking at night to pass urine” and it applies to any number of voids at any time during the night (3). Current studies report that nocturia is a common condition in both sexes, and its prevalence increases with advancing age (2). Since these studies used different definitions of nocturia and examined different populations, there is variation in the reported prevalence of nocturia among countries and studies (4).

Nocturia seldom occurs in isolation; it has also been shown to have many different causes and can be associated with a wide range of diseases. This implies that the health status of those with nocturia is probably worse than that of the general population (5). Additionally, nocturia is a bothersome condition with a significant effect on quality of life, and the degree of bother is likely to be associated with the degree of nocturia. Waking at night can result in sleep disturbance and fatigue, with a greater risk of falls and subsequent fractures in the elderly (1). On the other hand, not all patients with nocturia are bothered by their condition. This relationship is probably important in determining whether an individual with nocturia will seek medical help.

The Danish Prostatic Symptom Score (DAN-PSS-1) questionnaire was published by Hansen et al. in 1991, and, at that time, it contained a unique feature: not only occurrence but also the bother of the symptom was judged at the same time by the subject. Although correlation of symptom score with bother score has been found to be good in both scoring systems, the symptom and bother questions do not collect the same information, and the variability between the 2 scales has been high (6,7). These differences mean that both symptom and bother questions are needed in the same questionnaire intended for clinical use or epidemiologic studies, considering not only prevalence but also the impact of nocturia in a population.

The aim of this study was to report the prevalence of nocturia, its associated risk factors, and its

impact on bother in various age groups (by decade), in order to quantify and evaluate the bother of nocturia in relation to its severity and determine the characteristics of individuals who may need medical help.

Materials and methods

Between December 2006 and May 2007, attendants of nonurologic patients in our hospital, older than 20 years, were asked to participate in our study and were interviewed directly when they accepted. The Turkish translation of the DAN-PSS-1 questionnaire was used in assessing nocturia/LUTS in the study population. The DAN-PSS-1 questionnaire was delivered to the volunteers in assessing nocturia as well as other lower urinary tract symptoms (8). Responses to the nocturia questions from the DAN-PSS-1, “How many times did you have to urinate during the night for the past 2 weeks?” and “How much of a problem was getting up to urinate during the night for you?,” were specifically evaluated in our cohort for the present study.

Nocturia was rated from 0 to 3 with increasing frequency or severity (symptom score), and its impact on daily life was also recorded as a bother score. For the bother score, 0 was considered as no bother, and the other grades reflected perceived small (score of 1), moderate (score of 2), or severe (score of 3) problems. Concomitant medical conditions including hypertension (HT), diabetes mellitus (DM), cardiovascular disease (CVD), renal disease or neurological disorder (ND), and benign prostatic hyperplasia (BPH), based on patient history, were also noted.

To estimate bother relative to nocturia, a descriptive figure, the bother index (BI), was used for each group. The BI was calculated by dividing the number of volunteers in that age group reporting a bother score higher than a symptom score by the number of others reporting a bother score lower than a symptom score. A low BI was considered to describe a symptom that was tolerable or innocuous, whereas a high BI was considered to describe a symptom that was annoying at any symptom score level. The responses in which symptoms and bother scores were equal provided no information for the BI

since these were insensitive to the prevalence of the symptom.

The data were analyzed using SPSS 10.0 (SPSS Inc, Chicago, IL, USA). The prevalence of nocturia with regard to sex, age group, presence of DM, presence of HT, coronary arterial disease, BPH, renal disease, and stroke was compared between groups using the chi-square test. The association between the risk factors and nocturia prevalence was determined by using logistic regression analysis. Statistical significance was set at 0.05.

Results

The 3013 responders were included. The mean age of the subjects was 44.9 ± 16.5 (median: 45) years, of whom 68.8% were male (Table 1). The overall prevalence of nocturia (more than 1 void/night on average) in the Turkish adult population was 65%. Of this population, 37.3% woke once to void at night, 26.7% woke twice to void at night, and 35.9% woke 3 or more times. Of the men, 67.3%, and of the women, 59.7% reported having nocturia, which was a statistically significant difference between the groups ($P < 0.001$). Additionally, the prevalence of nocturia increased with increasing age; it was lowest in the 20-29 age group (30.7% in males, 28.1% in females) and the highest at and after the age of 70 in both groups (92.7% in males, 89.7% in females) (Figure).

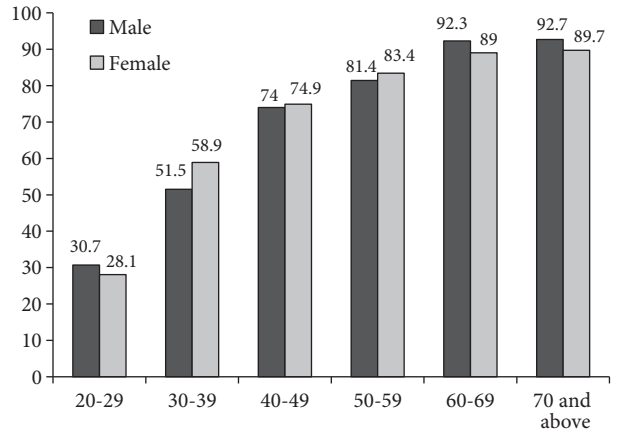


Figure. A plot of the percentages of individuals in different age groups (years) who reported nocturia.

In the univariate analysis, in addition to sex and age group, the nocturia prevalence was affected by the presence of DM, HT, CVD, BPH, renal diseases, and ND; there was not a statistically significant relation between smoking and nocturia (data not shown).

In the logistic regression analyses performed using the factors found to be associated with nocturia, the risk of nocturia was determined to be 1.4 times higher in males than in females (OR = 1.454; 95% CI = 1.229-1.721). The presence of DM increased the risk by 1.05 times, whereas HT increased the risk by

Table 1. The demographic data of individuals with and without nocturia.

	Nocturia % (n)	No nocturia % (n)	BI	Total N
Sex				
Male	67.3 (1395)	32.7 (678)	0.074	2073
Female	59.7 (561)	40.3 (379)	0.027	940
Decade				
2nd	28.9 (221)	71.1 (543)	0.060	764
3rd	53.5 (259)	46.5 (225)	0.080	484
4th	74.3 (391)	25.7 (135)	0.049	526
5th	82.1 (439)	17.9 (96)	0.075	535
6th	91.7 (421)	8.3 (38)	0.040	459
≥7th	92.2 (226)	7.8 (19)	0.053	245

1.1 times, CVD by 1.2 times, BPH by 1.1 times, and renal diseases by 2.7 times. The risk of nocturia was 2.1 times higher in those who had a history of stroke or any other ND than in those who did not (OR = 2.109; 95% CI = 1.515-2.935) (Table 2).

Table 3 shows the percentage of individuals waking at different times in the night with different degrees of bother. There was a significant association between more voids at night and an increasing degree of bother (P < 0.001).

Table 2. Logistic regression analysis of the factors affecting nocturia prevalence.

	n (%) [*]	B	OR (95% CI)	P
Age		0.078	1.081 (1.074-1.088)	<0.001
Sex				
Female	940 (59.7)			
Male	2073 (67.3)	0.374	1.454 (1.229-1.721)	<0.001
DM				
Absent	2748 (62.8)			
Present	265 (86.8)	1.054	2.870 (1.971-4.180)	<0.001
HT				
Absent	2563 (61.3)			
Present	450 (85.8)	1.157	3.179 (2.390-4.229)	<0.001
CVD				
Absent	2859 (69.7)			
Present	154 (89.0)	1.238	3.448 (2.046-5.811)	<0.001
BPH				
Absent	2857 (63.7)			
Present	156 (87.1)	1.145	3.141 (1.930-5.811)	<0.001
Renal diseases				
Absent	2974 (64.7)			
Present	39 (82.1)	0.994	2.701 (1.169-6.242)	<0.001
ND				
Absent	2781 (63.9)			
Present	232 (78.0)	0.746	2.109 (1.515-2.935)	<0.001

*Prevalence of nocturia

Table 3. The association between the degree of nocturia and bother.

Nocturia	Bother score								Total n
	0		1		2		3		
	%x	%xx	%x	%xx	%x	%xx	%x	%xx	
1	64.2	71.9	30.8	39.7	4.5	9.0	0.4	0.8	730
2	25.0	20.1	42.8	39.5	25.4	36.4	6.7	9.4	523
≥ 3	7.4	8.0	16.8	20.8	28.3	54.5	47.5	89.7	703
n	652		567		365		372		

%x: row percentage; %xx: column percentage; $\chi^2 = 2858,927$; P < 0.0001.

Discussion

Nocturia is one of the most common urological symptoms in both men and women, and its prevalence increases with advancing age (1). It is reported as the second most bothersome symptom that has severe impact on the health-related quality of life (9). Although the ICS defines nocturia as “waking at night to pass urine”, which applies to any number of voids at any time during the night, the previously unstandardized definition of nocturia resulted in different prevalence rates from different study groups (2,3). Tikkinen et al. reported the age-standardized prevalence of nocturia as approximately 40% in Finland and stated that nocturia was more common among young women than men (10).

We observed a similar prevalence among young individuals, whereas the prevalence rate in men exceeded its rate in women after the age of 60 in our study (Figure). The prevalence rate of nocturia, defined as waking up to pass urine at least once nightly, was 65% (59.7% in women, 67.3% in men) in the present study, whereas 40.6% reported voiding at least twice nightly. In respect to these results, the prevalence of nocturia in Turkey seems to be slightly higher than that of most other countries. This difference may be due to the inclusion of both men and women, without age limits or social factors and habits. Although there was a lower prevalence among women in the present study, other studies have not confirmed this (3,11). However, those studies were not based on a representative study population and they defined nocturia as at least 2 voids per night, the definition that was commonly used before 2002.

It is clear that nocturia is not an isolated entity but is also associated with other diseases. Hence, it may be worthwhile for physicians to screen patients with associated medical conditions or voiding symptoms for nocturia. The increase in nocturia may also be associated with other mechanisms that show an increased occurrence in the elderly compared to younger individuals and may not necessarily be linked to age. Poor health is increasing in parallel with increasing age, and there is an increase in nocturia in men with poor health (12,13). Our study confirmed the association between nocturia and other medical conditions such as DM, HT, BPH, CVD, renal diseases and strokes, or other NDs (Table

2). Interestingly, renal diseases and neurological symptoms were not the most significant correlates of nocturia symptoms, as was noted in a study by Liew et al. (11). In that study, subjects self-identified their medical conditions; that could have led to an underestimation of the prevalence of these diseases in their study and this could be a possible reason for this difference.

The prevalence of nocturia increases with age. Nocturnal polyuria due to age-related changes in the circadian regulation of urine production has been considered to be among the primary causes of nocturia, accounting for up to 70% of cases (14,15). The mean voided volume decreases significantly with age as a result of diminished functional bladder capacity, changes in bladder morphology, progressive denervation, and hypertrophy of the bladder wall caused by obstruction and/or an overactive bladder (16,17). The present study supports this, as shown by an increase in the prevalence of nocturia with age; it increased from 28.9% in the third decade to 92.2% in the eighth decade and beyond. The symptom of nocturia is strongly associated with BPH and our study showed a similar relationship, although Homma et al. suggested that nocturia is the least specific of all of the symptoms associated with BPH and the least sensitive related to treatment (18). In addition to that, there may be some functional changes in the ageing bladder, which results in either a bladder of smaller capacity or a decrease in bladder compliance. Therefore, it is important to use an algorithmic approach to elucidate the cause of nocturia in the elderly, rather than viewing nocturia as a natural part of ageing (4).

There are many simple prevalence studies of nocturia; there is a need for more advanced epidemiological analysis of risk factors and comorbidity using multivariate techniques to further address questions regarding cofactors and predictors for nocturia. When evaluating analytical epidemiological data, it is important to define “normal” and to distinguish between perceptions of symptoms and clinical entities. To maintain a more clinical approach, analytical measures should be combined with a secondary measure such as quality of life, bother, or a clinically relevant symptom score. Epidemiological data are prone to being misused

because associations often have been misinterpreted as causes (19).

A fundamental goal for developing scoring systems for nocturia has been needed to quantify and find objective support in decision-making for nocturia treatment. Although the correlation of symptom score with bother score has been found to be good in some other studies, the symptom and bother questions do not collect the same information and the variability between these 2 scales has been high (7,20). The DAN-PSS-1 scoring system is based on the frequency or severity of urinary symptoms and on their influence on daily life and bother (8).

The simple mathematical approach used in this study, the BI, reflects the relative importance of bother to symptom simultaneously in the same group of patients. We evaluated the perceived bother of nocturia in a population-based sample and compared it within different sex and age groups by means of the BI. In respect to the BI results, we observed that nocturia is considered more bothersome in the young, although it is more prevalent in older age groups. Additionally, women seem to be less bothered by nocturia than men (Table 1).

The nocturnal voiding frequency is another important factor in determining whether a patient with nocturia is likely to be bothered by it and seek medical help. In general, the proportion of people considering nocturia to be a problem increases with

its frequency. The degree of bother increases with 2 or more voids at night. A study performed on 2075 British women showed that 63% who had to void during the night found this to be at least a bit of a problem (21). In another study, 24% of women who had 1 or 2 voids/night considered this as a problem (2). Only 8% of the individuals in a Dutch population and 9.5% of an Asian population felt bothered by 1 void/night (4,11). In our study, 64.2% of the patients did not see 1 episode of voiding at night as a problem.

Therapy for nocturia must be initiated according to the degree of bother. Therefore, appropriate scores quantifying the bother of nocturia/LUTS are required to evaluate the need for treatment of BPH from the patient's perspective. Bother is very important as a symptom score, especially in decision-making among treatment options. We believe that the BI might be used as a more objective criterion, not only to make such a decision in the management, but also for assessing the results of treatment modalities such as watchful waiting and medical or surgical treatment.

Nocturia is a common condition in both men and women, especially in the elderly. It has a strong association with poor health status. Although the degree of nocturia determines whether patients are likely to be bothered, the BI may be a useful indicator of the bother of nocturia and may help in determining whether an individual with nocturia needs medical help.

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