

## THE COST OF NOCTURIA IN EUROPE

### Hypothesis / aims of study

Nocturia is common and can have a profoundly negative effect on those living with the condition, mainly due to its impact on sleep. Nocturia is the leading cause of sleep disruption in adults aged  $\geq 55$  years, but the consequence of poor sleep as a result of nocturia is often overlooked. Poor sleep leads to deficits in daily functioning, productivity and overall quality of life (QoL). The sleep fragmentation experienced by people with nocturia, especially when difficulties falling back to sleep are encountered, might help to explain the wide-ranging negative impact of the condition.

Since nocturia is believed to be an inevitable part of the aging process and not a serious medical condition, it is often regarded as a trivial 'QoL problem' which does not require treatment. It is therefore important to conduct a cost-of-illness calculation to investigate the economic consequences of nocturia. If there is significant cost to society caused by nocturia, the disease is no longer only relevant for the affected individual/family – it becomes a wider societal concern. This may impact upon the perception of nocturia and be of relevance in consideration of whether proactive treatment or 'watchful waiting' is the most appropriate strategy.

US data show that failing to treat nocturia leads to a large economic burden on society; however, these results cannot be translated to Europe as healthcare systems are very different in the USA and in Europe. Therefore, the aim of this study was to establish the cost implications of failing to treat nocturia in a European context. Reduced work productivity and increased falls are the two main sources of cost associated with nocturia which require consideration when calculating the economic burden of the condition.

### Study design, materials and methods

Based on the Epidemiology of LUTS (EpiLUTS) data,  $\geq 12.9\%$  of men and 15% of women experience severe nocturia ( $\geq 3$  voids/night) at least 'often'. European data on working hours and average salaries were obtained from EUROstat.

The impact of nocturia on work productivity was calculated using published data from population surveys of both absenteeism and productivity in professionally active adults with nocturia compared with controls. The work productivity and activity impairment questionnaire was used (1). The net impairment of 9.19% (0% = maximum productivity; 100% = total loss of work productivity) was based on subjects who had  $\geq 1$  void/night in the population survey; however, to ensure a modest estimate, this level of impairment was attributed to those who had  $\geq 3$  voids/night in this study.

To assess the impact of nocturia on falls we estimated the proportional population risk from a study on hip fractures in elderly ( $\geq 65$  years) nocturia patients, showing a prevalence of 1.38% and 1.52% per year for men and women, respectively (2). This was applied to the estimated EU mean cost of hospitalization for a hip fracture (8500 €) (3) to establish the total cost attributable to nocturia.

### Results

Based on prevalence rates from the EpiLUTS study, approximately 7 million men and 8 million women aged between 40 and 65 years have  $\geq 3$  voids/night in Europe (defined as EU-15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the UK).

Table 1 shows the estimated loss of productivity per year for men and women living with severe nocturia based on a reduction in work productivity of 9.19%. In total, nocturia costs approximately €29 billion per year.

Of the 24 million men and 33 million women  $\geq 65$  living in EU-15, approximately 3 million men and 5 million women suffer from  $\geq 3$  voids/night (severe nocturia) according to the EpiLUTS data. Applying the proportional population risk of breaking the hip due to severe nocturia ( $\geq 3$  voids/night) approximately 43,000 men and 76,000 women per year will break a hip in EU-15 due to nocturia (see Table 2). The estimated total cost of hospitalization for hip fractures due to severe nocturia per year in EU-15 is approximately €1 billion.

### Interpretation of results

It is difficult to conduct a cost of illness study in Europe because the European countries are very different. However, it is still interesting to compare the cost of nocturia in Europe with that in the USA. Since it was necessary to use many average values in our calculations, we have been as conservative as possible with the values incorporated into the model. Prevalence data used were for individuals with  $\geq 3$  voids/night (severe nocturia only). Although the prevalence rate (12.9% of men and 15% of women) is based on a sample of individuals aged 40–99 years and includes people above working age, it is still lower than in most other epidemiology studies. In addition, only hip fracture data were used for falls. These numbers are more reliable because a hip fracture must be treated in hospital and there are studies correlating nocturia and hip fractures. The current study, therefore, presents a conservative estimate because all other types of falls are not included. Lastly, the estimate is based upon data from the EU-15 countries only, since these have a more similar price level than some of the wider European Union countries (eg Bulgaria), and the average values therefore do not cover extreme outliers.

### Concluding message

These findings demonstrate that nocturia represents a very significant economic burden for EU-15 society, especially due to a decrease in productivity. This cost estimate challenges preconceived notions about nocturia that it should not be treated because it is a natural part of the aging process. The costs associated with nocturia indicate that whether or not nocturia is treated is not just a matter of relevance for the QoL of affected individuals, but is a wider societal concern.

**Table 1:** Economic burden of nocturia in Europe due to loss of work productivity in patient <65 (average European wage based on full-time employees in 'industry and services' with ≥10 employees).

	<b>Men</b>	<b>Women</b>
Average wage per hour	€14.1	€10.9
Productivity loss per person	180 hours	143 hours
Value of total lost productivity in EU per year	€17,753,966,984	€10,918,327,646

**Table 2:** Economic burden of nocturia in Europe due to hip fractures in nocturia patients ≥65.

	<b>Men</b>	<b>Women</b>
Mean cost of total hospitalization cost due to hip fracture	€ 8500	€ 8500
Number of nocturia patients (≥3 voids/night) suffering hip fracture	43,103	75,931
Total cost of hip fractures due to nocturia per year	€366,371,964	€645,409,339

### References

1. Kobelt G, Borgström F, Mattiasson A. Productivity, vitality and utility in a group of healthy professionally active individuals with nocturia. *BJU Int* 2003;91:190–195
2. Asplund R. Hip fractures, nocturia, and nocturnal polyuria in the elderly. *Arch Gerontol Geriatr* 2006;43:319–326
3. Panneman MJ, Goettsch WG, Kramarz P, Herings RM. The costs of benzodiazepine-associated hospital treated fall injuries in the EU: a Pharmo study. *Drugs Aging* 2003;20:833–839

<b>Specify source of funding or grant</b>	<b>Funded by Ferring Pharmaceuticals</b>
<b>Is this a clinical trial?</b>	<b>Yes</b>
<b>Is this study registered in a public clinical trials registry?</b>	<b>Yes</b>
<b>Specify Name of Public Registry, Registration Number</b>	<b>The study was registered on <a href="http://www.clinicaltrials.gov">www.clinicaltrials.gov</a> (NCT00477490, NCT00615836)</b>
<b>Is this a Randomised Controlled Trial (RCT)?</b>	<b>Yes</b>
<b>What were the subjects in the study?</b>	<b>HUMAN</b>
<b>Was this study approved by an ethics committee?</b>	<b>Yes</b>
<b>Specify Name of Ethics Committee</b>	<b>The study was approved by the institutional review board or ethics committee for each site.</b>
<b>Was the Declaration of Helsinki followed?</b>	<b>Yes</b>
<b>Was informed consent obtained from the patients?</b>	<b>Yes</b>