# 116A

M. Umlauf, K. Burgio, D. Bliwise*, D. Pillion, P. Goode, E. Kurtzer

University of Alabama at Birmingham, Birmingham, AL. USA
and Emory University*, Atlanta, GA, USA

## MECHANISMS OF NOCTURIA IN OLDER ADULTS: POSTAL SURVEY RESULTS

Aims of Study

Nocturia is commonly associated with prostate or bladder problems but it is also an important symptom obstructive sleep apnea (OSA). Both bladder problems and sleep disorders increase in frequency with age. Older adults suffer from problems with sleep maintenance and sleep quality and nocturia is often cited as an aggravating problem. The purpose of this first segment of a multi-phase study is to survey community-dwelling older adults (55 years) for frequency of nocturia and sleep disturbance symptoms. The primary aim of this three-phase study is to recruit subjects for a 24-hour stay (including polysomnography) on a metabolic research unit to observe patterns of urine output and the hormonal effects of sleep disordered breathing on urine output.

Methods

A random sample of 1000 older adults, balanced by ethnicity and gender, were surveyed by mailed questionnaire. The brief questionnaire included 33 items characterizing poor sleep quality, OSA symptoms, nocturia, irritative bladder symptoms, naps, self-rated health, age and sex. The return rate was 18% (n=176) and respondents were equally represented by gender and by ethnicity. Half of the respondents (n = 87, 49%) reported ≥ 2 voidings per night and two-thirds reported nocturia as bothersome. Nearly half (n = 80, 45%) volunteered to participate in subsequent studies.

Results

Although nocturia is commonly attributed to prostate enlargement, there was no statistical difference in nocturia, symptoms of apnea, sleep quality, naps, or bladder irritability between men and women. However, ethnic differences were found among black subjects who reported higher nocturia, more naps, and lower self-rated health. Statistical associations ($p < .05$) were found for nocturia when contrasting by both ethnicity and gender: black women - poor sleep quality (r =.54), naps (r =.30), irritative bladder symptoms (r = .48) and health (r = -.35); white women – irritative bladder symptoms (r = .53); black men - poor sleep quality (r =.44), naps (r =.39), and irritative bladder symptoms (r = .45); and white men – irritative bladder symptoms (r = .32), and poor sleep quality (r = .48). As expected, significant associations were observed in all groups when comparing apnea symptoms and poor sleep quality with the strongest correlations observed among black men (r = .74) to the lowest in black women (r =.39). Additional significant relationships were observed between naps and irritative bladder symptoms in black (r = .31) and white (r = .39) women, and black men (r = .33). As expected, those who volunteered for additional sleep research participation reported poorer quality of sleep and lower self-rated health as well as higher frequency of naps, nocturia, and irritative bladder symptoms than non-volunteers.

Conclusions

Although the phenomena of aging seems to make significant contributions to the development of both bladder problems and sleep disorders, it is important for health care providers to appreciate the latent risk of sleep disordered breathing among all older adults. It is known that many women go undiagnosed for sleep disorders for extended periods and that many women also underreport bladder problems. These findings emphasize the importance of detailed history taking and serious evaluation of sleep and bladder problems among women and minorities given the different ways which they manifest these conditions.

Funding Source: National Institute for Nursing Research, National Institutes of Health, USA

# 116B

M. Umlauf, K. Burgio, D. Bliwise*, D. Pillion, P. Goode, E. Kurtzer

University of Alabama at Birmingham, Birmingham, AL, USA
and Emory University*, Atlanta, GA, USA

## MECHANISMS OF NOCTURIA IN OLDER ADULTS: PRELIMINARY RESULTS OF CLINICAL INTERVIEWS

Aims of the Study

Nocturia is commonly viewed as a benign condition more frequently seen in older populations. As a result, older persons may fail to report this condition, and health care providers may fail to solicit symptoms of nocturia. This is problematic because nocturia may place the older person at risk for injury from falls or may be a symptom of obstructive sleep apnea (OSA), a serious but treatable condition. Nocturia in older adults is commonly overlooked as a symptom of OSA because bladder problems are also prevalent in later years due to prostatic and urologic pathology. However, nocturia is considered pathological at a frequency of two or more events per night. Regardless of cause, nocturia interferes with sleep maintenance and negatively affects sleep quality. The purpose of this phase of the study was to examine nocturia and sleep disturbance symptoms in community-dwelling older adults (> 55 years) and ultimately to identify subjects for an overnight sleep study in a metabolic lab setting.

Methods

Initially, a random sample of 1000 older adults, balanced by ethnicity and gender, were surveyed by mailed questionnaire. The brief questionnaire included 33 items characterizing poor sleep quality, OSA symptoms, nocturia, irritative bladder symptoms, naps, self-rated health, age and sex. The return rate was 18% (n=176) and respondents were equally represented by gender and by ethnicity. Half of the respondents (n = 87, 49%) reported ≥ 2 voidings per night and two-thirds reported nocturia as bothersome. Nearly half (n = 80, 45%) volunteered to participate in the second phase of the study. The clinical interview phase includes intensive interviews which consist of the following battery of tests: Sleep Disorders Questionnaire (Douglass et al, 1994), Functional Outcomes of Sleep (Weaver, 1996), a 3-day bladder diary, American Urological Association Benign Prostatic Hypertrophy Symptom Index (O'Leary, 1994), Bladder and Continence Assessment (Burgio et al, 1990), height, weight, a urine test for infection, and $HbA_{1c}$ to detect poorly controlled diabetes.

Results

Based on the findings from the postal survey, those who volunteered for participation in the clinical interviews typically reported poorer sleep quality and lower self-rated health, as well as a higher frequency of naps, nocturia, and irritative bladder symptoms than non-volunteers. At present, 46 subjects (24 men, 22 women, and 22 white, 24 black) have completed the intensive evaluations. When compared to controls (Douglass et al, 1994), all 46 subjects were within or below normal limits for symptoms of narcolepsy, myoclonus, and psychiatric sleep disorders. All subjects exceeded control norms for sleep apnea symptoms and had scores above the median for patients diagnosed with OSA. No differences were observed for apnea symptoms, or nocturia when comparing by ethnicity or sex. Significant ($p < .05$) associations were found between nocturia and apnea symptoms ($r = .38$); irritable bladder symptoms and apnea symptoms ($r = .35$), nocturia and body mass index ($r = .41$), and health and irritable bladder symptoms ($r = -.31$). Using stepwise linear regression body mass index and functional outcomes of sleep disturbance were found to predict nocturia ($r^2 = .26$), while nocturia and $HbA_{1c}$ were found to predict apnea symptoms ($r^2 = .20$).

Conclusions

Nocturia is a useful marker of sleep apnea because patients can easily identify it. Because frequent nocturnal voiding is considered by many to simply reflect poor diabetes control, bladder or prostate problems, the importance of nocturia as sign or symptom of OSA warrants more examination and exploration. Phase III of this study will entail full polysomnography of selected subjects during a 24 hour stay in a metabolic unit to examine the biochemical mechanisms which contribute to the over production of urine at night.

**Sample Demographics (n = 46)**

| Sex / Ethnicity | N | Nocturia | Apnea Scale | Body Mass Index |
|---|---|---|---|---|
| Male White | 13 | 3.2 | 60 | 30 |
| Male Black | 11 | 3.1 | 68 | 33 |
| Female White | 9 | 1.7 | 54 | 28 |
| Female Black | 13 | 3.4 | 61 | 32 |

References

Burgio KL, Engel BT. Biofeedback assisted training for elderly men and women. Journal of the American Geriatric Society, 38(3):338-40, 1990.

Douglass AB, Bornstein R, Nino-Murcia G, Keenan S, Miles L, Zarcone VP, Guilleminault C, Dement WC and Abelseth D. The Sleep Disorders Questionnaire I: Creation and multivariate structure of SDQ. Sleep, 17(2):160-67, 1994.

O'Leary N. What is the AUA symptom index for BPH, and how is it used? Contemporary Urology, 17-23, February 1994.

Funding Source: National Institute for Nursing Research, National Institutes of Health, USA

# 117

J. Ouslander, C. Adelman, N. Khan, J. Schnelle, D. Bliwise

Emory University and the VA Rehabilitation Research and Development Center, Atlanta, Georgia, U.S.A.

## DOES NIGHTTIME INCONTINENCE DISRUPT SLEEP IN GERIATRIC PATIENTS?

**AIMS OF STUDY**

Nocturia and nighttime incontinence are common problems in the geriatric population. Although these conditions may cause sleep disruption, the relationship between nighttime incontinence and sleep has not been carefully examined. Thus, it remains unknown if incontinence causes awakening, or if incontinence occurs in association with other conditions that cause sleep disruption. Answers to these questions have critical therapeutic implications. We therefore undertook this study in order to better define the relationship between nighttime incontinence and sleep disruption in geriatric patients using state-of-the-art polysomnographic techniques. To our knowledge, this is the first report examining these relationships in geriatric patients using polysomnography.

**METHODS**

Older subjects with chronic nighttime incontinence were recruited from one community and one VA long-term care facility. Each subject for whom consent was obtained and who had at least two nighttime incontinence episodes verified by research staff checks, underwent an overnight sleep study in their own bed using portable polysomnographic equipment. The equipment was interfaced wirelessly with a wetness monitor (Drytime, Healthsense, Inc.) so that sleep state at the time of an incontinence episode could be determined. Bedside noise and light monitors were also interfaced with the polysomnograph in order to identify awakenings associated with environmental factors. Sleep studies were interpreted by a trained sleep technician and an experienced sleep researcher. Volumes of all incontinence episodes were calculated by re-weighing pre-weighed pads.

**RESULTS**

Data from the first 27 overnight sleep studies in 21 subjects have been analyzed. Subjects included four females and 17 males, with average age 79. A total of 121 incontinence episodes occurred during the 27 nights of monitoring, of which 38 were excluded because they occurred when the subject had already been awake for longer than 10 minutes. Among the remaining 83 episodes, 56 (68%) occurred during a period of awakening that had begun within the prior 10 minutes, and 24 (29%) occurred during sleep. Of the latter 24 episodes, 21 (88%) were associated with awakening within the subsequent 10 minutes. The mean duration of sleep after these 21 episodes was 99 +/- 104 seconds, and in 7 of these 21 the subject awoke within 30 seconds. We also noted that incontinence was associated with sleep apnea or hypopnea in 17 of the 24 episodes (71%) that occurred during sleep. Incontinence volumes of the 24 episodes that occurred during sleep were significantly lower than volumes of episodes that occurred during wakefulness (117.5 +/- 70.8 ml vs 184.0 +/- 96.0; $t = 3.05$, $p < .005$).

**CONCLUSIONS**

Our data suggest that when nighttime incontinence occurs in older patients during polysomnographically defined sleep, it is associated with an awakening shortly thereafter. In addition, it appears that a large proportion of incontinence episodes occur in close temporal relationship to an episode of sleep apnea or hypopnea. This observation gives rise to the interesting possibility that a specific sleep disorder may play an important role in the pathophysiology of nighttime incontinence in some older patients. More subjects and more incontinence episodes that occur during sleep must be studied in order to make any definitive conclusions. However, our data thus far reinforce the clinical impression that nighttime incontinence does cause sleep disruption, and provide additional rationale for investigating and treating this common condition in the geriatric population.