

# Sleep deprivation tied to increased nighttime urination in preadolescence

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Nighttime visits to the bathroom are generally associated with being pregnant or having an enlarged prostate, but the problem can affect youngsters, too. A new study sheds light on why some children may need to urinate more often during the rest cycle. Danish researchers have found that sleep deprivation causes healthy children, between the ages of eight and twelve, to urinate significantly more frequently, excrete more sodium in their urine, have altered regulation of the hormones important for excretion, and have higher blood pressure and heart rates.

The study, entitled "Sleep Deprivation Induces Excess Diuresis and Natriuresis in Healthy Children, appears in the [American Journal of Physiology – Renal Physiology](#), published by the American Physiological Society.

## Methodology

Twenty healthy children (ten boys and ten girls) were enrolled in the study. The children underwent two consecutive 24-hour stays at the hospital. The first 24-hour period was used to register baseline values including urine data, blood pressure and heart rate, and other physiological measures. The second 24-hour period was used to register these values during and following sleep deprivation. The information was subsequently compared with everyday life records submitted by the parents.

On both evenings the children were required to be in a supine position in bed in a dimly lit room at 8:00 p.m. Physical activity, food and fluid intake were not allowed between this time and 7:00 a.m. In addition, on the second night, the children were kept awake as long as possible throughout the night, if they were willing, by telling and listening to stories, doing small tasks such as word and memory games, or making crafts. Daytime "catch up" sleep was not allowed.

## Results

Sleep deprivation had a dramatic effect on nighttime urine excretion, with an average increase of 68 percent among the participants. The amount of sodium in the urine from the sleep-deprived night was almost a third greater than it was during the normal-sleep night. The levels of hormones associated with water and sodium excretion had numerous differences after the sleep-deprivation, and blood pressure and heart rate were significantly higher. The findings were similar between boys and girls.

## Importance of the Findings

The study finds that [sleep deprivation](#) leads to numerous physiologic differences in children that, ultimately, result in greatly increased urine output and significantly higher sodium excretion. The authors speculate that the reason for these differences could be the result of changes in the regulations of the hormones responsible for setting water and [sodium](#) output in the kidney, which also affect heart rate and blood pressure.

Finding ways to address these factors could stem nighttime urine production, which in turn could potentially help sleep disruption and bed-wetting in [youngsters](#), according to the authors. They add, "The close relationship between the regulation of the sleep-wake cycle, blood

pressure, and nocturnal urine output points toward sleep induction or [blood pressure](#) lowering treatment as possible new concepts in enuresis [bed-wetting] research and treatment."

Provided by American Physiological Society

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