Adolescents need more sleep
Rethinking the preventive options of school environments
Roessler, Kirsten Kaya; Grove, Sidsel

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Adolescents need more sleep — Rethinking the preventive options of school environments

Sleep problems in adolescence is a well-researched area, and recently several national reports have documented the high prevalence of sleep problems in the Danish youth population (1-4). 20% of 11 years old children and 75% of 15 years old adolescents sleep less than recommended, while 66% of the 15 years old experience fatigue during the day (3). The percentage of Danish adolescents being tired in school at least one day per week increased between 1998 and 2010 for girls from 58% to 87 %, and for boys from 61 to 84 %. (4). Reasons for bad sleep behaviour are worries, failure to thrive, irregular bedtimes, electronic media before bedtime or inadequate parental attitudes (3, 5, 6). Sleep problems are associated with several health related problems including both somatic and psychological symptoms (7,8). The development and maturation of personality, identity and self-regulation makes adolescence an important developmental period with interruptions and maladjustments causing great consequences for future adult life. With many severe psychiatric disorders debuting in adolescence (9), understanding the factors that might influence normal development is crucial. Sleep problems should be considered an important risk factor and an indicator of a problematic development. Adolescence is defined as period from puberty to legal adulthood (age 12-18). Danish high school students are often older than 18 years old therefore we include students up to 19 years old in this commentary.
Traditionally, sleep interventions are individual-focused, with the purpose of helping the person regulating sleep through pharmaceutical or behavioural treatment, such as sleep hygiene programs, sleep medications or cognitive-behavioral approaches (10). These interventions are applied when the sleep problems are so severe that they become pathological. When targeting large health problems in the population, prevention is a key word since treatment of various pathology is costly for both society and the individual.

Therefore are adolescent sleep problems a public health matter and should receive more attention when health promoting strategies are developed. Only few interventions have been developed to target sleep problems from a public health perspective. An Australian study (11) evaluated a school based intervention using a psycho-educative approach giving knowledge on healthy sleep patterns with help of cognitive therapy. Indeed, the program increased the sleep knowledge, however, it did not change the late bed times. This might give an argumentation for a focus on environmental factors such as the possibilities of changing the school environment. This commentary aims to suggest a new way of thinking public health intervention by combining health psychology with environmental psychology.

Studies of adolescents’ sleep patterns have revealed that adolescents have a preference for later bedtimes – also called eveningness (7). Especially older adolescents (> 14 years) have an increased preference for evening activities, and sleep less than younger adolescents. This behavior change is driven by external factors, such as increased
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pressures from academic or social activities and by biological circadian factors (12). Melatonin is released an hour later in late adolescence compared to early adolescence, delaying the timing of the sleep period. The later bedtimes combined with early wake-up times at school days, leave many adolescents with prolonged sleep loss (13,14). While changes in sleep across adolescence are a normal part of development, many adolescents are getting insufficient sleep and are consequently, less likely to perform well at school, more likely to develop mood-related disturbances or be obese (14). In general, it would be the most fundamental solution, if especially younger adolescents could learn or get support to develop healthy sleep patterns at home with early bedtime and reduced screen activity to reduce the influence of light on the brain. When this approach is not successful, day time napping might be an alternative. A series of studies have explored the effect of daytime napping on adolescent sleep regulation (13,14). Many adolescents take a nap around 16:00 in the afternoon, underlying the matter of a sleep deprivation. A nap at this time a day contributes to postponed bedtimes and is part of an unhealthy sleep pattern (13,14). However, a nap taken at the right time a day has been found to improve several cognitive functions such as memory and attention, and a nap taken at the right time of the day can reduce some of the negative effects of sleep loss (15,16). A short nap of as little as ten minutes has been found to improve alertness and cognitive performance, and has been found not to result in sleep inertia or disrupt nocturnal sleep (15). Daytime napping is therefore not something that necessarily needs
to be completely avoided during adolescence but the timing and length of the nap is
important. A short nap taken at mid-afternoon has in general been found to be the best
way to benefit from daytime napping. The positive effects of short daytime naps have
caused several corporations to set up nap-rooms and give their employees the
opportunity to take a nap during working hours (17), and nap-rooms are more and more
common as part of the facilities at universities (18). A nap-room is a space dedicated to
rest and napping with beds, mattresses or special designed sleep pods (19).

Even though the positive effects of short daytime naps are well-documented, no
systematic attempts have been made to implement daytime napping in high-schools.

Most adolescents spend a considerable time in school, and it is important to consider the
built school environment when health promoting and prevention strategies are developed
(20). Traditionally, research in the built school environment has been focused on physical
health (e.g. air, temperature and noise) and learning environments (21). The potential of
creating spaces and facilities at school that promote psychological well-being is a research
area jet to be discovered. Integrating nap-rooms at high-schools could be one way to
prevent problematic sleep patterns in adolescence. A nap-room would provide students
with the opportunity to take a nap during their school day, which might prevent late
afternoon napping and therefore contribute to a healthier sleep pattern. We know, that
already short time naps of ten minutes result in improved alertness and performance (22),
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and that the establishing of nap rooms only demand few physical steps regarding the development of a suitable environment (an empty room, camping beds and blankets). However, a more overall decision on the administrative level is needed when students shall be able to spend at least 10 minutes in a nap room. A way to integrate these extra minutes in the school rhythm is to prolong the lunch break or to give students the possibility to choose their nap times individually. Considering the large body of research documenting beneficial effects of short daytime naps, integrating nap-rooms at high-schools could prove to be a cost-efficient way to prevent sleep problems in the youth population.

The authors have undertaken a pilot study\(^1\) in a Danish high school to explore if using a nap-room in the middle of the high school day could reduce perceived stress and fatigue and improve their sleep-quality. 24 high school students (age 16 to 20 years) participated, with 16 allocated to the intervention group and 8 to the control group. The intervention consisted of two three-week periods, where the intervention group used a nap-room every school day during lunch break. Multivariate analysis showed that the intervention group experienced a significant reduction in perceived stress and sleep quality (Pittsburgh Sleep Quality Index, and Perceived Stress Scale) compared to a control group. These explorative results indicated that using a nap-room might reduce stress, fatigue and sleep problems in adolescents. It was not possible to assess how falling asleep when using the nap-room affected the outcome compared to using the
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room without sleeping. Beside the limited validity caused by a small sample size, the pilot study showed environmental issues which need to be addressed in future studies. However, the pilot study illuminated practical issues in a Danish high school context. First of all, an enthusiastic school headmaster, giving a space for nap rooms. In the pilot study, the school library was used to establish two tiny nap rooms giving place to five adolescents. A school library might be a good environment to start up nap activities in schools, as the usage of and access to the room can be managed in a controlled way. A teacher on playground duty is needed to keep the students quiet and ask them not to set up alarms but to ask the teacher to wake them up at a specific time. Another, and less complicate to implement option is to have brief home or school-based interventions (23), such as a quiet recess for 10 minutes during class hours or in the evening, where the students are asked to close their eyes and put their mobile phones on night mode. An English University established a nap room, where students could book a 40 minutes sleep slot. The room had both closed circuit television and strict instructions not to misuse the facilities. With sleep problems being such a common complaint amongst adolescence we must address the problem from new angles and develop interventions that focus not only on individual pathology, but address environmental factors that contribute to healthy or unhealthy sleep patterns. In addition, more research on the preferences of adolescents according their sleep and school rhythm is needed. Alternatively, a later school start at 9
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7 o’clock a.m., as in other European countries, might be a solution to support full night
time sleeping, when nap rooms are no option. However, it will be important to find
solutions which will give space to individual solutions, making naps accessible for them
in need, and create a balance between the possibility for naps, the supervision of naps,
and institutional challenges. According to common sense, the education systems in the
Scandinavian countries are increasingly demanding when it comes to young people’s
academic achievements, it is important that we rethink the way to prevent adolescent
health, for example by rethinking the organisation of school environments.

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1 Please contact the first author for getting access to the complete pilot study.