

EFFECTS OF ROAD TRAFFIC NOISE ON SLEEP

Studies on sleep assessed by wrist-actigraphy and sleep logs for children and adults

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Introduction Many children are exposed to high levels of road traffic noise in their home environment and may also attend schools and other places/activities exposed to high levels of noise. Known noise-induced effects in children are hearing impairment, stress-related somatic effects and cognitive effects (1). Adverse effects of noise exposure at school and other places may be moderated by noise exposure at home, especially due to opportunities for relaxation and sleep in quiet environments. Very little is however known about how sensitive children are to sleep disturbances caused by road traffic noise and comparative research between children and adults is lacking. Eberhardt (2) studied the effects of road traffic noise on sleep in the home for young children who lived along streets with night traffic. A more quiet condition was obtained by mounting a transparent plastic pane over the window reducing the noise level by 11 dBA. The most significant effects of the noise reduction were a reduction in time for falling asleep and a very small, but statistically significant increase amount of REM sleep. Since sleep is very important to the health and development of children, more research is needed to obtain insight into possible adverse noise-induced effects on sleep. The objective of this Swedish project within the RANCH-program (Contract No: QLRT-2000-00197), was (A) To provide knowledge on exposure-effect relationships between road traffic noise in the home and the effects on health and well being including sleep comparatively for young children and adults (B) to provide knowledge on effects of noise on sleep by using perceived

No differences in sleep quality were found between the parents who had bedroom windows facing the road (49% in the three noisier areas) and those who had not.

Noise annoyance, “*Traffic noise interferes when I am going to bed*” was correlated with reported minutes to fall asleep and sleep quality among children ($r = .30$ and $r = .28$, $p < 0.05$) and with sleep quality among adults ($r = .25$, $p < 0.05$). A higher percentage of children reported noise interference with sleep than adults ($p < 0.001$).

Some of the health variables studied were significantly correlated to sleep quality. Among children reported sleep quality [scale 0-10] and sleep latency [assessed by wrist-actigraph] was correlated to “*Don’t feel well*” ($r = .27$, $p < 0.05$ and $r = .24$, $p < 0.05$ respectively). Tiredness in the morning [scale 0-10] was significantly related to *physiological and psychological symptoms* in both children and parents ($r = .26$, $p < 0.05$).

There were several significant differences in sleep quality between children and adults. In sleep parameters evaluated by sleep logs children reported significantly better sleep quality ($p < 0.001$) and felt less tired in the morning ($p = 0.01$) than adults. The figures below show some of the results on sleep parameters assessed by wrist-actigraphy.

