

## **Reviewer's report**

**Title:** Use of wireless telephones associated with self-reported health symptoms: a population-based study among Swedish adolescents aged 15-19 years

**Version:** 1 **Date:** 28 January 2008

**Reviewer:** Michael Kundi

### **Reviewer's report:**

This is an interesting hypothesis-generating cross-sectional study of mobile phone use in adolescents. It substantially increases the evidence base on wireless phone use in this group and adds interesting questions about determinants of usage habits on one side and consequences on health and wellbeing on the other side. Study design and conduct were of good quality, analysis can be improved as detailed below.

#### **Minor Essential Revisions:**

**Abstract:** Age range of subjects should be included in the Methods section. Factors associated with frequency of mobile phone use should be restricted to subject's characteristics; sleep should be excluded (see below).

**Page 4, 1st paragraph:** As there are only few data linking mobile phone use in children and adolescents to variables such as smoking and drinking habits and other health related life-styles as well as to social background, statements about such relationships should express greater caution and may also refer to possible dependencies on the socio-cultural background.

**Page 5, 2nd paragraph:** It is stated that the questionnaire comprised 27 questions. However, in the following description of the contents of the questionnaire much more than 27 items are mentioned. Obviously some questions comprised several items. As the number of questions is of minor interest rather the number of pages should be mentioned because the mentioned discrepancy might lead to confusion.

**Page 6 & 7, Statistical Methods:** Because authors mentioned in the introduction that investigation of the relationship between subjective symptoms and mobile phone use was exploratory it should be mentioned in this section that no correction for multiple endpoints has been applied. While it is not faulty to use logistic regression with mobile phone and DECT use in one model as independent and in others as dependent variable this procedure might still cause confusion. Therefore, authors should think about applying the more general log-linear model for explaining mobile phone and DECT phone use and restrict application of logistic regression to analysis of symptoms. Alternatively, authors could apply ordinal regression for symptoms and general health ratings (because no dichotomization, which is always debatable, is needed in this case).

Page 9, 4th paragraph: Analysis of sleep length as an explanatory variable for mobile phone and DECT phone use reveals the methodological insufficiency of the chosen procedure because rather the extensive use of these devices explains the sleeping behavior as the other way round.

Page 10, 2nd paragraph: Analyzing the different categories of symptoms separately is not the best option. Either ordinal or if distinct differences in contribution of explanatory variables across symptom categories are assumed, multinomial logistic regression should be preferred.

Page 11, 2nd paragraph: Interpretation of the relationship between sleep and use of wireless phones is not convincing. Age was controlled for in the analysis. This may not remove interaction of age with other independent variables; however, it seems that sleep is no independent predictor at all. Rather extensive use of TV, computers and wireless phones indicates a certain life-style in adolescents that now and then will lead to problems getting enough sleep. In addition, recent studies indicate that mobile phone use before going to sleep increases tiredness (Sleep 2007;30(9):1220-3, Arnetz B submitted).

Page 12, 1st paragraph: Authors mentioned the possibility the significant results could be due to chance. Indeed, 23 symptoms have been analyzed in relation to mobile phone use, and assuming independence of occurrence of these symptoms and a 5% level of significance the probability of three or more of the symptoms being significant by chance is about 2.5%. What is more interesting is the fact that among the 23 symptoms only 2 had ORs below 1 for mobile phone use and only 1 for DECT phone use. Unless we assume that all symptoms are somehow related to mobile or DECT phone use this points to a confounding factor. The symptoms strongest associated with mobile and DECT phone use point to a socio-economic factor. Family income or education of parents or some other proxy of SES should be included in the analyses (although family income was only weakly related to mobile and DECT phone use). Another possibility would be to construct a variable from TV and computer use that could be included as well. Headaches as well as concentration difficulties could be related to a life-style of extensive media use and less outdoor and physical activities. Asthmatic symptoms have been explained to some degree by the hygiene hypothesis, which partly explains higher prevalence in higher categories of SES (fewer siblings, less contact to animals etc.).

Page 13, 2nd paragraph: Analysis of hands-free devices is not clear. It is stated that excluding subjects reporting anytime use of hands-free kits had no statistically significant effect on results. As prevalence of headaches was lower in subjects using hands-free equipment, excluding them should increase ORs of mobile phone use. Furthermore, statistical comparison between results of analysis with and without subjects using hands-free kits is not admissible. Rather use of hands-free devices should be included as a dummy variable.

Discretionary Revisions:

Page 3, 3rd paragraph: Conductivity of tissues at different ages, and in particular of human tissues, has not been extensively studied so far. Although there are theoretical reasons and some empirical data that support the statement about higher conductivity and increased absorption in brain tissues of children this is still an unresolved problem. In addition, even if absorption in sensitive tissues is higher in children, we do not know at which age absorption reaches the values of adults. Instead of referring to scientific controversies surrounding these issues authors rather should underline the insufficient scientific basis to resolve them.

Page 11, 2nd paragraph: It is interesting that DECT phone use is less popular in sparsely populated areas. Do authors have data about landline phone use in these areas? Maybe phone use in general is less popular in these regions (although mobile phone use does not show a difference, which might still sum up to an overall less prevalent use of phones).

**What next?:** Accept after minor essential revisions

**Level of interest:** An article of outstanding merit and interest in its field

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.