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Sunbed use among 64,000 Danish students and the associations with demographic factors, health-related behaviours, and appearance-related factors

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ABSTRACT

Sunbed use is associated with an increased risk for skin cancer and is particularly dangerous for younger persons. The objective of this study was to assess how demographic factors, health-related behaviours and appearance-related factors are associated with sunbed use. Cross-sectional data from the Danish National Youth Study collected by the National Institute of Public Health during 2014 was used. A total of 64,382 students aged 15–25 years were included in the present study. Multilevel logistic regression analyses were used to determine associations. Sunbed use during the past 12 months was reported by 22% of students, with a higher proportion among females (29%) than males (12%). Factors associated with sunbed use were older age, studying at a vocational college or a higher preparatory examination school compared to upper secondary school, and lower parental education. Furthermore, being a smoker, been binge-drinking, longer duration of exercise and been dieting were also associated with sunbed use. For females, poor dietary habits were also associated with sunbed use. Feeling overweight was associated with lower odds for sunbed use for males, but with higher odds for females. Lower body satisfaction was associated with higher odds of sunbed use, except for overweight males. Students who were underweight had lower odds for sunbed use, than normal weight students. Conclusively, we found evidence of associations between demographic factors, health-related behaviours and appearance-related factors and sunbed use. Understanding these relations could help to identify high-risk groups and guide preventive strategies for sunbed use and skin cancer prevention.

1. Introduction

The incidence of skin cancer has increased globally over the past decades. Each year, 2–3 million non-melanoma skin cancers and 132,000 melanoma skin cancers are registered globally (WHO). Exposure to ultraviolet radiation is the main cause of skin cancer (Armstrong and Kricker, 1993; Ghassassi et al., 2009), and sunbed use is therefore associated with an increased risk for skin cancer, and is particularly dangerous for younger persons (Autier and Boyle, 2008; Autier and Doré, 1998; Boniol, 2012; Boniol et al., 2012). The risk for melanoma increases with frequency of use (Boniol, 2012; Boniol et al., 2012). Sunbed use is prevalent in many western countries, especially among females and young people (Bentzen et al., 2013; Demko et al., 2003; Grange et al., 2015; Guy et al., 2014; O'Riordan et al., 2006; Wester et al., 1999). Furthermore, studies have found that lower parental socioeconomic status is associated with sunbed use in their children (Bentzen et al., 2013; Demko et al., 2003; Mayer et al., 2011; Simmons et al., 2014).

In Denmark, melanoma is the commonest type of cancer among women aged 15–34 years and the third commonest among men in the same age range (Engholm et al., 2015). It is essential to identify the characteristics of sunbed users in order to design and implement effective prevention strategies.

Studies have shown an association between sunbed use and an unhealthy lifestyle in terms of alcohol consumption and smoking (Bentzen et al., 2013; Demko et al., 2003; Guy et al., 2014; Miyamoto et al., 2012; O'Riordan et al., 2006; Schneider and Kramer, 2010). Studies assessing the associations between sunbed use and dietary habits as well as physical activity/exercise have shown inconsistent results (Demko et al., 2003; Guy et al., 2014; Miyamoto et al., 2012). Appearance-related behaviour, such as dieting and unhealthy weight control have previously been associated with sunbed use (Amrock and

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Weitzman, 2014; Blashill, 2013; Demko et al., 2003; Guy et al., 2014; Miyamoto et al., 2012; O'Riordan et al., 2006). Some studies have found that low body satisfaction is related to sunbed use (Blashill and Traeger, 2013; Brandberg et al., 1998; O'Riordan et al., 2006), however the evidence is inconsistent, as another study showed that people with a high degree of satisfaction with their body and weight were more likely to use sunbeds (Yoo and Kim, 2012), and another study found no association (Demko et al., 2003). Most of the studies mentioned above were conducted in the USA.

In view of inconsistency in some of the associations with sunbed use from previous research, and the lack of studies from Europe, this study examined sunbed use among Danish students. The aim of this study was to examine the associations between demographic factors, health-related behaviours, and appearance-related factors and sunbed use.

2. Methods

2.1. Design and participants

The Danish National Youth Study survey was conducted by the National Institute of Public Health in 2014. The survey involved an Internet questionnaire consisting of >250 questions on health behaviours, health and well-being, which was administered in class with a teacher present. The questions were derived from a wide variety of disciplines and sources. Some questions were developed specifically for the Danish National Youth Study, in close collaboration with researchers in the field, while some questions were from existing national and international surveys. The questionnaire was pilot tested on several occasions in the target group. All 137 Danish upper secondary schools and higher preparatory examination schools were invited (except for the international baccalaureate). Upper secondary schools are a three years education, preparing students for higher education such as university. Higher preparatory examination schools are similar to upper secondary schools, but the programme duration is only two years and is generally attended by older students. Additionally, 12 of the largest vocational colleges in Denmark were invited to participate, with selected classes from the basic programme. There are 89 vocational colleges in Denmark, which prepare students for a wide range of specific jobs such as carpenter, gastronome and hairdresser. Of the invited schools, 119 (87%) of the upper secondary and higher preparatory examination schools and 10 (83%) of the vocational colleges agreed to participate. In participating classes, 84% of the upper secondary and higher preparatory examination students and 69% of the vocational students filled in the questionnaire, for a total of 75,853 students. The analyses were restricted to students aged 15–25 years ($n = 75{,}022$). Students who had not answered the question regarding sunbed use ($n = 3196$) and students with missing values on education ($n = 1652$), dietary habits ($n = 1376$), smoking ($n = 44$), binge-drinking ($n = 284$), exercise ($n = 123$), dieting ($n = 66$), weight perception ($n = 107$), body satisfaction ($n = 117$), and Body Mass Index (BMI) ($n = 1359$) were also excluded. Students, where it was not possible to link their questionnaire with their civil registrations number, where also excluded, since their parent's education could not be attained from Statistic Denmark ($n = 2316$). The final study sample comprised 64,382 students aged 15–25 years (85% of the original study sample). The selection of the study sample is shown in Fig. 1.

2.2. Study measures

2.2.1. Outcome measure

The study outcome, sunbed use, was measured from the question "During the past year, how often have you used a sunbed?", with four possible responses: "I have not used a sunbed", "Monthly or less", "Weekly" and "Daily or almost daily". The responses were dichotomized into sunbed users (used a sunbed at least once in the past year) and non-users (did not use a sunbed in the past year). This is a frequent used definition of sunbed use. The proportion of sunbed use according to the response categories is shown in Table 1.

2.2.2. Demographic factors

Demographic factors included in this study were sex, age ("15", "16", "17", "18", "19", and "20–25 year"), education ("upper secondary school", "higher preparatory examination school", and "vocational college"), and geographical region ("Capital", "Zealand", "Southern", "Central" and "North"). Furthermore parental education was included from Statistics Denmark, where the highest education of the students' parents was used as an indicator of the student's social status ("primary school", "vocational college", "upper secondary school", "higher education - ≤2 years", "higher education - 3–4 years", and "higher education - >4 years").

2.2.3. Health-related behaviours

Health-related behaviours assessed in this study were; dietary habits, smoking, binge-drinking and exercise. Dietary habits were assessed from an index constructed from answers about eating habits in 'a normal week': eating fruit daily (yes, 1; no: 0); eating vegetables daily (yes, 1; no: 0); and eating wholemeal products (e.g. oats, wholemeal pasta) daily (yes, 1; no: 0). Responses were summed and indexed between 0 and 3. A score of 0 were categorized as "poor habits"; 1 "fair habits"; 2 "good habits"; and 3 "excellent habits". Smoking was identified from answers to the question "Which statement describes you best?", as: "I smoke daily", "I smoke at least once a week", "I smoke sometimes (e.g. at parties)", "I rarely smoke" and "I never smoke". Binge-drinking was assessed from answers to the question "Within the past 30 days, how many times have you consumed five or more drinks on one occasion?" and were categorized into "0 times", "1 time", "2 times", "3–4 times" and "5 or more times". Exercise was assessed from answers to the question "Outside school, how many hours a week do you usually exercise to the extent that you become breathless or sweat?". The answers were "None", "Approximately 30–60 min", "Approximately 2–3 h", "Approximately 4–6 h" and "Approximately 7 h or more".

2.2.4. Appearance-related factors

Appearance-related factors assessed in this study were dieting, weight perception, body satisfaction, and BMI. Dieting was assessed from answers to the question "Within the past year: How often did you diet to lose weight?", and the answers were categorized into "never", "1–4 times" and "5 times or more". Weight perception was measured from answers to the question "Do you think that you are…", with the possible responses "…way too thin", "… a little too thin", "… just right", "…a little overweight" and "…way too thick". Body satisfaction was assessed from answers to the question: "On a scale from 1 (very unsatisfied) to 10 (very satisfied), how satisfied are you with your body?" and was categorized into "1–3 (very unsatisfied)", "4–5 (unsatisfied)", "6–7 (satisfied)" and "8–10 (very satisfied)". BMI was calculated by self-reported weight and height and were indexed according to Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, 2015) and World Obesity's (World Obesity) definitions of BMI for children and adults, and were categorized as either "underweight", "normal weight", and "overweight".

2.3. Statistical analyses

The statistical package STATA/IC11.1 was used for all statistical analyses. We used multilevel logistic regression models to examine the associations between demographic factors, health-related behaviours, and appearance-related factors and sunbed use. Selected variables were identified from the literature and a priori knowledge. Females and males were analysed separately because the associations varied according to sex.

The descriptive tables show differences between sunbed users and non-users assessed by a X^2 test. For the multilevel logistic regression models, we reported odds ratios (ORs) and their 95% confidence interval [95% CI] and P-values <0.05 were considered statistically significant.