Journal of Adolescent Health 67 (2020) 609–611

ELSEVIER

JOURNAL OF ADOLESCENT HEALTH

www.jahonline.org

Adolescent health brief

Indoor Ultraviolet Tanning Among U.S. Adolescents and Young Adults: Results From a Prospective Study of Early Onset and Persistence

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Article history: Received November 21, 2019; Accepted March 7, 2020
Keywords: UV indoor tanning; Adolescence; Tanning persistence; Melanoma

A B S T R A C T

Purpose: The purpose of the study was to test whether those who initiate tanning during adolescence are more likely to continue tanning in young adulthood, potentially increasing their risk for melanoma.
Methods: The study included prospective data from the Growing Up Today Study, a cohort study started in 1996 (N = 5,882).
Results: Among men and women who ever indoor UV tanned, those who indoor UV tan by age 17 years consistently indoor tanned at least twice the prevalence as those who did not indoor UV tan by age 17 years. Indoor tanning prevalence at age 27 years was nearly 4 times as high (18.8% vs. 4.8%) among men who started indoor tanning by age 17 years than those who did not indoor tan by age 17 years. These differences persisted through age 27 years and are more pronounced in men (18.8% vs. 4.8%) than in women (30.5% vs. 13.0%).
Conclusion: Adolescents who indoor UV tan by age 17 years are more likely to continue to indoor tan through young adulthood than those who begin indoor UV tanning at age 18 years or older. Our findings suggest that interventions to prevent indoor UV tanning among minors may substantially reduce years of exposure to this carcinogenic behavior in young adults.
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IMPLICATIONS AND CONTRIBUTION

Indoor UV tanning by age 17 years is associated with persistent tanning among men and women. Health professionals, community advocates, and policy-makers should work to strengthen age restrictions for indoor UV tanning that have previously been shown to work for young women and research possible interventions for young men.

Conflicts of interest: There are no financial conflicts of interest to disclose.

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https://doi.org/10.1016/j.jadohealth.2020.03.027

Indoor ultraviolet (UV) tanning increases a person's risk of melanoma, with increased use of indoor UV tanning associated with increased melanoma [1]. Young adults are particularly at risk as people who indoor UV tanned before age 35 years have a 75% higher chance of melanoma than those who never indoor tanned [2]. Younger women are further at risk as indoor UV tanning is more common among adolescent women than among adolescent men (7.5% vs. 3.5%) [3,4]. The gender difference in indoor UV tanning reflects the greater pressure that women often experience to conform to beauty ideals than men [5,6].

However, while we know that indoor UV tanning at young ages is associated with increased melanoma risk, we do not know if indoor UV tanning during adolescence is associated with persistent indoor UV tanning in later life stages. To fill this gap in the literature, we examined patterns of indoor UV tanning from age 18–27 years among those who have ever used indoor UV tanning as a function of their gender and whether they began indoor UV tanning by age 17 years. We used prospective data from the 1996 to 2014 questionnaires of the Growing Up Today Study (GUTS) cohort study.

Methods

Participants

Participants were drawn from GUTS, a US cohort study of the children of women in the Nurses' Health Study II that was established in 1996. The GUTS cohort included 27,706 individuals aged 9–14 years at baseline (additional details surrounding GUTS methodology and sample are detailed here [7]). Data for the present study were drawn from the 12 questionnaires from 1999 to 2014 in which an indoor UV tanning item appeared on the survey. Follow-up is limited to 27 years because few participants were older than 27 years at the time of analysis. The analytic sample was limited to those who reported indoor UV tanning during the study period (N = 5,882, including 4,771 women and 1,111 men). The institutional review boards of the Brigham and Women's Hospital and the Harvard T.H. Chan School of Public Health approved the study protocol.

Measures

Respondents were asked how frequently they used an indoor tanning bed in the past year on every questionnaire from 1999 to 2014, with responses dichotomized as (0) never in the past year or (1) at least once in the past year. From this, a dichotomous variable was created of respondents who reported (0) never indoor UV tanning by age 17 years or (1) indoor UV tanning at least once by age 17 years. Age 17 years was chosen because it was the youngest age under the legal age of majority where all GUTS participants had the opportunity to complete a survey with indoor UV tanning questions. Participants who did not respond to the indoor UV tanning questions on any questionnaires by age 17 years are not included in the analysis.

Analysis

We calculated the percent of people who ever used indoor UV tanning by age, stratified by gender, and whether they reported indoor UV tanning by age 17 years. We also tested an interaction between gender and UV indoor tanning by age 17 years in logistic regression models estimating past-year tanning at each age from 18 to 27 years adjusted for age, age^2, and race. All analyses were conducted using SAS 9.4.

Results

Among women who began indoor tanning at age 17 years or younger, 69.5% reported indoor UV tanning in the past year at age 18 years (Figure 1). This increased to 78.3% at 19 years and declined to 30.5% at 27 years. In contrast, among women who did not report indoor tanning by age 17 years, only 6.5% of women reported tanning in the past year at age 18 years, increasing to 33.0% at 19 years and decreasing to 13.0% at 27 years. Among women who ever indoor UV tanned, those who indoor UV tanned by age 17 years continued to indoor tan through age 27 years

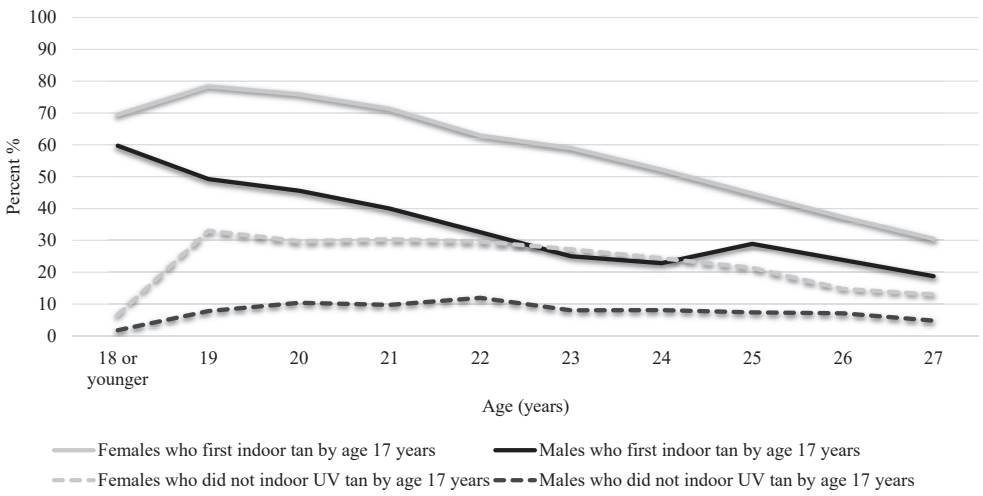

Figure 1. Percent of young adults reporting indoor UV tanning in the past year by age in years among those who have ever indoor UV tanned (N = 5,965). Figure 1 uses data from GUTS participants who reported ever indoor UV tanning. It is based on the percent of participants who at any given age report having used indoor UV tanning in the past year, stratified by gender and use of indoor UV tanning by age 17 years.

at least twice the prevalence as those who did not do so by age 17 years.

A similar pattern was visible for men who ever used indoor UV tanning, such that men who reported indoor UV tanning by age 17 years were more likely to indoor tan in the past year than men who did not indoor UV tan by age 17 years through age 27 years, or the last year of follow-up (18.8% vs. 4.8%). The results presented were supported by findings from interactions in a multivariate logistic regression (see Appendix Table A).

Discussion

Over three-quarters of the risk of melanoma diagnosed before age 35 years is attributable to indoor UV tanning [1]. We found that among those who have ever indoor UV tanned, adolescents who indoor UV tanned by age 17 years were more likely to indoor tan up through age 27 years than those who indoor UV tan later. This suggests that indoor UV tanning by age 17 years is associated with persistent use of indoor UV tanning for men and women. There are several possible explanations for this, including normalization of tanning, physiological dependence on indoor tanning [8], cementing certain beauty ideals, or different risk-taking profiles.

To our knowledge, this study is the longest prospective study examining indoor UV tanning patterns over time. Nonetheless, its generalizability is limited by sample's population, which consists of nurses' children, and is predominately white and middle class. Future research should examine whether these patterns exist in more diverse samples and explore other predictors of early onset and persistence. In addition, research should examine the impact of state laws banning indoor UV tanning by minors with different age thresholds [9,10].

Funding Sources

This work was supported by National Cancer Institute, National Institutes of Health T32CA009001; the Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health R01HD057368 and R01HD066963; the Maternal and Child Health Bureau, Health Resources and Services Administration T71MC00009 and T76MC00001; American Cancer Society MRSG CPHPS 130006.

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jadohealth.2020.03.027.

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