

Nursery School Teacher Trainees' Knowledge and Attitudes about Adopting UV-protective Behavior for Themselves and Children

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ABSTRACT

UV protection of children is an ever-increasing concern because skin cancer incidence continues to rise. Whereas many programs have been developed, most studies show that only minor behavior changes occur. For this study we targeted not the children themselves but one of their most important role models, the nursery school teachers. Eighteen nursery school teacher trainees were invited to take part in this study of their knowledge and attitudes concerning UV protection. Subsequently, they took part in a project that included a teaching a unit that integrated various subject areas (e.g., Biology, Educational Sciences, Mathematics, German, Religion, Sports, and English [as a foreign language]). After they completed the teaching unit their knowledge and attitudes were assessed again. Results demonstrated that the trainees themselves pursued sun-seeking practices. Before teaching the unit, their knowledge concerning UV protection was incomplete and employing specific measures to protect children were unclear. After teaching the unit they showed more interest in protecting children from the sun and demonstrated better knowledge and more favorable attitudes about protection. Their own intentions to pursue sun-seeking behavior remained unchanged.

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Introduction

Incidence rates in the United States of the three most prevalent forms of skin cancer associated with ultraviolet (UV) radiation exposure (i.e., basal cell carcinoma, squamous cell carcinoma, and melanoma) have risen in recent years (Howe, Wingo, Thun, Ries, Rosenberg, Feigal, et al. 2001) accounting for the greatest increases in the last decade among all preventable cancers.

During the period from 1973 to 1989, the incidence of malignant melanoma increased 85%, more than any other major cancer. The lifetime risk of acquiring melanoma is now estimated to be about 1 in 87.4. Much of the increase in incidence in skin cancer can be attributed to increased exposure to UV radiation resulting from changes in high-risk behaviors, such as intentional or recreational sunbathing and inadequate sun protection (Wesson & Silverberg, 2003). There is a clear relationship between cumulative sun exposure and the development of both melanoma and non-melanoma skin cancers (Wesson & Silverberg, 2003). This correlation has been established for lifetime sun exposure and cumulative damage of repetitive sun-related injuries such

as tanning and sun burning (Howe et al, 2001). Eighty percent of sun damage occurs before age 18 years (Howe et al 2001). Despite these data, skin cancer is largely preventable by public education and behavior change (American Cancer Society [ACS], 2006).

We conducted a preliminary study evaluating the existing measures for sun protection by interviewing the head teachers of nine nursery schools. The recommended prevention for skin cancer is limiting exposure to the sun during the midday hours; wearing protective clothing such as hats, long-sleeved shirts, and long pants; wearing sunglasses; and using sunscreen with a sun protection factor (SPF) of 15 or higher (ACS, 2006). However, scientific evidence that sunscreen use will prevent skin cancer is limited (Hill, Jorgenson, McDavid et al. 2001). For this study we placed a special emphasis on sun protection methods in addition to sunscreen use.

Due to sun damage that can occur in early years, influencing children's attitudes toward protecting themselves against sun exposure needs to begin at early age. At school this should begin in nursery school² (Howe et al. 2001).

Moreover, health habits established in childhood may be sustained throughout life, more so than those acquired during any other period during the lifespan (O'Riordan, Geller, Brooks, Zhang, & Miller, 2003). Previous interventions that have targeted children themselves have generally shown favorable effects on their knowledge and attitudes, but not regarding their sun protection behaviors (Dadlani & Orlow, 2008). In this study we assessed the attitudes of children's future role models, nursery school teacher trainees. Role models have an important position in influencing children's behavior in regard to sun protection practices. During the preschool years, a child's health habits most closely relate to those of parents, siblings, or adult care providers (O'Riordan et al. 2003).

Methods

Our first research task was to assess nursery school teacher trainees' attitudes and behaviors concerning sun protection. Our second research question was to evaluate whether nursery teacher trainee's knowledge and attitudes can be positively influenced by a project-based teaching unit. Measures for this study were self-report questionnaires.

The study was conducted in nursery-schools (n=9) which were responsible for the practicum of the nursery teacher trainees. Head teachers of those institutions were asked to answer a questionnaire anonymously and return it using a postage-paid envelope.

Knowledge concerning the harm of UV radiation and appropriate protective action was evaluated by a pretest before the teaching unit and a posttest after the teaching unit. Attitudes and beliefs about sun exposure and sun-protective behaviors were measured anonymously before and after the teaching unit. The trainees were asked to code their pretest and posttest questionnaires in the same manner by the first letter of their mother's first name, the 3rd and 4th number of their telephone number and the first letter of their place of birth. All items on this questionnaire had been tested before with trainees from a different class to ensure comprehension.

All four classes of nursery school teacher trainees (n=75) mean age (21.5 ± 1.6) all attending the education college at the University of Cologne were invited to take part in the pretest. Trainees' consent was a pre-requisite for participation. Ethical approval and protocol authorization was given by the College's Institutional Review Board.

One class from the four available was randomly chosen (n= 18 mean age 20.9 ± 1.3) to take part in the teaching unit. The teaching unit was consistent with curricular practices and requirements so that no "professional preparation time" was lost. This project embraced the following school subjects: Biology, Educational sciences, Mathematics, German, Religion, Sports and English as a foreign language.

The integrated school matters contributed the following conceptual areas: Biology (skin cancer, composition of infant and adult skin, effects of UV radiation, vitamin D supply), Educational Sciences (behavioral sciences with special emphasis on the role model including self-reflection by the trainees, mechanisms of behavioral change for children), Mathematics

(calculation of UV exposure times with different sun creams, clothing, shelters, calculation of surfaces (exposed skin surface of toddlers, adults), interpretation of likelihood of cancer development), German (rhetoric training how to convince children, parents and senior nursery school staff), Sports (indoor plays, plays under a shelter), Religion (being a role model by analysis of adequate scriptures "... let him who is without sin cast the first stone...(John 8:7) and "...how can you say to your brother, 'Brother, let me take out the speck that is in your eye,' when you yourself do not see the log that is in your own eye? (Luke 6:41), English as a foreign language (working with the original English version of the "sun wise" program). Statistical analysis was performed with distribution-free methods because parametric assumptions were not met. Nominal data of matched pairs were analyzed using the McNemar test.

Results

Pretest

Analysis of the questionnaire revealed that 26% of nursery schools inform parents about applying sun cream in the morning on their children, but do not (re-) apply it themselves. Overall, 74% of nursery schools do not apply the "no hat, no play" rule. None of the nursery schools have an official policy to protect the eyes from UV radiation. Officially children are not allowed to play outside from 11:30 AM to 12: 30 PM. However, this contradicts to nursery trainees' personal observations.

Knowledge of nursery teacher trainees concerning the harm of UV radiation and protective action. The return rate of the written pretest was 100%. Analysis showed that 7% believed themselves to be sufficiently informed about UV radiation, and 68% were unsure. Overall, 22% did not know the effects of UV radiation, and 41% were unsure. In addition, 76% could not calculate maximum exposure times to UV radiation. About 81% knew that UV exposure is dangerous especially for toddlers; however, only 23% knew how to protect the skin of infants.

Attitudes of nursery school teacher trainees concerning their own personal UV-protection.

Participation in the survey was 100%. Results revealed that 16% would wear long-sleeved clothes. However, 79% would inform parents to provide appropriate clothing. Results showed that 45% were not sure about the harm of UV radiation in solariums (i.e., tanning parlors, tanning beds, tanning booths, etc.), and 47% were not sure whether tanning in solariums could be an appropriate preparation before sun exposure in summer.

Knowledge of nursery teacher trainees concerning the harm of UV radiation and protective action after the teaching unit. Analysis showed that 100% believed themselves to be sufficiently informed about UV radiation, a highly significant increase over the pretest baseline ($P<.001$). The proportion of trainees who could calculate maximum exposure times to UV radiation increased significantly to 83% ($P=.004$). Finally, 83% knew how to protect the skin of infants ($P=.004$).

Attitudes of trainees concerning personal UV-protection after the teaching unit. After carrying out their teaching, 89% indicated they would wear sun-protective clothing at work, statistically significant increase ($P=.002$). However, only 45% would do so during. Approximately 11% stated they would continue using solariums.

Discussion

Interventions targeting children themselves have demonstrated generally favorable effects on knowledge and attitudes, but not on sun-protective behaviors. Sun protection interventions are slow at effecting behavioral change (Buller, Reynolds, Yaroch, et al. 2006; Dadlani & Orlow, 2008).

The present pilot study shows that apart from children's and parents' resistance to changing their sun protection behaviors, there is at least one additional human factor, the future nursery school teachers. Even though the nursery school teacher trainees are arguably supposed to be role models, the ones in this study showed sun-seeking behavior that

was comparable to young adults that seek a tanned look for social approval. Even the proportion of nursery school teacher trainees who used solariums was similar to young adults in general (Branstrom, Brandberg, Holm, et al. 2001; Cokkinides, Weinstock, O'Connell, & Thun, 2002).

The use of artificial tanning modes may be especially detrimental to nursery school teachers who already spend a high proportion of their workday outdoors supervising young children, and hence, are already exposed to natural solar radiation and accruing harmful effects to their skin (Spencer, & Amonette, 1998). A 30-minute salon session exposes the body to the same amount of harmful UV sunlight as a day at the beach (Spencer & Amonette, 1998).

Experimental studies with animal models have shown the direct effects of tanning salon-type radiation on the cutaneous carcinogenesis process and demonstrated the direct effects of the carcinogenic potential of sun beds in humans (i.e., DNA alterations). Some epidemiologic studies have reported an association between artificial tanning devices and melanoma risk and with nonmelanoma skin cancers. For instance, one study showed that for individuals younger than 36 years old who regularly use an indoor tanning lamp, the risk of melanoma was 8.1 times greater compared to never users (Karagas, Stannard, Mott, Slattery, Spencer, & Weinstock, 2002).

Early communication and role modeling by parents and other caregivers regarding the importance of sun protection is an important aspect of children's sun protection behavior (Dadlani & Orlow, 2008) the positive attitude of nursery school teacher trainees towards tanning seems to be devastating. The policy of nursery schools that solely rely on the use of sunscreen by children may paradoxically increase children's overall sun exposure and subsequent risk of melanoma and nonmelanoma skin cancers (Johnson, Davy, Boyett, Weathers, & Roetzheim, 2001). Because approximately 50% of

parents regularly use sun protection for their children, it seems highly desirable that nursery schools play an important role in teaching children how to protect themselves from UV radiation (Johnson et al. 2001). Nursery school teachers should especially serve as role models where measures that protect the skin from damage (sunscreen use, avoiding the sun, maximizing shade, and wearing protective clothing) are concerned. In this respect, the significant increase of reported use of appropriate protective clothing by the trainees after the teaching unit of study seems promising. We attribute this result to the compound approach of this teaching unit. The nursery teacher trainees learned not only the facts concerning UV radiation during biology lessons, but also calculated the effects of UV exposure in Mathematics. In Sports, they learned how to improve indoor play and conduct outdoor play and games in the shade. In German language arts studies, they learned how to cope with children's resistance. Finally, this example of a "disconnect," whereby they expected children to protect themselves from UV radiation but pursued active sun-seeking themselves was important to defining their role as a teacher better (Rossi, Blais, Redding, 1995).

Several studies have demonstrated that knowledge of skin cancer and the damaging affect of UV radiation alone effect neither sunbathing habits nor the use of sun protection (Branstrom et al. 2001; Cokkinides et al. 2002). However, this multi-unit approach is bound to affect sun protection much more than brief programs (Buller et al. 2006), because multiple reinforcements are needed to change sun protection behavior (Geller, Rutsch, Kenausis, Selzer, & Zhang, 2003). The reduction of barriers has been found to be an essential step in skin cancer protection (Geller et al. 2003). In this respect, outdoor activities (played under a shelter) and German (techniques of persuasion) could provide valuable barrier reducing tools. Finally teachers' role identification process and self-efficacy were improved, two factors

that have been related to enhancing sun-protection behavior (Tripp, Carvajal, McCormick, et al. 2003).

These findings showed a gap between trainees' perceived professional role and their private sun protection behavior. This gap might indicate a need to target their private sun protection behavior with messages that stress the negative effects of sun exposure on appearance (i.e. photo aging) and that address perceived barriers to behavioral change. In school there are health-related issues such as bullying, teasing, substance abuse and nutrition, among others that are likely to gain higher priority than sun safety. However, the present example shows that effective skin cancer prevention programs are feasible in school.

Study Limitations

Similar to other sun protection intervention trials, this study is limited by its reliance on self-report measures that are subject to social desirability and recall bias (Norman, Adams, Calfas, et al. 2007). Moreover, results mostly identify intended behavior changes. In addition, the teaching unit was intended to prepare trainees for their internship at a nursery school in summer. Therefore the nursery teacher trainees did not have the opportunity to practice newly-learned skills right after teaching and additional evaluation tools like a sun protection diary or assessment of the skin tone using a colorimeter were not applicable. For this pilot study one class was chosen out of four. This sampling method was primarily one of convenience thereby calling representativeness into question. Finally, as with many pilot studies the total number of participants was small.

Future Directions

One intervention is not likely robust enough to change sun protective behaviors by itself. Thus, school faculty must band together with community groups and parent-teacher organizations to develop sun protection policies within schools such as improving shading on the playground, providing sunscreen reminder notes to parents before outdoor school field trips,

suggesting tips for better protection during recess, and so on (Geller, Rutsch, Kenausis, Selzer, & Zhang, 2003; Johnson et al. 2001; Norman et al. 2007).

It is likely that the impact of individual-level interventions is constrained by the broader policy and environmental contingencies existing in communities. Therefore we invited the head teachers of the cooperating nursery schools to design a sun protection policy together.

To obtain more objective data concerning the effectiveness of the teaching units the members of the education college agreed to check implementation of the teaching unit by supervising teachers during the summer internship. These data will be used to improve the feasibility of implementation at nursery schools. Finally, after the success of this pilot study and the satisfaction of with this project, all four classes will participate again in this program, providing further opportunity to refine efficiency and feasibility with larger numbers of participants.

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