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Long-term development of parental knowledge about skin cancer risks in Germany: Has it changed for the better?

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ABSTRACT

Substantial public health efforts have been undertaken throughout the last 25 years to increase awareness about skin cancer risks in the German population. An evaluation of long-term effects of these awareness campaigns and preventive activities on the population level and in specific subgroups is yet lacking. We address the temporal development of knowledge about skin cancer risk factors and agreement to the necessity of sun protection in different outdoor situations among parents of young children. We compiled data from four population-based surveys comprising data from 8184 parents of 3- to 6-year-old children in two regions of Germany performed over a nineteen-year period between 1993 and 2012. These individual cross-sectional studies used an identical methodology to recruit study subjects and to assess the principal outcome measures. Overall, parental knowledge about skin cancer risk factors and agreement to the necessity of sun protection improved significantly over the nineteen-year period. For instance, the recognition of fair skin/hair, sunburns during childhood and a high number of naevi, respectively, being risk factors for skin cancer increased by 20.0%, 19.9% and 19.2% from the first to the most recent survey. Two remaining knowledge gaps became evident: (i) the underrating of intermittent intensive sun exposure as a skin cancer risk factor and (ii) the erroneous belief that clouds provide sufficient sun protection at midday during summertime. The messages of future public health campaigns in Germany addressing skin cancer risks and informing about preventive measures for sun protection should thus be refined regarding these aspects.

1. Introduction

Over the past decades substantial public health efforts have been undertaken worldwide to increase awareness about skin cancer. Building upon experience from pioneering public education campaigns in Australia (Marks, 1990; Montague et al., 2001; Sinclair and Foley, 2009) many European countries, Canada, the U.S. and New Zealand started similar initiatives at the end of the last century (Breitbart, 1997). In Germany, the Association of Dermatological Prevention (ADP) has set the agenda for educational campaigns during the last 25 years (Arbeitsgemeinschaft Dermatologische Prävention, 2015). By developing a so-called period of life programme (POLP) the ADP tried to deliver tailored prevention messages to age-specific target groups within the population (Breitbart et al., 2006). Information about the risk of intensive exposure to ultraviolet radiation (UVR) has been the cornerstone of these activities (Narayanan et al., 2010), but also education about the role of constitutional (skin) factors has been provided. Parents of young children have been the target group of several campaigns launched by the ADP as children have a prominent role in the POLP concept (Breitbart et al., 2010; Kölmel et al., 1993).

An evaluation of long-term effects of these campaigns and preventive activities on the population level and in the target group of parents of young children is yet lacking. For the first time we compiled data from four surveys in Germany performed over a nineteen-year period between 1993 and 2012 to address this issue. These individual cross-sectional studies used an identical methodology to recruit study subjects and to assess the principal outcome measures, thereby allowing a joint analysis. We report on (i) the temporal development of parental knowledge about skin cancer risk factors and (ii) parental judgement about the necessity of sun protection in different outdoor situations. Our objective is to assess the impact of skin cancer campaigning in Germany on these aspects and to identify possible difficulties in understanding the campaigns' messages in the target population.

2. Material and methods

2.1. Surveys

Data (n = 8184) from four surveys among parents of children supervised in local German kindergartens have been combined and analysed

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jointly. Data from the original surveys were restricted to those referring to children within the range of 3 to 6 years of age at the time when parents completed the questionnaire. Detailed information on the individual cross-sectional studies has been published elsewhere (Gefeller et al., 2014, 2015; Li et al., 2011, 2012; Pfahlberg et al., 1997a,b,c). Briefly, the first two surveys took place during spring 1993 and autumn 1994, respectively, in Göttingen and were designed as a census in all 56 kindergartens of the city. The third survey during winter 2001/02 was performed in the city of Erlangen and its surrounding rural district Erlangen-Höchstadt and covered half of the kindergartens of the study area. The fourth survey during winter 2011/12 enlarged the study area used of the third study by including also the town of Ansbach and additionally increased the sampling proportion in the previous study region from one half to two thirds of all kindergartens in the study area.

Participants in all studies were recruited using the same strategy. First, the local kindergartens were approached and informed about the investigation. In a second step, an invitation letter and a questionnaire were distributed to all parents with the logistic support of the kindergarten teaching professionals. Return of questionnaires and reminders to return were organised locally in the participating kindergartens. At the end of the field phase at the kindergarten level the completed questionnaires were collected from all kindergartens by the central study personnel. Only in the most recent study an online participation option has been implemented additionally to allow parents to enter their answers to all items of the questionnaire via a secure web interface using an individualised password system to ensure that exclusively parents having received the invitation letter can enter data only once. This alternative mode of participation has only been used by 173 (= 5.4%) parents in this survey. Response rates of the four surveys and further study-specific information is shown in Table 1.

2.2. Questionnaire

The standardized self-administered questionnaire used in the four surveys varied slightly with respect to some items which were not part of all surveys. For example, photosensitivity data, such as the children's hair and iris colour, have not been ascertained in the first two surveys and the highest educational level attained by the parents was not asked for in the third survey. Only the last two surveys assessed which parent filled in the questionnaire. These slight discrepancies did, however, not concern the central items analysed here, addressing parental knowledge about skin cancer and parental opinions towards the necessity of sun protection in different situations. In all four study questionnaires the same questions using an identical wording have been asked.

To assess the knowledge about skin cancer risk factors nine exposures were listed in one of the questions and parents had to judge whether or not these were risk factors. The nine exposures comprised true risk factors (such as constitutional factors like high number of naevi, fair skin/hair and behavioural factors related to UVR exposure), but included also three exposures (allergies, diet, air pollution) that have attracted public health concern, but have not been identified as skin cancer risk factor. These distracting factors served to indicate whether parents have specific knowledge about skin cancer. The pattern of answers was then summarised by a sum score measuring the ability of parents to discriminate true risk factors from other factors of public health concern unrelated to skin cancer. In more detail, identification of a true risk factor increased the score by one point, whereas misstating a distracting factor as risk factor decreased the score by two points. We employed this unequal weighting of correct and incorrect judgements as the number of distracting factors was only half the number of true risk factors among the nine items and the resulting score had better psychometric properties (Cronbach's alpha – a measure related to reliability and internal consistency of a score – was higher for this definition than for other score definitions, e.g. the one using an equal-weighting scheme). The score was further classified into four categories ('low' [≤0], 'medium' [1–3], 'good' [4–5], 'excellent' [6]). The highest category of the knowledge score includes only those who discriminated perfectly all true risk factors from all distracting factors.

Another section addressed parental opinions about the necessity of sun protection in five different situations (on the beach, at midday, during outdoor sports, on cloudy summer days, on sunny evenings). For each of the five settings parents could select their answer from a 4-point Likert scale ('totally agree', 'agree partially', 'tend to disagree', 'totally disagree').

Table 1
Characteristics of the four German surveys and their samples (n = 8184) during the nineteen-year period from 1993 until 2012.

Period of investigation	Spring 1993	Autumn 1994	Winter 2001/2002	Winter 2011/2012	
Area	Göttingen	Göttingen	Erlangen and Erlangen/Höchstadt	Erlangen and Erlangen/Höchstadt	Ansbach
Number of kindergartens	56	56	59	83	15
Response[a] (%)	64.9	61.5	64.7	56.7	55.4
Sample size[a] (n)	1332	1080	2643	2653	476
Questionnaire filled out by mother (%)	n.a.	n.a.	87.6	93.2	93.7
Male children (%)	50.9	50.1	50.5	50.9	50.2
Children's age (mean	4.60	4.32	4.46	4.35	4.36
(std))	(0.93)	(0.92)	(0.99)	(0.97)	(0.98)
Mother's age (mean	33.67[b]	33.38[b]	34.29	36.02	34.51
(std))	(5.03)	(4.91)	(4.63)	(5.22)	(5.49)
Hair colour:					
Red (%)	n.a.	n.a.	1.7	2.1	1.5
Blonde (%)	n.a.	n.a.	63.0	63.4	61.1
Brown (%)	n.a.	n.a.	32.6	32.7	36.4
Black (%)	n.a.	n.a.	2.7	1.9	1.1
Eye colour:					
Blue (%)	n.a.	n.a.	51.9	51.6	51.5
Green (%)	n.a.	n.a.	16.5	16.5	17.2
Brown (%)	n.a.	n.a.	31.6	32.0	31.3
Highest level of parental education:					
Low (%)	18.7	17.4	n.a.	14.2	22.4
Medium (%)	35.2	35.0	n.a.	24.4	37.0
High (%)	46.1	47.6	n.a.	61.4	40.7

[a] Response rates have been calculated based on the number of returned questionnaires relative to the number of children from different parents supervised in the kindergartens. The sample size shown and used for this analysis is lower due to the age restriction.
[b] Information about the respondent's age was asked for in the questionnaire. Since questionnaires have been predominantly filled out by mothers, the values are similar, but not mutually comparable in a strict sense.