A Programme for Photoprotection Education: Implementation and Results

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Abstract

Education for health is an increasingly important objective in education. Photoprotection education may help to avoid negative consequences for health resulting from inadequate sun exposure habits. Photoprotection is especially important for young individuals, like adolescents, as they frequently have poor photoprotection habits. In this respect, educational programmes directed to adolescents may help to develop long-lasting healthy photoprotection behaviours. We developed a sun protection programme in a secondary school of Vila-real (Spain) consisting in a 20 min educational class directed to students of the third year of secondary school before the summer season. After the summer season, a questionnaire was passed out to the students to evaluate their sources of information, knowledge on sun exposure risks, as well as their photoprotection habits. The results of the programme show that the intervention improved the information received by students on this issue. Also, students had a good knowledge of the most important risks of sun exposure as well as about basic measures for photoprotection. However, the intervention group had better level of knowledge than the control group, and girls demonstrated better knowledge than boys. Results of habits showed that a high percentage of adolescents had unhealthy habits, but again the intervention group had significantly better values for photoprotection habits than the control group. However, contrarily to what occurred with the knowledge, boys had better photoprotection habits than girls. In conclusion, educational programmes can improve the photoprotection knowledge and habits of adolescents. Given the important gender differences, we suggest that specific photoprotection programmes should be devised for each sex. Implementation of this kind of programmes in the curriculum of adolescent students could contribute to a better health education in the future.

1. Introduction

Excessive sun exposure is very harmful for health, in particular for children and adolescents [1]. Adolescents are known to have inadequate photoprotection habits, as having a greater sun exposure in order to get more tanned [2]. Several studies show that photoprotection programmes may improve the knowledge and habits of adolescents regarding sun exposure [3]. Implementing such programmes in secondary (high) schools has the advantage of reaching most of the target population, facilitates attracting the attention of students, and can be incorporated in regular school activities [4].

Although there are many reports on the photoprotection knowledge and habits of adolescents there are not many studies dealing with the results of interventions on photoprotection [4]. Measurement of the changes induced by educational programmes on photoprotection knowledge and habits is essential for assessing the success and effiectiveness of these programmes. In this respect, the use of questionnaires as been widely used [3].

Here, we investigate the effect of a short intervention to improve photoprotection knowledge and habits in a population of adolescents from the Spanish Mediterranean coast.

2. Methodology

2.1 Population

The population consisted of 169 students distributed in 7 classroom groups of the third course of Compulsory Secondary Education (high school) aged between 14 and 17 years from the "Francesc Tàrrega" secondary school, which situated in Vila-real (Castelló, Spain). Data were taken at the beginning of the study on demographic data (age, gender, skin type, eye, and hair colour).

2.2 Intervention and evaluation

The photoprotection intervention was performed in three groups (69 students), while the other four (100 students) were left as control.

The intervention was performed before summer season and consisted of a brief PowerPoint presentation (20 min) in which the following subjects were treated: (a) beneficial and detrimental effects of sun exposure; (b) risks of inadequate sun exposure: sunburns, skin cancer, skin aging; (c) mortality and morbility statistics caused by inadequate sun exposure in our region, (d) basic advices for sun exposure and sunbathing: sun avoidance in the hours of most intense radiation, garments for sun protection, recommendations of use of sunscreen, explanation of the meaning of the sun protection factor, etc.

A questionnaire, containing 21 two-choice (yes/no) questions was passed to the participants after the summer season. Seven questions were related to knowledge on photoprotection, and nine to photoprotection habits (Table 1). In order to have an overall assessment of the photoprotection knowledge and habits, a knowledge index (*KI*) score and a habits index (*HI*) score was used. The scoring system used is presented in Table 1.

Table 1. Questions passed to participants related to photoprotection knowledge, and habits, and scores given to positive answers for each of the knowledge and habits questions.

Question	Scores
Knowledge	
K1. Does sun exposure involve the risk of skin burns?	1
K2. Does sun exposure involve the risk of cancer?	1
K3. Does sun exposure involve the risk of skin aging?	1
K4. Do adolescents and children have greater risks than adults upon sun exposure?	1
K5. What is the most risky time for sun exposure?[a]	1
K6. Do you know what the sun protection factor (SPF) is?	1
K7. Do sunscreens protect against the risks of sun exposure?	1
Habits	
H1. Did you suffer sunburns during the last summer?[b]	1
H2. Did you expose to the sun for tanning?[b]	1
H3. Do you wear cap at the beach?	0.33
H4. Do you wear T-shirt at the beach?	0.33
H5. Do you wear sunglasses at the beach?	0.33
H6. Do you use sunscreen at the beach?	1
H7. When going to beach, do you apply sunscreen before leaving home?	0.5
H8. At beach, do you apply sunscreen at least once every 3 hours?	0.5
H9. At beach, do you apply sunscreen at least twice a day?[c]	0.25

[a]Three alternatives were given for this answer: (a) from 8 to 12; (b) from 12 to 16 h; (c) from 16 to 20 h. Answer (b) was considered as positive answer and (a) and (c) as negative answer.

[b]For this question a “No” answer is considered as positive (score=1) and a “Yes” answer is considered as negative (score=0) for calculating the habits index score.
[c]Individuals giving simultaneously positive answers to questions H8 and H9 are considered as positive for H8 and negative for H9 for calculating the habits index score.

3. Results

3.1 Photoprotection knowledge

Adolescents of both the intervention and control groups had a good knowledge of the most important risks of sun exposure as well as on basic photoprotection measures (Fig. 1). More than 90% of adolescents knew that sun exposure can cause cancer, that the most risky timing for sun exposure is from 12 to 16 h and that sunscreens protect against the risks of sun exposure (Fig. 1). The least reported knowledge corresponded to the fact that sun exposure causes skin aging. When considering the knowledge index (*KI*), significant differences (P=0.044) are found between the intervention and control groups, so that the intervention group has significantly better results (*KI*=5.91) than the control group (*KI*=5.74).
Females had a highly significantly (P<0.001) better knowledge than males of the fact that sun exposure can cause skin aging (Fig. 1). For the other six questions, no significant differences were found between both groups; however, females had higher percentages of positive answers than males for four of these six questions. However, as occurred with the intervention and control groups, highly significant differences (P<0.001) were found between females and males for *KI*, with females having significantly better scores than males (*KI*=5.49).

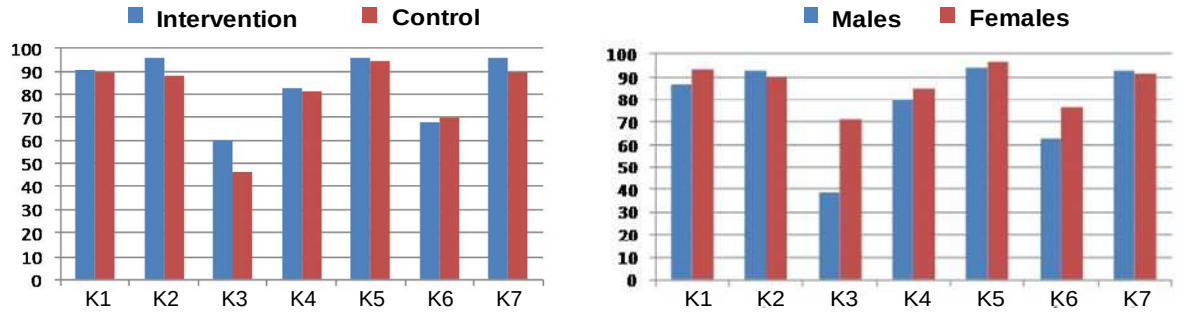

Fig. 1. Questionnaire results for each of the photoprotection knowledge questions performed in the intervention and control groups (left) and in the males and females (left). Codes for each of the questions can be consulted in Table 1.

3.2 Photoprotection habits

The photoprotection habits were, in general, less good than those obtained for the knowledge questions (Fig. 2). As a mean, almost 50% of the adolescents had suffered sunburns during last summer and more than 70% exposed to the sun for tanning, and only around 15% of adolescents wear a cap and 20% a T-shirt at beach (Fig. 2). The use of sunglasses is more frequent, but as a mean it is just around 50%. Regarding the use of sunscreen at beach there are more than 75% of users, although only 45% of sunscreen users apply it before leaving home, and only 15% of them apply sunscreen at least once every 3 h, with only around 50% of them applies sunscreen at least twice a day. The intervention group had a higher frequency than the control group for the use of sunscreen and of application of sunscreen at home before leaving home when going to the beach (Fig. 2). The overall estimation of the photoprotection habits through the habits index (*HI*), revealed

the existence of significant differences (P=0.042) between the intervention and control groups, so that the intervention group has better scores (*HI*=1.69) than the control group (*HI*=1.41) (Fig. 2).

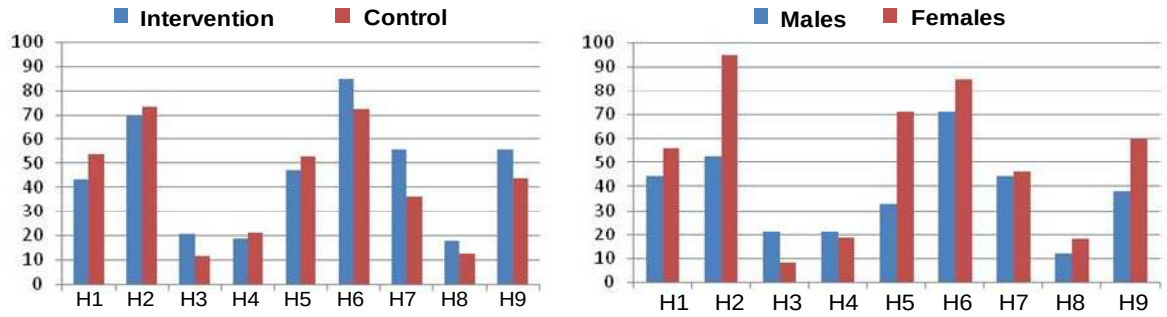

Fig. 2. Questionnaire results for each of the photoprotection habits questions performed in the intervention and control groups (left) and in the males and females (left). Codes for each of the questions can be consulted in Table 1.

Regarding gender differences, we found important differences between sexes for the frequency of sun exposure for tanning as well as for the use of sunglasses at beach (Fig. 2). Important differences were found for the use of cap at the beach and for the application of sunscreen at least twice a day at the beach. Also, differences were found for the use of sunscreen at the beach. For the rest of questions no significant differences were found between sexes (Fig. 2). For *HI*, significant (P=0.029) differences were found between sexes, and contrarily to what occurred for the knowledge index, for the habits index males had better scores (*HI*=1.68) than females (*HI*=1.34).

4. Discussion

4.1 Photoprotection knowledge

The results of the questionnaire shows that most (around 90% or more) students in both the intervention and control groups had a knowledge of basic aspects on photoprotection; however, as found by others [5], the less-known aspect of knowledge is that excessive sun exposure can cause skin aging.

Short interventions on photoprotection in adolescents have had positive effects on photoprotection knowledge in adolescents [6, 7]. We have found that the intervention increased the knowledge on photoprotection, as shown by the significant increase in *KI*. However, the differences between the intervention and control group for the most well-know aspects have been small, and somewhat larger for the less known aspects, like the fact that sun exposure can cause skin aging.

Important gender differences have been found in some knowledge aspects. Females have more knowledge on aesthetically important aspects, like that excessive sun exposure causes skin aging [5]. As a consequence, females get, on average, higher scores than males for *KI*, indicating that they are likely more interested in this information.

4.2 Photoprotection habits

The results indicate that many adolescents follow undesirable photoprotection habits. Around 50% of participants reported having suffered skin burns during the last summer, which, nonetheless, are lower than values by others [8, 9]. However, it is remarkable that, on average, more than 80% of the participants report using sunscreen at the beach, values much higher than those found in former studies from other countries [5, 9], reflecting the growing awareness of protection from solar radiation

at beach. However, the percentage of adequate frequency of use of sunscreen is not as positive, with only 15% applying sunscreen at least once every three hours.

As a consequence of the change of habits, the intervention group had better *HI* scores than the control group. In another study [6] a positive effect on habits of adolescents after a short intervention was found, but in several other studies [3] no effect was found, so that the frequency of interventions improving knowledge is greater than those improving habits.

Adolescent females expose more frequently to sun for tanning than males [8]. Several studies show that adolescent females are more susceptible to influences that promote a tanned skin associated to attractive appearance [3]. In particular, almost 95% of females of our study exposed intentionally to the sun for tanning, which confirms the greater interest of females for tanning. Females make a greater use of sunscreen than males [8], which is probably associated to the fact that they have a greater frequency of sun exposure.

4.3 Conclusions

The adolescent population studied had a fairly good knowledge of basic photoprotection measures, but that the habits were mostly inadequate. A short-term presentation before summer improved the photoprotection knowledge and habits, showing that such programmes may be useful at improving health education regarding photoprotection and to developing healthy habits. In our case, females have better photoprotection knowledge and worst habits than males, which suggests that interventions directed specifically to each gender may be useful for creating healthy photoprotection attitudes.

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