# Associations between health literacy and preventive Skin Cancer Prevention Strategies among University Students

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## ABSTRACT

**Background and Objective:** A person's putting every behavior into practice after they receive information on health may mean that the person can exhibit the appropriate health behavior and protect his health within the context of their level of health literacy. This study was aimed at determining university students' health literacy levels and the effects of their health literacy on their knowledge of, and attitudes and behaviors towards skin cancer prevention strategies.

**Materials and Methods:** This descriptive study included 800 university students in the Aegean Region of Turkey. The data were collected by the researchers between March 01, 2019 and March 30, 2019. The research data were collected using the Descriptive Characteristics Form including 3 parts (the Participants' Socio-Demographic Characteristics Questionnaire, Information-Attitude-Behavior Questionnaire, Risk Factors Questionnaire) and the "Turkish Health Literacy Scale". The association between the sociodemographic characteristics of the students and their scores for protective behavior, knowledge levels and risk factors and Health Literacy was analyzed using the linear regression model (the 'Enter' method). The relationship between health literacy and knowledge/ attitude / behavior scores was evaluated with the Pearson's correlation. $p<0.05$ was considered as statistically significant.

**Results:** The mean age of the participating students was 21.0 ± 1.8 (18-36) years. Of them, 63.8% were women. The study results demonstrated that the participating university students' knowledge levels regarding the harmful effects of sunshine and skin cancer prevention were inadequate. There is a positive correlation between health literacy and sun protection attitudes and behaviors. Of the participating students, those whose health literacy levels were high and those who had high knowledge / attitude scores about sun protection displayed better sun protection behaviors ($p<0.05$).

**Conclusion:** A significant result of the study was that health literacy should be improved in order to improve sun protection and skin cancer prevention strategies.

**Paper Type:** Research Article
**Keywords:** University student, skin cancer, sun protection, health literacy

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## Introduction

Both melanoma and non-melanoma skin cancers attract attention due to their increasing incidence both in our country and in the other countries of the world (1,2,3). It is reported that the frequency of skin cancer development throughout life is 1 in 33 men, and 1 in 52 women [4]. Research on the issue reveals that 90% of non-melanoma skin cancers and 65% of melanoma are caused by UV rays. Due to the thinning in the ozone layer, which protects the world from the harmful effects of sunrays (sun's harmful UV radiation), the higher level of UV radiation reaches the earth and thus increases the harmful effects of the sun. As a result, the incidence of melanoma and non-melanoma skin cancers is increasing day by day (5,6).

Turkey is a Mediterranean country located between the temperate zone and subtropical zone with abundant sunlight. Despite this intensive exposure to the sun's rays, societal attempts similar to those achieved by the other European countries have been made to protect people both from the harmful effects of sunshine on health and from skin cancers (7,8).

Although any person is at risk of developing skin cancer, there are some risk factors increasing the likelihood of developing skin cancer. Especially people who have fair skin, many moles and spots, are exposed to the sun for a long time and have a history of childhood sunburn are more likely to develop skin cancer (9,10,11). In addition, the risk of developing melanoma due to exposure to sunlight during childhood and adolescence is more than that due to exposure to sunlight at later ages [12]. In the literature, it is reported that approximately 25-50% of a person's lifetime exposure to sunlight occurs before the age of 18-21, and annual sun exposure in children is three times more than that in adults [13]. In order to minimize this risk of skin cancer and to protect ourselves against it, it is recommended to wear hats and sunglasses in the sun, to stay in the shade not in the sun to avoid direct sunlight in sunny weather, to wear clothing that will prevent UV rays from passing through, and to use broad spectrum sunscreens (11,14).

Health literacy is defined as the ability of individuals to obtain, process and understand the basic health information and services required to make appropriate health decisions. Health literacy is a holistic concept that requires a person to identify their health, to know what their illness is, to make appropriate decisions about their health, and to know how to use and how to make use of the health system rather than just read and understand health-related information. Most of the behaviors displayed or activities performed by individuals affect their health. A person's putting every behavior into practice after they receive information on health may mean that the person can exhibit the appropriate health behavior and protect his health within the context of their level of health literacy. In the literature, in several studies, it has been indicated that the level of health literacy may have an impact on health behaviors (15,16,17,18,19). This information suggests that health literacy plays an important role in skin cancer prevention strategies.

In the literature, studies have been performed either on skin cancer prevention or on health literacy. However, our search for studies in which health literacy and skin cancer prevention, and the effect of health literacy on the skin cancer prevention knowledge / attitude / behavior were investigated indicated a gap in the literature. The purpose of this study was to determine health literacy levels of university students and the effects of health literacy on their knowledge / attitudes / behaviors related to skin cancer

prevention strategies. The present study is also important because the data obtained in this study is expected to provide guidance for the activities to be performed on skin cancer prevention, and data for the authors of future studies to be conducted on the issue.

## Materials and Methods

### Sample and setting:

The study was done in a cross-sectional type. Research data was collected between 01.03.2019 and 30.03.2019. Students attending Manisa Celal Bayar University in the 2018-2019 academic year formed the population of the research (n=19.301). The research was conducted on a sample group. One branch from each department of faculties was randomly selected. The sample size was at a 95% confidence border with a 50% prevalence and 0.05 error level, the design effect was 2, and the minimum sampling size was determined as 754. The study included 800 people. Which departments to be included in the study were determined randomly (Faculty of Economics, Faculty of Science and Letters, Faculty of Health Sciences Sports Science Faculty). All students who volunteered to participate in the study were included in the study.

### Data collection:

The data were collected by the researchers between 01.03.2019 and 30.03.2019. They were contacted directly in their classroom. Detailed information was given to the students about the research and verbal consent was obtained. The ques tionnaires were distributed to students in their classroom. It took approximately 20 min to fill out a survey in a single session. After the students filled out the questionnaires in the classroom, the questionnaires were collected by researchers in a box.

### Instruments:

The research data was collected using a survey form questioning participants' socio-demographic characteristics, information-attitude-behavior questionnaire, risk factors questionnaire and the "Turkish Health Literacy Scale".

The survey instrument was a questionnaire developed to determine risk factors, knowledge and behavior, and was based on the current published work (2,5,14,15,18,19). After determining the questions, the expert opinions of one dermatologist, three public health, 2 academician nurses and two dermatology nurses were obtained. In December 2018, subsequently, a pilot application was conducted with 20 young students of the same age who were not participating in the study. The final questionnaire included four parts, with 17 questions relating to sociodemographic characteristics, 10 questions about behavior for protection against the sun, 14 questions relating to the risk factors of skin cancer, and 18 questions about knowledge of skin cancers and methods of protecting against the sun. In addition, questions were asked about familial skin cancer, experiences of sunburn, sources of knowledge, tanning behavior and use of SPF. The skin types of the students were grouped according to the Fitzpatrick classification: skin “burns” without or with minimal tanning (phototype I and II), “burns” and then tans (phototype III) or tans easily without burning (phototype IV) Bu klasifikasyonda tipV ve VI da var. Bunlar: “Rarely burns” and tans darkly easily (Type V) and “never burns” and always tans darkly (Type VI) (20).

### Information-attitude-behavior score:

Knowledge level score for protection against skin cancer The knowledge level for the etiopathogenesis of skin cancers and methods of protection against the sun was examined in 15 questions and the results were obtained by adding 1 point for each of the correct responses (0 points were given for “wrong/I do not know” answers

and 1 point was given for correct answers). The knowledge level score was formed by adding all the scores together. The knowledge scores ranged 0 (minimum) to 15 (maximum). Behavior score for protection against the sun and skin cancer Points were given according to the frequency of implementation of each of the methods applied for protection against the sun and were evaluated on a 4 point scale ("never" = 1, "sometimes" = 2, "frequently" = 3 and "always" = 4). The total points obtained were divided by the number of 13 items, to calculate the behavior score for protection against the sun and skin cancer. For the calculation of the total score, a minimum of eight responses to the 13 protective behavior patterns was needed (minimum 13, maximum 52 points).

**Risk score for skin cancer:** Total risk score was calculated by giving 1 point to each existing risk for skin cancer.

Social class; employers according to the father jobs of the students, high-quality self-employed, tradesmen / marginal, high-quality paid, white collar upper social class; unskilled service workers, blue collar, unemployed are evaluated as sub social class (21 ).

**Turkish Health Literacy Scale:** Turkish Health Literacy Scale, It has 5 point Likert type scaling of 32 questions. The scale consists of four domains. Access to information, understanding information, appraisal / evaluation, application / use. The instrument demonstrates good internal consistency reliability with a Cronbach's alpha of 0.927, where 0,880 and 0,863 for ''health care'' and ''disease prevention and health promotion'' areas, respectively. As the score of the scale increases, the level of Health Literacy of the individual also increases (22 ).

**Ethical implementations:**

Ethical committee permission for the study was granted by Celal Bayar University Local Ethics Committee (ethic no: 20478486-050.04.04). Verbal permission was obtained from the Celal Bayar university where the study was carried out and verbal approval was obtained from the students. Students' names were not used.

**Limitations of the study:**

The study was conducted only among the students studying at Celal Bayar University. Therefore, the results obtained may not be representative of all university students. Another limitation of the study is that only volunteers participated in the study.

**Statistical analysis:**

Data analysis Statistical software (SPSS 15.0; SPSS Inc., Chicago, IL, USA) was used for data analyses.

The association between the sociodemographic variables of the students and their scores for protective behavior, knowledge levels and risk factors and Health Literacy was analysed using the linear regression model (the 'Enter' method). The relationship between health literacy and knowledge / attitude / behavior scores was evaluated with Pearson correlation. $P<0.05$ was considered as statistically significant.

## Results

Sociodemographic and general health characteristics and Risk characteristics for skin cancer

Sociodemographic and general health characteristics of the students are given in Table 1. The mean age of the participating students was 21.0 ± 1.8 (18-36) years. Of them, 63.8% were women, 29.52% were in the upper social class. 12% had a disability, 3.9% had a chronic disease, 59.8% perceived their health status as quite good or very good, and 48.1% perceived their quality of life as quite good or very good (table 1).

**Table 1. Sociodemographic and general health characteristics of the students(n=800)**

| | N | % | | N | % |
|---|---|---|---|---|---|
| socio-demographics | | | General Health Status | | |
| Gender | | | Disability ituation | | |
| Male | 290 | 36.3 | No | 698 | 87.3 |
| Female | 510 | 63.8 | Yes | 102 | 12.8 |
| Faculty | | | Disability Type | | |
| Faculty of Economics | 198 | 24.8 | Seeing | 19 | 2.4 |
| Faculty of Science and Letters | 200 | 25.0 | Hearing | 2 | 0.3 |
| Faculty of Health Sciences | 176 | 22.0 | Orthopedic | 1 | 0.1 |
| Sports Science Faculty | 226 | 28.3 | | | |
| Class | | | Satisfaction with the Quality of Life | | |
| 1st Class | 214 | 26.8 | Not satisfied | 40 | 5.0 |
| 2nd Class | 194 | 24.3 | Very little dissatisfaction | 89 | 11.1 |
| 3rd Class | 212 | 26.5 | Neither satisfied nor dissatisfied | 246 | 30.8 |
| 4th Sınıf | 180 | 22.4 | Pretty satisfied | 250 | 31.3 |
| | | | Very satisfied | 175 | 21.9 |
| Social status | | | Health Satisfaction | | |
| Upper | 236 | 29.5 | Not satisfied | 31 | 3.9 |
| Lower | 564 | 70.5 | Very little dissatisfaction | 56 | 7.0 |
| | | | Neither satisfied nor dissatisfied | 235 | 29.4 |
| | | | Pretty satisfied | 272 | 34.0 |
| | | | Very satisfied | 206 | 25.8 |
| Chronic Disease | | | | | |
| Yes | 31 | 3.9 | | | |
| No | 574 | 71.8 | | | |

Risk characteristics for skin cancer of the students are given in Table 2. The rate of Fitzpatrick skin type 1, 2, 3, 4 and 5 in the students was 21.4%, 22.5%, 1.24%, 27.0% and 5.0% respectively. Of them, 73.4% had a dark eye color, 64.4% had common nevus, 20% worked at a paid job outside the school, and 56% had an outdoor hobby, 13.5% had a history of a childhood sunburn, 8.8% had lentigo on the haired skin, 32% had lentigo on the face, and 14.6%) had lentigo on the dorsal surfaces of the hands (Table 2).

**The students' knowledge of, and attitudes and behaviors towards the sun and skin cancer:**

The students' knowledge of, and attitudes and behaviors towards the sun and skin cancer are given in Table3. The three pieces of information known well most by the participants were as follows: "Radiation exposure increases the risk of skin cancer." "Sun exposure increases the skin aging." "Dark-colored clothes have better sun protection than that oflight-colored ones." (63.9%, 61.0%, 60.9% respectively). The top three most common behaviors displayed by the participants to protect themselves from the harmful effects of the sun were as follows: trying to stay in the shade, drinking at least 8-10 glasses of water a day, and wearing sunglasses (82.2%, 78.7%, and 77.4% respectively). The rate of those who agreed that it is necessary to protect ourselves from the harmful effects of sunrays was 72.9% (Table 3).

**Table 2. Risk characteristics for skin cancer of the students(n=800)**

| | N | % |
|---|---|---|
| Fitzpatrick Skin Type | | |
| Fitzpatrick Skin Type 1 | 171 | 21.4 |
| Fitzpatrick Skin Type 2 | 180 | 22.5 |
| Fitzpatrick Skin Type 3 | 193 | 24.1 |
| Fitzpatrick Skin Type 4 | 216 | 27.0 |
| Fitzpatrick Skin Type 5 | 40 | 5.0 |
| Eye color | | |
| Dark (black / brown) | 587 | 73.4 |
| Blue / Green / other | 213 | 26.6 |
| Hair colour | | |
| Dark (Black / brown) | 587 | 73.4 |
| Light (yellow / red) | 213 | 26.6 |
| Commonnevus | | |
| Yes | 514 | 64.3 |
| No | 286 | 35.8 |
| Common nevus number | | |
| No | 203 | 25.4 |
| Less than 25 | 483 | 60.4 |
| 25-50 | 98 | 12.3 |
| More than 50 | 16 | 2.0 |
| Work done outside | | |
| Yes | 160 | 20.0 |
| No | 640 | 80.0 |
| Outdoor hobby | | |
| Yes | 448 | 56.0 |
| No | 352 | 44.0 |
| Burnt story in childhood (Face; hands and scalp skin) | | |
| Yes | 108 | 13.5 |
| No | 692 | 86.5 |
| lentigo on the face | | |
| No | 552 | 69.0 |
| 1-3 | 201 | 25.1 |
| More than 4 | 47 | 5.9 |
| Lentigo in the scalp | | |
| Yes | 70 | 8.8 |
| No | 730 | 9.,2 |
| Lentigo in the dorsal of the hand | | |
| Yes | 117 | 14.6 |
| No | 683 | 85.4 |

## Knowledge / Attitude / Behavior and Health Literacy

The correlation between some characteristics of the students and their knowledge and health literacy levels, and attitudes and behaviors are given in Table 4.

## Knowledge / attitude / behavior

The participants' knowledge levels were affected by their year at school, faculty they attended, mothers' education level, and behavior scores. Those who were the 3rd and 4th grade students and those who were the students at health-related faculties, those who had mothers whose education level was above secondary education, and those who had high behavioral scores had better knowledge of sun protection than did the other students ($p < 0.05$).

The participants' attitudes were affected by their behavior scores. Those who had higher behavior scores had higher attitude scores than did the other students ($p < 0.05$).

The participants' behaviors were affected by the presence of a disability, sex, knowledge score, attitude score, and the scores for the overall Health Literacy Scale and its implementation subscale. The female students, those with no disability, those having high knowledge and attitude scores, and those having higher scores for the overall Health Literacy Scale and its process subscale displayed better sun protection behaviors than did the other students.

## Health Literacy Scale and its subscales

Access to information was affected by sex, the year at school, faculty the student attended, knowledge score and attitude score. The female students, 3rd and 4th grade students, those who attended a health-related faculty, those who had high knowledge and attitude scores, and those who were satisfied with their quality of life obtained higher scores from the access to information subscale ($p < 0.05$).

Understanding information was affected by

**Table 3: The students' knowledge of, and attitudes and behaviors towards the sun and skin cancer**

| The students' knowledge towards the sun and skin cancer | Yes | No | I don't know | |
|---|---|---|---|---|
| There is a high risk of developing malignant melanoma in exposed and exposed areas of the body.. | 41.0 | 14.3 | 44.8 | |
| The risk of cancer (malignant melanoma) increases significantly in those with nevus in the body. | 39.6 | 15.3 | 45.1 | |
| Sunscreens are not effective in preventing some types of skin cancer (malignant melanoma, basal cell cancers) | 44.9 | 13.8 | 41.4 | |
| The high number of melanocytic nevi is a risk factor for the development of melanoma. | 35.9 | 10.5 | 53.6 | |
| Early childhood sunburn plays a greater role in the development of skin cancer than adult sunburn. | 40.1 | 13.3 | 46.6 | |
| Early childhood sunburn plays a greater role in the development of skin cancer than adult sunburn. | 61.0 | 13.5 | 25.5 | |
| Solar light has an immunostimulating effect. | 38.9 | 15.0 | 46.1 | |
| Dark colored clothes have better sun protection feature compared to light colored ones.. | 60.9 | 13.4 | 25.8 | |
| Clothing that covers the body tightly has better sun protection than those with plenty. | 36.8 | 29.1 | 34.1 | |
| If the family has skin cancer, the risk of skin cancer increases | 51.8 | 15.0 | 13.3 | |
| Exposure to radiation increases the risk. | 63.9 | 12.0 | 24.1 | |
| Smoking increases the risk of skin cancer. | 53.1 | 18.6 | 28.3 | |
| **The students' behaviors towards the sun and skin cancer** | **No** | **Someti-mes** | **Of-ten** | **Always** |
| I don't go out during the hours when the sun is on the hill | 15.0 | 45.3 | 24.1 | 15.0 |
| I wear a wide brimmed hat when I go out | 49.0 | 28.8 | 14.1 | 8.1 |
| I wear a protector before going out | 32.6 | 36.9 | 17.6 | 12.9 |
| I pay attention to being in the shade | 17.8 | 28.0 | 33.3 | 21.0 |
| I wear sunglasses that do not pass the harmful rays of the sun. | 22.6 | 34.8 | 25.4 | 17.3 |
| I watch the nevus in my body | 33.6 | 38.4 | 17.6 | 10.4 |
| I apply protective cream with 15 factors and above. | 31.6 | 35.4 | 19.6 | 13.4 |
| I apply a 15-factor protective cream every half hour on the beach or at the beach | 26.3 | 37.6 | 21.9 | 14.3 |
| I do not swim | 36.8 | 35.9 | 15.6 | 11.8 |
| I don't sunbathe on the beach | 37.1 | 34.4 | 16.3 | 12.3 |
| I drink at least 8-10 glasses of water a day | 21.3 | 30.8 | 24.4 | 23.6 |
| I wear long sleeved clothing | 26.1 | 39.3 | 16.3 | 18.4 |
| I use sun umbrella | 49.1 | 24.3 | 12.6 | 14.0 |
| **The students' attitudes and behaviors towards the sun and skin cancer** | **I strongly disagree** | **I do not agree** | **Undeci-ded** | **I ag-ree** | **Absolu-tely I agre** |
| Sun rays have harmful effects. | 5.9 | 5.6 | 13.5 | 42.1 | 32.9 |
| Güneş ışınlarının zararlı etkilerinden korunmak gerekir. | 6.4 | 5.9 | 14.9 | 38.0 | 34.9 |
| It can be protected from the harmful effects of sun rays by protective methods. | 8.3 | 7.0 | 14.4 | 40.0 | 30.4 |
| The bronze appearance does not represent health | 4.4 | 8.1 | 26.4 | 29.5 | 31.5 |
| People protected from the sun are of superior quality (more classy) | 15.0 | 18.0 | 24.0 | 21.1 | 21.9 |

**Table 4. The association between some characteristics of the students and their knowledge and health literacy levels, and attitudes and behaviors Linear Regresyon**

| | B | S.E. | β | %95 CI | | P |
|---|---|---|---|---|---|---|
| | | | | min | max | |
| ***Knowledge** | | | | | | |
| Faculty | 1,411 | ,246 | ,234 | ,929 | 1,893 | ,000 |
| Class | ,589 | ,227 | ,098 | ,143 | 1,034 | ,010 |
| Mother education | ,915 | ,435 | ,085 | ,060 | 1,769 | ,036 |
| Behavior score | ,736 | ,213 | ,127 | ,319 | 1,154 | ,001 |
| ****Attitudes** | | | | | | |
| Behavior score | ,306 | ,055 | ,202 | ,198 | ,414 | ,000 |
| *****Behaviors** | | | | | | |
| Gender | ,134 | ,037 | ,124 | ,061 | ,207 | ,000 |
| having any handicap | ,318 | ,089 | ,204 | ,144 | ,493 | ,000 |
| Knowledge Score | ,021 | ,006 | ,119 | ,009 | ,032 | ,009 |
| Attitude Score | ,125 | ,023 | ,189 | ,080 | ,169 | ,000 |
| Health Literacy / Practice | ,025 | ,008 | ,215 | ,040 | ,011 | ,001 |
| Total Health Literacy | ,008 | ,004 | ,290 | ,001 | ,016 | ,032 |
| ****** Health Literacy / Access to Information** | | | | | | |
| Gender | ,878 | ,336 | ,093 | ,219 | 1,538 | ,009 |
| Faculty | 1,205 | ,375 | ,133 | 469 | 1,942 | ,001 |
| Class | 1,023 | ,341 | ,113 | ,354 | 1,693 | ,003 |
| Life quality | 1,230 | ,524 | ,135 | ,201 | 2,258 | ,019 |
| Knowledge Score | ,116 | ,054 | ,077 | ,010 | ,222 | ,032 |
| Attitude Score | ,677 | ,204 | ,118 | ,277 | 1,076 | ,001 |
| ******* Health Literacy / Understanding Information** | | | | | | |
| Gender | 1,515 | ,431 | ,126 | ,668 | 2,362 | ,000 |
| Faculty | 1,091 | ,482 | ,094 | ,145 | 2,037 | ,024 |
| Class | 1,353 | ,438 | ,117 | ,493 | 2,212 | ,002 |
| Satisfaction with health | 1,297 | ,553 | ,110 | ,211 | 2,383 | ,019 |
| Attitude Score | ,994 | ,262 | ,135 | ,481 | 1,508 | ,000 |
| ******** Health Literacy / Assessment** | | | | | | |
| Gender | 1,286 | ,522 | ,088 | ,260 | 2.311 | ,014 |
| Faculty | 1,826 | ,583 | ,130 | ,680 | 2,971 | ,002 |
| Class | 1,111 | ,530 | ,079 | ,070 | 2,152 | ,036 |
| Health Satisfaction | 1,399 | ,670 | ,098 | ,083 | 2,714 | ,037 |
| Attitude Score | 1,344 | ,317 | ,151 | ,722 | 1,966 | ,000 |
| ********* Health Literacy / Practice** | | | | | | |
| Gender | 1,142 | ,325 | ,125 | ,505 | 1,779 | ,000 |
| Faculty | ,901 | ,363 | ,102 | ,189 | 1,612 | ,013 |
| Disability Status | -2,311 | ,776 | -,175 | -3,833 | -,788 | ,003 |
| Life quality | 1,185 | ,506 | ,134 | ,191 | 2,179 | ,019 |
| Behavior Points | ,749 | ,310 | ,089 | ,140 | 1,358 | 0,016 |
| Attitude Score | ,849 | ,197 | ,152 | ,463 | 1,236 | ,000 |
| **********Total Health Literacy** | | | | | | |
| Gender | 4,821 | 1,346 | ,127 | 2,179 | 7,463 | ,000 |
| Faculty | 5,023 | 1,503 | ,137 | 2,071 | 7,974 | ,001 |
| Class | 4,331 | 1,367 | ,118 | 1,648 | 7,013 | ,002 |
| Disability Status | -7,072 | 3,216 | -,129 | -13,385 | -,759 | ,028 |
| Attitude Score | 3,864 | ,816 | ,166 | 2,261 | 5,466 | ,000 |

Variables Taken to the Model: Gender (ref: women), grade (ref: 1-2. grade), faculty education area (ref: related to health), mother's education (ref: over secondary education), father's education (ref: over secondary education), social status (ref: upper), income (ref: Income equivalent to expense/or more), family type (ref: nuclear family), having any chronic illness (ref: no), having any handicap(ref: no), health Satisfaction score, quality life score, knowledge / attitude / behavior score, Turkish Health Literacy Scale total score and sub score.

**Table 5. The correlation between health literacy and knowledge / attitude / behavior scores**

| | | Knowledge | Attitudes | Behaviors | Health Literacy Sub-Dimensions | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Access to Informa-tion | Understanding Informa-tion | Asses-ment | Practice | Total Health Literacy |
| Knowledge<br>r<br>p | | 1 | ,085(*)<br>,017 | ,134(**)<br>,000 | ,069<br>,050 | ,059<br>,094 | ,058<br>,102 | ,025<br>,490 | ,064<br>,071 |
| Attitude<br>r<br>p | | | 1 | ,221(**)<br>,000 | ,153(**)<br>,000 | ,166(**)<br>,000 | ,184(**)<br>,000 | ,149(**)<br>,000 | ,197(**)<br>,000 |
| Behavior<br>r<br>p | | | | | ,153(**)<br>,000 | ,166(**)<br>,000 | ,184(**)<br>,000 | ,149(**)<br>,000 | ,197(**)<br>,000 |
| Health Literacy Sub-Dimension | Access to Information<br>r<br>p | | | | 1 | ,619(**)<br>,000 | ,597(**)<br>,000 | ,473(**)<br>,000 | ,785(**)<br>,000 |
| | Understanding Information<br>r<br>p | | | | | 1 | ,696(**)<br>,000 | ,589(**)<br>,000 | ,877(**)<br>,000 |
| | Assesment<br>r<br>p | | | | | | 1 | ,613(**)<br>,000 | ,897(**)<br>,000 |
| | Practice<br>r<br>p | | | | | | | 1 | ,777(**)<br>,000 |
| | Total Health Literacy r<br>p | | | | | | | | 1 |

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

sex, faculty the student attended, year at school, attitude score, and health satisfaction. The female students, those who attended a health-related faculty, 3rd and 4th grade students, those who had high attitude scores, and those who were satisfied with their health better understood the information than did the other students (p <0.05).

Evaluation was affected by sex, the year at school, faculty the student attended, attitude score, and health satisfaction. The female students, 3rd and 4th grade students, those who attended a health-related faculty, those who had high attitude scores, and those who were satisfied with their health had higher scores from the Processing ("Evaluation" ya da "assessment") subscale of the Health Literacy Scale than did the other students (p <0.05).

Application was affected by sex, the faculty the student attended, presence of a disability, attitude score, behavior score and quality of life. The female students, those who attended a health-related faculty, those who had high attitude and behavior scores, those who were satisfied with their health, and those with a disability had higher scores from the application subscale of the Health Literacy Scale than did the other students (p <0.05).

Total Health Literacy Scale score was affected by sex, the faculty the student attended, year at school, attitude score and presence of a

disability. The female students, those who attended a health-related faculty, 3rd and 4th grade students, those who had high attitude and behavior scores, and those with a disability obtained higher scores from the overall Health Literacy Scale than did the other students ($p < 0.05$). The relationship between health literacy and knowledge / attitude / behavior scores are given in Table 5. Accordingly, there is a positive relationship between knowledge / attitude / behavior and health literacy.

As the participants' health literacy levels increased, their attitudes and behaviors towards protection against sun and skin cancer changed positively.

## Discussion

In recent years, there has been a noticeable increase in the incidence of skin cancer, and this risk situation develops due to the cumulative effects of lifetime sun exposure (23). However, in the literature, it has been revealed that skin cancer can be prevented by 80% with effective protection methods and habits (24). Therefore, it is very important to provide information on the issue especially to young individuals, and to encourage them make changes in their attitudes and behaviors towards skin cancer. However, while attempts made provide information, they cannot effectively encourage young individuals to change their attitude and turn them into behaviors. In order to talk about effective sun protection, individuals should develop attitudes and behaviors that will protect them against all the harmful effects of the sun. In this case, it is thought that knowing the factors affecting attitudes and behaviors and knowing how health literacy which affects health behaviors differentiates are important in the development of positive behaviors.

In the present study, almost half of the participating students were not knowledgeable about skin cancer and sun protection, and only two-thirds of them strongly agreed that the sun had harmful effects, which indicates that even university students' knowledge of and attitudes towards skin cancer and sun protection were not at a good level in our country. We think that, our search for studies in which health literacy and skin cancer prevention, and the effect of health literacy on the skin cancer prevention knowledge / attitude / behavior were investigated indicated a gap in the literature. The study was conducted with university students and volunteers in a particular region, so the data obtained may not be representative of all young people.Studies conducted in our country also indicate that the society's knowledge level about the harmful effects of the sun is not adequate (25,26,27). Based on the results of Fangchao, Collado-Mesa, Hu, Kirsner's study (2007), it can be stated that the perceived skin cancer risk in Turkish adolescents and young people is lower than was that in people in other countries (28).

In the present study, the leading three common behaviors the participating students displayed to protect themselves from the harmful effects of the sun were as follows: trying to stay in the shade, drinking at least 8-10 glasses of water a day, and wearing sunglasses (82.2%, 78.7%, 77.4% respectively). The most commonly used sun protection behavior in many studies conducted with students in our country is "not going out during the hours when the intensity of UV rays is strongest (26,29,30). In their study with students in Belgium in 2006, De Vries et al. found that the protective behavior displayed most was the use of sunscreen every 2 hours. In the Turkish literature, the frequency of sunscreen use is reported to range from 10.7% to 56% (31,32,33). In a multi-center study conducted in 25 low- and middle-income developing countries, the highest rate of sunscreen use was 63.6% in India

followed by that in Bangladesh (57%). In our study, among the sun protection methods, the use of protective cream ranks seventh (67.4%).

In the present study, sex was an important variable affecting both sun protection behavior and awareness of skin cancer, and health literacy. Sun protection behaviors and skin cancer awareness of the female students were better than were those of the male students. This result is consistent with the results of studies both in Turkish literature (26,34,35) and in the international literature. This is probably due to the fact that the female students cared more about their appearance than did male students, and that they approached the issue more sensitively. In addition, health literacy levels of the female students were higher than were those of the male students. Similarly, there are studies in the literature showing that women have higher health literacy levels (35,36,37). On the other hand, there are other studies indicating that women's health literacy levels are lower than are those of men (38,39).

In the current study, the knowledge and health literacy levels of the first and second grade students regarding protection against sun and skin cancer were higher than were those of the third and fourth grade students. In the literature, it is stated that protection from the harmful effects of the sun among the students (people) decreases as their age increases (26,34,35).

In the present study, mothers' education level and socioeconomic status such as being in the upper social class, having a good income level according to the results of the univariate analysis were determined as variables affecting both behaviors towards protection against sun and skin cancer, and health literacy. In the literature, families with high economic levels displayed better protective behaviors and had higher levels of health literacy than did other families (34,35,40,41). Since sun exposure occurs especially during childhood, awareness of sun and skin cancer protection will be raised by educating both children and families. It is thought that the positive effect of education on health literacy is important for young people to realize the importance of the issue and understand the information.

In the current study, health literacy levels of those who were satisfied with their health and quality of life were higher than were those of the other participants. Inadequate level of health literacy increases the risk of getting sick, lowers the level of understanding treatment methods, increases the cost of health services and affects the health-related quality of life negatively. Adequate level of health literacy improves the quality of life, improves the level of effective use of and the quality of health services and reduces the costs of health services 42). In the literature, it is stated that individuals with an adequate of level health literacy display behaviors towards improving their health more actively (43,44). In the light of this information, it is assumed that improving health literacy levels of individuals is important in their being healthier.

In the present study, of the participating students, those who attended a health-related faculty had higher health literacy levels than did those who attended other faculties. Individuals with health education have a higher level of health literacy than others have, and are more advantageous than are others in accessing, understanding and processing health information. The best way to improve health literacy is health education (45).

In the present study, of the participants, those with a disability, those whose skin cancer risk scores were high in the univariate analysis and those with a chronic disease had better health literacy scores than did the others. The level

of health literacy plays an important role in an individual's management of chronic diseases and compliance with medication. Low levels of health literacy make it difficult for a person to access the accurate information and health services, to make use of these services, to use resources correctly, and to be competent enough at the management of their own health and public health (46). In several studies in the literature, it has been demonstrated that having a chronic disease increases a person's health literacy level, which was explained by the fact that patients assume more responsibilities in chronic disease management, and that the process is not limited to the hospitalization period; it should be effectively managed by the patient in the daily life (41,47).

In the current study, a positive correlation was determined between 'sun / skin cancer protection', and 'knowledge / attitude / behaviors and health literacy'. In the literature, in several studies, it has been stated that individuals with adequate health literacy are more active in obtaining information about their health and solving their problems on their own when they experience any health problems, and making behavior changes to improve their health (8,44,48). Health literacy increases individuals' ability to better understand their current health condition, to participate in treatment processes, to manage chronic diseases, and to benefit from preventive health services, which encourages individuals to take more responsibility for their own health (49).

## Conclusion

According to the results of the present study, university students' knowledge levels regarding sun and skin cancer protection are insufficient. There is a positive correlation between health literacy levels and sun protection attitudes and behaviors. Sun protection behaviors are better in those whose health literacy levels are high and in those who have high knowledge / attitude scores about sun protection. In addition, health literacy and sun protection behaviors are affected by socioeconomic factors and are better in students form the upper social class. In our study, another variable that affects health literacy and protection from sun and skin cancer is sex. The female students are better at both health literacy and sun protection behavior than are male students. The participants who have a high level of health literacy also have a better quality of life and are more satisfied with their life than the other participants.

Suggestion: In order to improve health literacy levels in our country, importance should be given to education in general and to health education in particular. Within this context, health education issue can be emphasized at all levels of formal education, and community education programs can increase the health literacy level of the public and contribute to their awareness of sun and skin cancer protection. In addition, by covering the costs of sunscreens and sunglasses in the social security system, arranging the working hours of people working in the open field, especially of children and adolescents, providing more umbrellas in public beach areas and using the media more effectively to enlighten people about protection methods, the public's awareness of sun and skin cancer protection can be improved.

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