KNOWLEDGE, ATTITUDE AND PRACTICE ABOUT SKIN CANCER AND ITS PREVENTION AMONG IIUM KUANTAN UNDERGRADUATE STUDENTS

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ABSTRACT

Introduction: The worldwide incidence of skin cancer has been rising for the past decades that at least two million of non-melanomas and 100,000 of melanomas occur every year. In Malaysia, there are 212 deaths related to skin cancer that were reported in 2018. Skin cancer is mainly caused by the exposure to ultraviolet light that most undergraduate students in IIUM Kuantan are exposed to as they commute to teaching and learning venue. The Malaysian Meteorological Department reported that the east coast region receives 50% sunny weather yearly as compared to other parts of Malaysia. Hence, the main objective of this research was to assess the level of knowledge, attitude and practice about skin cancer and its prevention among IIUM Kuantan undergraduate students. **Methods:** A cross-sectional study using convenience sampling method was conducted to collect data from 129 respondents. The questionnaire was adapted and modified before being distributed through Google form to the participants. **Results:** Overall, the level of knowledge, attitude and practice about skin cancer and its prevention among IIUM Kuantan undergraduate students was moderate. Mann-Whitney test and Kruskal-Wallis test performed revealed a significant association of level of knowledge between gender ($p = 0.020$) and exposure to direct sunlight ($p = 0.050$). Similarly, a significant association was observed in attitude as well as practice of skin cancer prevention between gender ($p<0.001$). Spearman correlation showed a positive correlation between knowledge and attitude and attitude and practice about skin cancer and its prevention. **Conclusion:** IIUM Kuantan undergraduate students have a moderate level for knowledge, attitude and practice about skin cancer and its prevention. There was an association of level of knowledge with gender and exposure to direct sunlight. However, only gender associate with the level of attitude and practice. This study found a positive correlation between knowledge and attitude and attitude and practice. This research is expected to provide more insight into overall awareness regarding skin cancer among the IIUM Kuantan undergraduate students which might serve as a benchmark for more related research in the future.

KEYWORDS: skin cancer, knowledge, attitude, practice, Malaysia

INTRODUCTION

Skin cancer does not receive a lot of attention like other types of cancers. In the past decades, the worldwide incidence of skin cancer has shown a rising trend, and it is estimated that between 2-3 million non-melanomas and approximately 132,000 melanomas occur every year (*World Health Organization*, 2017). In 2003-2005, Malaysia National Cancer Registry Report reported that skin cancer is the tenth common type of cancers in Malaysia which represent about 2.6% of all cancer cases while prostate gland cancer ranked ninth (National Cancer Registry Report, 2019). However, it is believed that this data is poorly reported because according to Dermatology Clinic, Hospital Kuala Lumpur in its reports from 2006-2014 revealed that basal cell carcinoma is the highest reported skin cancer case which is about 34.9% of cases (Mohd Affandi, 2021). Nevertheless, recent data published in 2018 by WHO reported that about 212 of total deaths related to skin cancers in Malaysia.

Malaysia was one of the countries that was mostly sunny and receives 2200 hours of sun per year. The Malaysian pose a high risk of developing skin cancer especially in the east coast region of Malaysia that receives on average 2530 hours of sun per year (Al-Naggar, 2013). According to the Malaysian Meteorological Department (*Weather Atlas*, n.d.), Kuantan, which is the main city of Pahang on the east coast, receives on average 3.6 hours to 9.7 hours of sunshine per day in a year, while the UV index throughout the year is between 11 to 12. The UV index "indicate the amount of skin-damaging UV rays reaching the Earth's surface during the day" (*Ultraviolet (UV) radiation*, 2019), which the value of more than 6 is considered as high and protection against the sun is needed. The annual average of high temperature was reported between 28.9 ^{o}C to 32.8 ^{o}C. Therefore, this present study is aimed at conducting assessment on knowledge, attitude, and practice regarding skin cancer and its prevention among the undergraduate students of one of the universities in Kuantan, Pahang, which is in the east coast region of Malaysia.

International Islamic University Malaysia (IIUM) Kuantan is a public university located in Kuantan, Pahang. It consists of six kulliyyah which are Kulliyyah of Allied Health Sciences (KAHS), Kulliyyah of Medicine (KOM), Kulliyyah of Pharmacy (KOP), Kulliyyah of Nursing (KON), Kulliyyah of Dentistry (KOD), and Kulliyyah of Science (KOS). Approximately, there are more than 3000 students in the IIUM Kuantan which includes undergraduate and postgraduate students. Kuantan is the capital state of Pahang located on the east coast of Peninsular Malaysia. The majority of IIUM Kuantan students study sciences, allied health, pharmacy, dentistry, nursing, and medicine. They regularly traveled to class under direct sun by means of walking and riding motorcycles as well as participated in many outdoor activities. Hence, this research is expected to provide more insight into overall awareness regarding skin cancer among the IIUM Kuantan undergraduate students in terms of their knowledge, attitude, and practice of its prevention, which might serve as a benchmark for more related research in the future.

MATERIAL AND METHODS

Study Design and Area

A quantitative based cross-sectional study was conducted using an online survey to assess the level of knowledge, attitude and practice of skin cancer and its prevention among IIUM Kuantan undergraduate students. Google form was distributed among IIUM Kuantan undergraduate students to collect the data from the respondents. The study was conducted from October 2021 until May 2022.

Sample Size

A single proportion formula was used to determine the sample size. The sample size was calculated with 0.09 precision, 95% Confidence Interval and 50% population with good knowledge level toward skin cancer.

Sample size, $n = (\frac{Z\alpha/2}{\Delta})^2 \, p(1-p)$

$Z_{\alpha/2} = 1.96$ (for 95% Confidence Interval (CI))

p = estimate 50% of population with good knowledge level, 0.5

Δ = level of precision, 0.09

Sample size calculation:

$n = (\frac{1.96}{0.09})^2 \, 0.5(1-0.5)$

$= 119 + 10\%$ (non-response rate)

$= 129$

Approximately 10% of respondents were expected to drop out from the study, thus, the minimum required sample size for this study was 129.

Sampling Method

A non-random convenience sampling was employed to recruit the subjects for this study. This method was chosen to recruit the subjects which were among IIUM Kuantan undergraduate students who were willing to answer the survey. In addition, this method is affordable, easy and less time consuming. Due to time constraints, convenience sampling method can help to collect data in a short time.

Inclusion Criteria

All male and female undergraduate students of IIUM Kuantan from year 1 to year 5.

Exclusion Criteria

Students who cannot read and understand English were excluded from the study as the questionnaire was designed in English only. Besides, postgraduate students were excluded from this study.

Data Collection

The data was collected from 17th March 2022 until 23rd April 2022 through Google form that was distributed to the Year 1 until Year 5 students of IIUM Kuantan from all kulliyyah. Consent form has been obtained at the beginning of the online survey.

Questionnaire and Pilot Study

In this study, the questionnaire was adapted and modified from previous published studies (Alamri et al., 2015; Al-Naggar, 2013; Nguyen et al., 2020; Pinos-León et al., 2021) to fit the suitability of the IIUM Kuantan students. The first section of the questionnaire comprises of demographic information, whereas the second section covered on knowledge about skin cancer and its prevention with total of 16 items that covers question regarding the type, risk factors and preventive measures of skin cancer. This section included

questions with 'Yes', 'No', and 'Maybe' options. One mark was given to correct answer and zero mark was given to false and unsure answers. The third section was on attitude towards skin cancer and its prevention. Five-point Likert's scale was used for this section which consists of 'Strongly Disagree', 'Disagree', 'Neutral', 'Agree', and 'Strongly Agree'. Each response was graded from one to five, starting from Strongly Disagree to Strongly Agree. However, for negative statements, the score was reversed. The fourth section was regarding the practice of skin cancer prevention. This section was assessed using a four-point Likert scale which are 'Never', 'Rarely', 'Sometimes', and 'Always'. The marks for each option were graded from one to four, starting from Never to Always. Then, a pilot study was done among 15 respondents. The purpose of the pilot study was to test the reliability of the questionnaire. Internal consistency of the questionnaire was determined by looking at Cronbach's alpha value. The value of more than 0.7 is considered as reliable. The items were analyzed using Statistical Package for Social Sciences (SPSS) version 26.

Data Analysis

Descriptive frequency was used to identify the level of knowledge, attitude and practice about skin cancer and its prevention among IIUM undergraduate students. While Mann-Whitney U test and Kruskal-Wallis test were used to investigate the association between the demographic information such as age, gender, year of study, kulliyyah, family income and duration of exposure to sunlight per day with the level of knowledge, attitude and practice about skin cancer and its prevention. Spearman correlation was used to evaluate the correlation between the level of knowledge, attitude and practice about skin cancer and its prevention among IIUM Kuantan undergraduate students.

RESULTS AND DISCUSSIONS

Sociodemographic Characteristics of Respondents

A total of 129 undergraduate students of IIUM Kuantan participated in this study. There were six sociodemographic characteristics which include gender, age, kulliyyah, year, family's income, and exposure to direct sunlight per day, which were tabulated in Table 1 in terms of their frequency and percentage. The female respondent was more than male with 76% and 24% respectively. Majority of respondent is 19-21 years old (51.2%). All six kulliyyah responded to the survey but most of the respondent was from Kuliyyah of Allied Health sciences (40.3%). The student of year 3 was the the highest that responded to the survey followed by year 2 and year 1 with 32.6%, 31% and 23.2% respectively. Nevertheless, 48.8% of respondent receive 20-30 minute whereas 34.9% of them receive more than 40 minutes of exposure to the sunlight.

Table 1 Sociodemographic data of the respondents (n = 129)

Sociodemographic Characteristics	Frequency	Percentage (%)
Gender		
Male	31	24.0
Female	**98**	**76.0**
Age		
19 – 21 years old	**66**	**51.2**
22 – 24 years old	59	45.7
25 – 27 years old	4	3.1

Kulliyyah		
Kulliyyah of Allied Health Sciences	**52**	**40.3**
Kulliyyah of Dentistry	8	6.2
Kulliyyah of Medicine	14	10.9
Kulliyyah of Nursing	19	14.7
Kulliyyah of Pharmacy	20	15.5
Kulliyyah of Sciences	16	12.4
Year		
Year 1	30	23.2
Year 2	40	31.0
Year 3	**42**	**32.6**
Year 4	15	11.6
Year 5	2	1.6
Exposure to direct sunlight per day		
Less than 10 minutes	21	16.3
20 - 30 minutes	**63**	**48.8**
More than 40 minutes	45	34.9

Note: The total of the highest frequency from each category is highlighted in bold.

Scores for Knowledge, Attitude and Practice about Skin Cancer and its Prevention

Table 2 depicts the categories of score for knowledge, attitude, and practices along with their frequency and percentage. The result shows that the knowledge, attitude and practice about skin cancer and its prevention among IIUM Kuantan undergraduate students were moderate. From the table, more than half of the respondents possessed a moderate knowledge score (n = 70, 54.2%). For the attitude section, most of the respondents obtained a moderate score (n = 78, 60.5%). Lastly, for the practice section, only twelve percent of them achieve a good practice score (n = 16, 12.4 %).

Table 2: Categories of score for knowledge, attitude and practice about skin cancer and its prevention (n = 129)

Categories	Frequency	Percentage (%)
Knowledge		
Poor	25	19.4
Moderate	**70**	**54.2**
Good	34	26.4
Attitude		
Poor	8	6.2
Moderate	**78**	**60.5**
Good	43	33.3
Practice		
Poor	37	28.7
Moderate	**76**	**58.9**
Good	16	12.4

Note: The total of the highest frequency for each category is highlighted in bold.

Level of Knowledge about Skin Cancer and its Prevention

Table 3 illustrates the distribution of knowledge about skin cancer and its prevention. Most of the respondents answered correctly for most of the questions. However, there were only three questions that have the highest frequency of 'Not sure' option which were questions number 13, 14 and 15.

Table 3: Distribution of knowledge about skin cancer and its prevention (n = 129)

Statement	True freq. (%)	False freq. (%)	Not sure freq. (%)
1. Ultraviolet rays from sun cause sun tan.	**93 (72.1)**	1 (0.8)	35 (27.1)
2. Sun exposure can cause freckles.	**88 (68.2)**	15 (11.6)	26 (20.2)
3. Sun exposure can cause wrinkles on face.	**91 (70.5)**	11 (8.5)	27 (20.9)
4. Sun exposure can cause skin cancer.	**121 (93.8)**	2 (1.6)	6 (4.7)
5. Sun exposure can cause dry skin.	**116 (89.9)**	6 (4.7)	7 (5.4)
6. Sun exposure can cause aging.	**98 (76.0)**	7 (5.4)	24 (18.6)
7. Sun exposure can cause spots.	**97 (75.2)**	6 (4.7)	26 (20.2)
8. Sun is harmful to dark skin compared to fair skin. #	2 (1.6)	**114 (88.4)**	13 (10.1)
9. Sun is harmful to fair skin compared to dark skin.	**107 (82.9)**	8 (6.2)	14 (10.9)
10. Sunscreen do not protect from ultraviolet radiation. #	3 (2.3)	**109 (84.5)**	17 (13.2)
11. Melanoma is the most dangerous type of skin cancer.	**63 (48.8)**	8 (6.2)	58 (45.0)
12. Severe sunburns during childhood does not increase the chance of getting skin cancer. #	13 (10.1)	**60 (46.5)**	56 (43.4)
13. The number of moles of a person has is an important risk factor for developing melanoma.	42 (32.6)	26 (20.2)	**61 (47.3)**
14. There are two main types of skin cancer: melanoma and non-melanoma.	55 (42.6)	8 (6.2)	**66 (51.2)**
15. Skin cancer is common in Malaysia. #	26 (20.2)	48 (37.2)	**55 (42.6)**

16. Skin cancer can cause death.	**77 (59.7)**	9 (7.0)	43 (33.3)

Note: The total of highest frequency for each category is in bold. Negative items are denoted with (#)

Level of Attitude about Skin Cancer and its Prevention

The attitude level was assessed by 7 items that covers skin cancer and its prevention. This section also combines both positive and negative statements with the purpose to reduce bias. The analyses were tabulated in Table 4, which depicts the distribution of attitude about skin cancer and its prevention. Most of the respondents are strongly agree regarding the statement "I always use sunscreen when doing outdoor activities". Besides, majority of respondents agree on statements "Sunscreen is expensive", "I am concerned about the exposure to sun can give me cancer", and "My skin will age quickly if I am expose to the sun" with the percentage of 33.3%, 43.4%, and 41.1% respectively. For statements "Sunscreen is harmful because it contains chemical substances" and "It is unnecessary to apply sunscreen during cloudy day", most of them are disagree with the statement. Finally, almost 40% of the respondents give a neutral response for statement "I think my occupation increases the risk of skin cancer".

Table 4 Distribution of attitude about skin cancer and its prevention (n = 129)

Statements	Strongly disagree freq. (%)	Disagree freq. (%)	Neutral freq. (%)	Agree freq. (%)	Strongly agree freq. (%)
1. I always use sunscreen when doing outdoor activities.	11 (8.5)	11 (8.5)	16 (12.4)	40 (31.0)	**51 (39.4)**
2. Sunscreen is expensive.	2 (1.6)	24 (18.6)	35 (27.1)	**43 (33.3)**	25 (19.4)
3. Sunscreen is harmful because it contains chemical substances. #	31 (24.0)	**60 (46.5)**	36 (27.9)	2 (1.6)	0 (0.0)
4. It is unnecessary to apply sunscreen during cloudy day. #	32 (24.8)	**59 (45.7)**	14 (10.9)	13 (10.1)	11 (8.5)
5. I am concerned about the exposure to sun can give me cancer.	2 (1.6)	6 (4.7)	19 (14.7)	**56 (43.4)**	46 (35.7)
6. My skin will age quickly if I am expose to the sun.	1 (0.8)	4 (3.1)	30 (23.3)	**53 (41.1)**	41 (31.8)

7. I think my occupation increases the risk of skin cancer.	17 (13.2)	40 (31.0)	**50 (38.8)**	5 (3.9)	17 (13.2)

Note: The total of highest frequency for each category is in bold. Negative items are denoted with (#)

Level of Practice about Skin Cancer Prevention

The practice level was assessed by 8 items that covers regarding the practice of skin cancer prevention. Table 5 illustrates the distribution of practice about skin cancer prevention. As can be seen from the table, majority of the respondents always apply sunscreen when doing outdoor activities, wear clothing that covers most part of the body and go in the shade to prevent from skin cancer. Besides, the highest frequency of 'never' option can be seen on two items, which are regarding the application of sunscreen when stay at home and wearing sunglasses, which accounted for 34.1% and 43.4% respectively. Furthermore, 16.3% of the respondents always use umbrella during hot day and only 7.8% of the respondents always wear hat when going out.

Table 5 Distribution of practice about skin cancer prevention (n = 129)

Statements	Never freq. (%)	Rarely freq. (%)	Sometimes freq. (%)	Always freq. (%)
1. Apply sunscreen when doing outdoor activities	10 (7.8)	12 (9.3)	37 (28.7)	**70 (54.3)**
2. Apply sunscreen every 4 hours a day	42 (32.6)	**43 (33.3)**	36 (27.9)	8 (6.2)
3. Apply sunscreen when stay at home	**44 (34.1)**	41 (31.8)	27 (20.9)	17 (13.2)
4. Wear clothing that covers most part of the body	4 (3.1)	6 (4.7)	25 (19.4)	**94 (72.9)**
5. Wear sunglasses	**56 (43.4)**	48 (37.2)	17 (13.2)	8 (6.2)
6. Use umbrella during hot day	15 (11.6)	**54 (41.9)**	39 (30.2)	21 (16.3)
7. Wear hat when going out	40 (31.0)	**41 (31.8)**	38 (29.5)	10 (7.8)
8. Go in the shade	11 (8.5)	15 (11.6)	41 (31.8)	**62 (48.1)**

Note: The total of highest frequency for each category is highlighted in bold.

Association of Sociodemographic Characteristics with Knowledge

Table 6 shows the outcome of the tests that have been conducted on gender, age, kulliyyah, year and duration of exposure to direct sun per day. Mann-Whitney U test revealed that there was a statistically significant difference in terms of knowledge between male and female (p = 0.020). However, Kruskal-Wallis test revealed that there was no significant difference in terms of knowledge between age (p = 0.514), kulliyyah (p = 0.220) and year (p = 0.736).

Table 6 Association between sociodemographic characteristics with knowledge (n = 129)

Variable	Mean	Median	p-value
Gender			
Male	9.68	10.00	0.020*
Female	11.01	11.00	
Age			
19 – 21 years old	10.97	11.00	
22 – 24 years old	10.37	11.00	0.514
25 – 27 years old	10.75	11.00	
Kulliyyah			
Kulliyyah of Allied Health Sciences	10.90	11.00	
Kulliyyah of Dentistry	9.63	10.50	
Kulliyyah of Medicine	8.38	10.00	0.220
Kulliyyah of Nursing	11.32	12.00	
Kulliyyah of Pharmacy	11.40	12.00	
Kulliyyah of Sciences	9.44	10.00	
Year			
Year 1	10.67	10.00	
Year 2	10.95	11.00	
Year 3	10.21	11.00	0.736
Year 4	11.27	12.00	
Year 5	11.50	11.50	
Exposure to direct sunlight	10.81	11.00	
Less than 10 minutes	10.17	10.00	0.050*
20 – 30 minutes	11.36	12.00	
More than 40 minutes			

Note: (*) p-values is statistically significant

Association of Sociodemographic Characteristics with Attitude

Table 7 presents the outcome of the tests that have been conducted on gender, age, kulliyyah, year and duration of exposure to direct sun per day. Mann-Whitney U test revealed that there was a statistically significant difference in terms of attitude between male and female (p <0.001). However, Kruskal-Wallis

test revealed that there was no significant difference in terms of attitude between age (p = 0.441), kulliyyah (p = 0.529), year (p = 0.559) and exposure to direct sunlight (p = 0.172).

Table 7 Association between sociodemographic characteristics with attitude (n = 129)

Variable	Mean	Median	p-value
Gender			
Male	24.04	22.00	<0.001*
Female	26.66	27.00	
Age			
19 – 21 years old	25.85	27.00	
22 – 24 years old	25.47	25.00	0.441
25 – 27 years old	25.50	26.00	
Kulliyyah			
Kulliyyah of Allied Health Sciences	25.87	27.00	
Kulliyyah of Dentistry	24.25	24.00	
Kulliyyah of Medicine	25.64	26.50	
Kulliyyah of Nursing	26.16	26.00	0.529
Kulliyyah of Pharmacy	25.80	25.00	
Kulliyyah of Sciences	25.00	25.00	
Year			
Year 1	24.87	26.00	
Year 2	26.50	27.00	0.559
Year 3	25.60	25.50	
Year 4	25.40	25.00	
Year 5	24.50	24.50	
Exposure to direct sunlight			
Less than 10 minutes	24.57	26.00	
20 – 30 minutes	25.19	25.00	0.172
More than 40 minutes	26.29	27.00	

Note: (*) p-value is statistically significant

Association of Sociodemographic Characteristics with Practice

Table 8 depicts the outcome of the tests that have been conducted on gender, age, kulliyyah, year and duration of exposure to direct sun per day. Mann-Whitney U revealed that there was a statistically significant difference in terms of attitude between male and female (p <0.001). However, Kruskal-Wallis revealed that there was no significant difference in terms of attitude between age (p = 0.508), kulliyyah (p = 0.654), year (p = 0.141) and exposure to direct sunlight (p = 0.198).

Table 8 Association between sociodemographic characteristics with practice (n = 129)

Variable	Mean	Median	p-value
Gender			
Male	18.06	18.00	<0.001*
Female	21.65	22.00	
Age			
19 – 21 years old	21.17	21.00	
22 – 24 years old	20.34	20.00	0.508
25 – 27 years old	21.25	20.00	
Kulliyyah			
Kulliyyah of Allied Health Sciences	21.27	21.00	0.654
Kulliyyah of Dentistry	20.75	22.00	
Kulliyyah of Medicine	19.57	20.50	
Kulliyyah of Nursing	21.05	23.00	
Kulliyyah of Pharmacy	20.55	20.00	
Kulliyyah of Sciences	20.31	19.00	
Year			
Year 1	20.57	20.00	0.141
Year 2	22.03	22.00	
Year 3	20.26	20.00	
Year 4	19.80	19.00	
Year 5	18.00	18.00	
Exposure to direct sunlight			
Less than 10 minutes	19.71	19.00	
20 – 30 minutes	19.63	20.00	0.198
More than 40 minutes	20.26	22.00	

Note: (*) p-value is statistically significant

Correlation between Knowledge, Attitude and Practice about Skin Cancer and Its Prevention

Table 9 shows the result that showed a moderately positive correlation between knowledge and attitude (r = 0.318) as well as attitude and practice (0.457). The p-value suggests that there is a statistically significant correlation between knowledge and attitude (p = 0.001) as well as attitude and practice (p <0.001).

Meanwhile, there was a weak positive correlation between knowledge and practice (r = 0.105). Besides, there is no statistically significant correlation between knowledge and practice (p = 0.611). Figures 1, 2, and 3 illustrate the correlation between knowledge and attitude, knowledge and practice and attitude and practice about skin cancer and its prevention among IIUM Kuantan undergraduate students.

Table 9 Correlation between knowledge, attitude and practice about skin cancer and its prevention (n = 129)

Variables	Correlation coefficient, r	p-value
Knowledge and attitude	+0.318	0.001**
Knowledge and practice	+0.105	0.611
Attitude and practice	+0.457	<0.001**

Note: positive r-value show positive correlation; (**) p-value is statistically significant (<0.05)

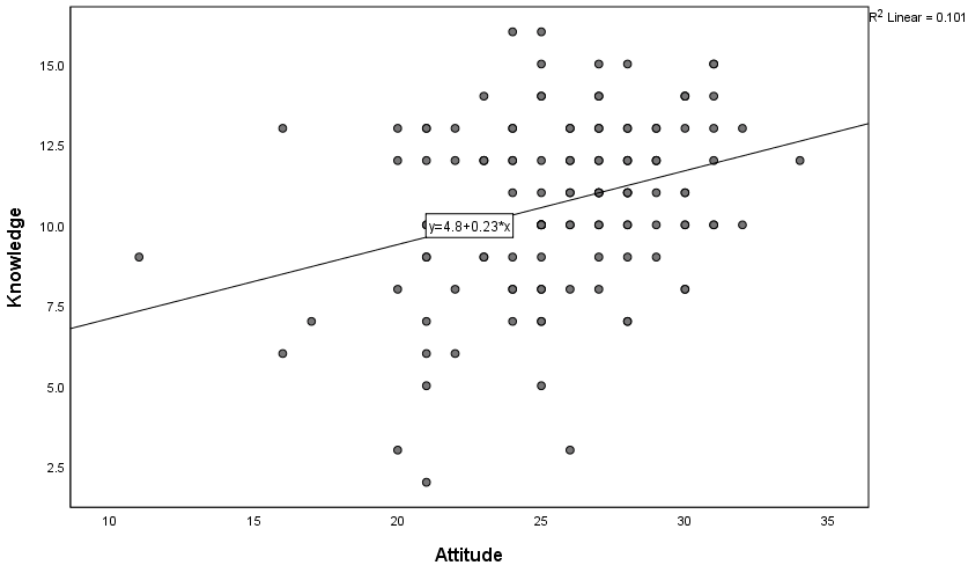

Figure 1 Correlation between knowledge and attitude about skin cancer and its prevention among IIUM Kuantan undergraduate students

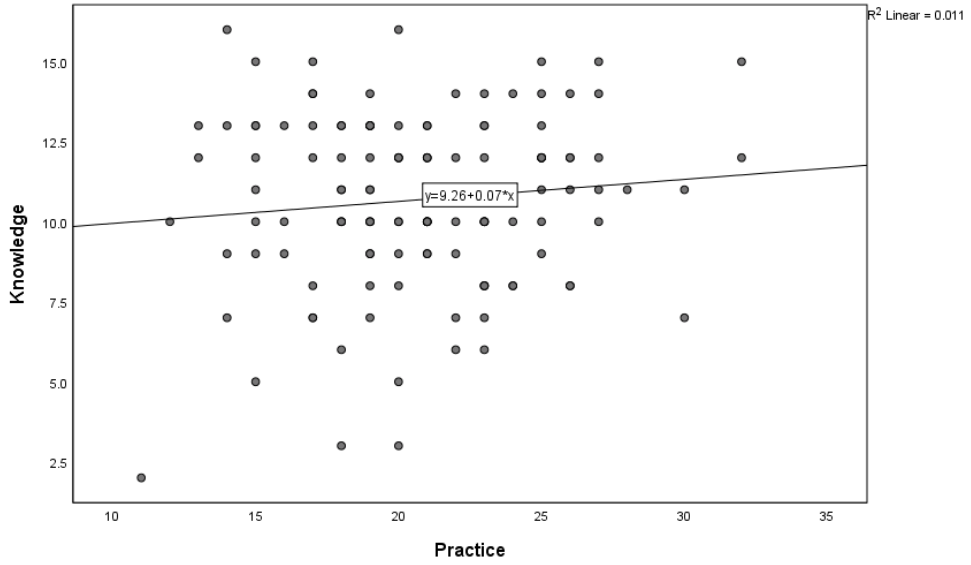

Figure 2 Correlation between knowledge and practice about skin cancer and its prevention among IIUM Kuantan undergraduate students

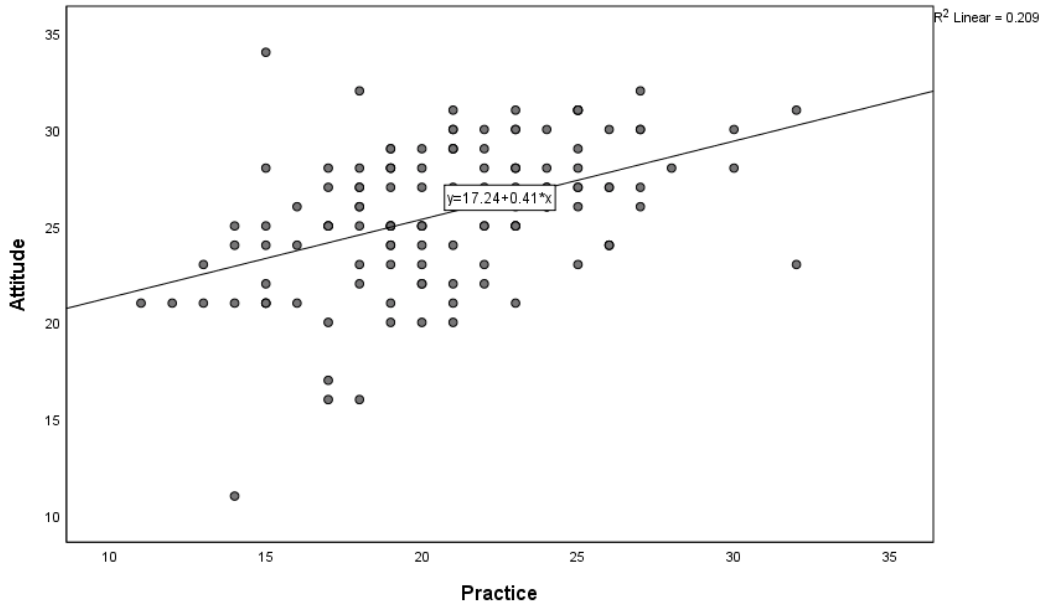

Figure 3 Correlation between attitude and practice about skin cancer and its prevention among IIUM Kuantan undergraduate students

Level of Knowledge about Skin Cancer and its Prevention

The results of the study revealed that majority of the respondents were well informed regarding the type, risk factors and preventive measures of skin cancer. A total of 70 out of 129 respondents (54.3%) possessed a moderate level of knowledge about skin cancer and its prevention. 26.4% obtained a good level of knowledge and another 19.4% had poor knowledge.

Most of the respondents managed to answer correctly regarding the negative effects of sun exposure such as freckles (68.2%), wrinkles (70.5%), skin cancer (93.8%), dry skin (89.9%), aging (76.0%) and spots (75.2%) (Table 3). From the result, it can be said that almost all respondents knew that skin cancer is associated with sun exposure. Similarly, a study by Pinos-León et al. (2021) revealed that about 72% of respondents reported knowing the association between the development of skin cancer and sun exposure. However, these findings contradict with a study by Alamri et al. (2015) which revealed that 83.4% of respondents did not aware that sun exposure is the risk factor for skin cancer.

Despite the low incidence of skin cancer in Malaysia, IIUM Kuantan undergraduate students can achieve a moderate level of knowledge about skin cancer and its prevention. This finding might be influenced by their background of study which most of them are in the health sciences field. This is supported by a study from Nguyen et al. (2020) that reported education influences the level of knowledge regarding skin cancer.

Level of Attitude about Skin Cancer and its Prevention

The results of the study revealed that more than half (60.5%) of respondents have a moderate attitude, 33.3 % of good attitude and 6.2% of poor attitude regarding skin cancer and its prevention. This result was noticeably better than the previous study by Şenel & Süslü (2015), which disclosed that the attitude among the studied population was generally unsatisfactory.

Approximately 70% of the respondents always apply sunscreen when going for outdoor activities (Table 4). Similar study that was conducted among doctors and pharmacists revealed that about 87.5% of

respondents agree that sunscreen should be applied when going for outdoor activities (Low et al., 2021). According to Whiteman et al. (2019), the best protection during outdoor activities is sunscreen. When going for outdoor activities, we are more likely to be exposed to the damaging UV rays. Most studies agree that the function of sunscreen is to prevent the damaging effects of sunlight (Awadh et al., 2016; Ibrahim et al., 2021). Therefore, by applying sunscreen, it can protect our skin from the risk of skin cancer.

Level of Practice about Skin Cancer and its Prevention

The results of the study illustrated that the majority of the respondents (58.9%) achieved a moderate level of practice while a good level of practice has the least percentage (12.4%) (Table 5). This result was way better compared to study by Al Naggar (2012) which reported poor conduct of skin cancer preventive measures among university students.

The fact that more than half of the respondents (54.3%) apply sunscreen when going for outdoor activities was a pleasant finding. The percentage reported from this study was found to be slightly higher than several previous studies as they revealed that 43.5% (Al Naggar, 2012), 41% (Awadh et al., 2016), 42.6% (Nguyen et al., 2020), and 31.5% (Low et al., 2021) of the respondents use sunscreen as a practice of skin cancer preventions. However, another study conducted by Al-Atif (2021) reported that 82% of the Saudi Arabia population use sunscreen as a preventive measure. The difference regarding the usage of sunscreen could be due to the difference in target population.

Besides, only 6.2% of them reapply sunscreen every 4 hours a day. Reapplying sunscreen is necessary to keep your skin protected. Furthermore, Hung et al. (2022) revealed that the usage of sunscreen was associated with a lower prevalence of skin cancer. Another epidemiological study suggested that the usage of sunscreen can prevent squamous cell carcinoma and decrease the number of moles that are known to be one of the risk factors for skin cancer. Also, it was found that the regular application of sunscreen could reduce the risk of skin cancer (Green et al., 2011). In terms of application of sunscreen when staying at home, it is reported that most of them (34.1%) never apply sunscreen when staying at home (Table 5). As UV radiation can pass through windows, it is important to apply sunscreen when staying indoors. However, through this study, it is revealed that majority of them were not aware of the importance of applying sunscreen when staying indoors.

Association of Sociodemographic Characteristics with Knowledge

In terms of knowledge, the results showed a significant difference in knowledge between gender ($p = 0.020$). Females had higher knowledge ($\bar{X} = 11.01$) compared to male ($\bar{X} = 9.68$). The possible reason behind this finding is that majority of the respondents were female (76.0%). In general, the number of female students in the Kuantan campus is higher than the number of male students, which leads to higher response from female students to participate in this study. This finding is in line with a previous study by Alamri et al. (2015) where the knowledge about skin cancer among females ($\bar{X} = 9.9$) is slightly higher than male ($\bar{X} = 9.6$). However, another study conducted by Pinos-León et al. (2021) found no differences in terms of knowledge level between male and female.

Moreover, there was a significant difference in terms of knowledge between exposure to direct sunlight ($p = 0.050$). Different duration of exposure to direct sunlight might lead to the differences in terms of knowledge in which those who are exposed to direct sunlight for more than 40 minutes had the highest knowledge ($\bar{X} = 11.36$) compared to those who exposed for less than 10 minutes ($\bar{X} = 10.81$) and 20 – 30 minutes ($\bar{X} = 10.17$) (Table 6). The difference in duration of exposure to the sun could be due to the fact that students are actively involved in outdoor activities such as physical exercise and jogging in the evening. However, there was no information between the association of level of knowledge about skin cancer and its prevention and exposure to direct sunlight found in previous studies that related to skin cancer.

Meanwhile, Kruskal-Wallis test had revealed that age, kulliyyah and year do not show any association in terms of knowledge level.

Association of Sociodemographic Characteristics with Attitude

Regarding the association of sociodemographic characteristics with attitude level, only gender shows a significant difference in terms of attitude level (p = <0.001). In this study, it shows that females have a higher attitude about skin cancer and its prevention ($\bar{X}$ = 26.66) compared to male ($\bar{X}$ = 24.04). Evidence from a study by Pinos-León et al. (2021) revealed that female respondents were more likely to have good attitudes compared to male respondents. This could be due to the high level of awareness related to sun protection among females compared to male (Low et al., 2021). Another study stated that attitudes about skin cancer were associated with gender, education level, and family income (Nguyen et al., 2020). However, this study showed there was no association in terms of attitude level between year of study (p = 0.559). Meanwhile, the study on the level of attitude about skin cancer and its prevention for exposure to direct sunlight was not found in previous studies that related to skin cancer. Hence, the findings revealed that only gender is associated with the level of attitude.

Association of Sociodemographic Characteristics with Practice

In terms of practice, there was an association found between male and female with practice level (p = <0.001). In this study, females had a higher practice level ($\bar{X}$ = 21.65) compared to male ($\bar{X}$ = 18.06). This finding coincides with a finding from another study which reported that females are 1.68 times more likely to obtain a higher score in practice than male (Pinos-León et al., 2021). This could be caused by the nature of females, who are always concerned about beauty and grooming, hence consistently applying sunscreen to improve their cosmetic look (Rajagopal et al., 2021). Nevertheless, there were no associations found between other sociodemographic characteristics such as age, kulliyyah, year and exposure to direct sunlight regarding attitude level. This finding contradicts a study by Al Naggar (2012) which revealed that gender, age, educational background and family income significantly influenced the level of practice. Study by Al Naggar (2012) also reported that the practice of skin cancer prevention increased with age. From this study, although there was no association in terms of practice with age, it can be seen that the eldest age group, 25 – 27 years old, had a slightly better practice level ($\bar{X}$ = 21.25) compared to younger group, 19 – 21 years old ($\bar{X}$ = 21.17) and 22 – 24 years old ($\bar{X}$ = 20.34). The study on level of practice about skin cancer prevention for exposure to direct sunlight was not found in previous studies that related to skin cancer.

Correlation between Knowledge, Attitude and Practice about Skin Cancer and Its Prevention

As can be seen from Table 6, the findings showed that there was a statistically significant correlation between knowledge and attitude (r = 0.318, p = 0.001) as well as attitude and practice (r = 0.457, p = <0.001). This suggests that an increase in knowledge contributes to the increase in attitude and good attitude level result in good practice on skin cancer prevention. However, there was no correlation found between knowledge and practice (p = 0.611). Hence, knowledge level does not have an impact on the practice levels among IIUM Kuantan undergraduate students. The predictor factor might be due to less awareness regarding the benefits of skin cancer prevention practices on oneself.

CONCLUSIONS

In conclusion, more than half of IIUM Kuantan undergraduate students achieved a moderate level for knowledge, attitude and practice about skin cancer and its prevention. Nearly 55% presented a moderate knowledge level, about 60.5% achieved a moderate attitude level, and almost 60% showed a moderate attitude level about skin cancer and its prevention. Next, there was an association in terms of knowledge between gender and exposure to direct sunlight. Besides, only gender is associated with the level of attitude

and practice. In terms of correlation between knowledge, attitude and practice, this study found that there was a positive correlation between knowledge and attitude and attitude and practice. By conducting this study, IIUM Kuantan undergraduate students' awareness regarding skin cancer was determined and their awareness can be increased by promoting them to regularly practice the use of sunscreen as it is one of the most convenient preventative measures of skin cancer.

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