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Public Knowledge and Practices Toward Sun Exposure and Use of Sun Protection in Sibu Municipal Council Area, Sarawak, Malaysia

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ABSTRACT

Background: Understanding the risks and benefits of sun exposure promotes overall health and well-being by encouraging safe sun practices. The study aims to assess the knowledge and practice of sun protection in the public towards the harmful effects of prolonged sun exposure.
Subjects and Method: A cross-sectional study was conducted in Sibu, Sarawak, Malaysia among 302 respondents, from October to November 2023. The respondents were recruited by a convenience sampling method. Research team members interviewed the respondents by using questionnaires with the study variables were age, gender, ethnicity, education and occupations of respondence, knowledge, practice and the reasons to use sunscreen protection. The data were analyzed descriptively using frequency tables and inferential statistics with p value.
Results: More than half of the participants (56%) had average knowledge about the harmful effects of prolonged sun exposure, and 83.1% had moderate levels of sun protection practice. Most participants wore long-sleeved clothing for sun protection and practice for physical appearance, sense of vulnerability or fear, and peer pressure. The statistical results showed no significant difference in practice between different age groups, ethnic groups, education levels, or occupations, and a significant difference was found between genders.
Conclusion: Targeted interventions are needed to improve sun protection practices and reduce skin damage and cancer.

Keywords: Sun exposure, sun protection, skin damage

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BACKGROUND

Public awareness and practices regarding sun exposure and the use of sun protection are crucial in preventing skin cancer and promoting overall skin health. Excessive exposure to ultraviolet radiation from the sun is a significant public health concern, as it is a leading risk factor for the development of skin cancer. According to the 3rd report of the National Cancer Registry Malaysia (2003-2005), skin cancer is ranked as the 10th most common cancer in Malaysia,

accounting for approximately 2.6% of all cases (Affandi, 2018). Skin cancer rates have been rising, leading to significant costs to healthcare systems. Outdoor workers are especially at risk of high levels of UV exposure and the associated increased risk of skin cancer. However, data on the effectiveness of these interventions is limited, and more research is needed to identify effective strategies to promote sun-safe practices among outdoor workers (Glanz et al., 2007).

Despite efforts to educate the public on the harms of UV exposure, personal sun protection practices have shown little improvement in recent years (Masterson and Leigh, 2015). Skin cancer prevention initiatives in the workplace, such as modifying work sites to increase shade and adding sun safety to workplace policies and training, can help reduce occupational health inequities and protect workers (Ragan et al., 2019). Research has shown an increasing awareness of the significance of sun protection practices among various populations.

A study conducted among urban office workers in Brisbane, Australia, found a correlation between knowledge about vitamin D and sun protection practices (Vu et al., 2010). Similarly, a study focusing on non-medical, female university students in Saudi Arabia identified seeking shade and wearing protective clothing as commonly used sun protection methods (Almuqati et al., 2019). Another study in Saudi Arabia found that they had good knowledge of risk factors, proper preventive measures, and symptoms of skin cancer, and reported that they used sun protection methods regularly (Al-Atif, 2021).

Interventions and educational programs have proven effective in enhancing awareness and behaviors related to sun exposure. An intervention study among Egyptian farmers showed a significant improvement in participants' awareness of sun exposure hazards and adoption of sun safety measures post-intervention (El-Shafei and Said, 2023). Additionally, findings from a study on preservice teachers in Australia suggested that integrating sun protection education into teacher training programs could improve teachers' ability to deliver sun safety curriculum effectively in schools (Scott et al., 2023).

Few studies in Malaysia have explored people's knowledge and practice of sun exposure and sun protection usage. Studies found that Malaysian university students and road traffic officers frequently used sunscreen, protective clothing, sunglasses, and hats for skin cancer prevention. (Al-Naggar, 2013; Al-Naggar and Bobryshev, 2012). Another study in Malaysia among medical students showed that they had limited knowledge of sun protection, however, had good knowledge about skin cancer (Fadzilah et al., 2023).

Furthermore, organizational policies play a crucial role in promoting sun protection practices, particularly in work settings. Studies have indicated that senior managers' awareness of sun protection policies is essential for the successful implementation of sun safety measures in workplaces (Walkosz et al., 2019). Occupational sun safety programs that advocated for the adoption of sun protection policies and provided training have been successful in promoting sun safety behaviors among outdoor workers (Buller et al., 2018).

This study seeks to evaluate public knowledge and behaviors related to sun protection and the detrimental effects of extended sun exposure.

SUBJECTS AND METHOD

1. Study Design

The cross-sectional study was conducted from October to November 2023 in Sibu District, Sarawak, Malaysia.

2. Population and Sample

A total of 302 samples was selected using estimation proportion with specified absolute precision demonstrated in "Sample size determination in health studies: a practic size determination in health studies: a practical manual" by S. K. Lwanga and S. Lemeshow.

3. Study Variables

The variables of study were age, gender, ethnicity, education, occupation, knowledge, practice, and reasons to use.

4. Operational Definition of Variables

Age: defined as completed years

Gender: categorized as male, female

Ethnicity: categorized as Chinese, Iban, Malay, Orang Ulu, Melanau, Bidayuh, and others

Education: defined as no formal education, PMR, SPM, STPM, graduate, postgraduate

Occupation: defined as employed, student, un-employed

Knowledge: categorized as average and above, below average

Practice Level: defined as high, moderate, and low

Reasons to use: Desire to look good, sense of vulnerability, sense of fear, peer pressure.

5. Study Instrument

Data for this research was collected by passersby approaching food courts, fast food restaurants, pharmacies, shopping malls, and wet markets. The researchers explained to them the research objectives and asked whether they wanted to participate in the research. The questionnaire were translated into the Malay language for proper understanding. All subjects gave their informed consent for inclusion before they participated in the study. The study was conducted following the Declaration of Helsinki. After getting informed consent, we utilized interviewer administered questionnaires to measure the age group, gender, ethnicity, and education level associated with the knowledge and practice towards sun exposure and use of sun protection.

6. Data Analysis

The data were analyzed descriptively using frequency tables and inferential statistics. p value < 0.050 considered statistically significant.

7. Research Ethics

Prior to the study's onset, all respondents received a full overview of the goal and action plan of the study. The respondents were then provided with informed consent, and they were given the opportunity to decide on participating in the study. Moreover, the respondents were given the assurance that anonymity would be maintained, and data would be used for research purposes only. The participation was entirely voluntary. Even after signing the informed consent form, they were fully permitted to withdraw the study at any time.

RESULTS

There were more female participants (71.9%), with the highest age group being 20-29 years old (73.9%). The ethnicities of the participants were Chinese, Malay, and Iban, followed by Others, Melanau, Bidayuh, and Orang Ulu. The educational level was highest in SPM level (33.1%), followed by Bachelor's degree (32.1%), STPM (27.2%), Postgraduate (4.3%), No Formal Education (2.0%), and PMR (1.3%). Most of the participants were employed (63.6%), followed by students (32.1%), and the rest were unemployed individuals. The results are shown in Table 1.

Table 1. Sociodemographic characteristics of respondents in Sibu, Sarawak, Malaysia (n=302)

Characteristics	Category	Frequency (n)	Percentage (%)
Age Group	< 20 yr	24	7.9
	20 - 29 yr	223	73.8
	30 - 39 yr	33	10.9
	40 - 49 yr	5	1.7
	50+ yr	17	5.6
Gender	Male	85	28.1
	Female	217	71.9
Ethnicity	Chinese	96	31.8
	Iban	66	21.9
	Malay	70	23.2
	Orang Ulu	3	1.0
	Melanau	23	7.6
	Bidayuh	5	1.7
	Others	39	12.9
Education	No Formal Education	6	2.0
	PMR	4	1.3
	SPM	100	33.1
	STPM	82	27.2
	Graduate	97	32.1
	Postgraduate	13	4.3
Occupation	Employed	192	63.6
	Student	97	32.1
	Un-Employed	13	4.3

Table 2 showed 65.6% of participants wear long-sleeved clothing for sun protection, 48.0% prefer hats, 53.0% wear sunglasses and 26.8% use other methods like sunscreen and staying indoors during bright sun hours. Most participants also wear hats and stay indoors when the sun is brightest.

Table 2. Sun protection methods practiced by the participants

Sun protection methods	Frequency (n)	Percentage (%)
Sunscreen	266	88.1
Wearing long sleeves	198	65.6
Wearing hats	145	48.0
Sunglasses	110	36.4
Umbrella	160	53.0
Others	81	26.8

Table 3 showed that 56.0% of participants had average or higher knowledge about the harmful effects of prolonged, unprotected sun exposure, compared to 44.4% who had below-average knowledge.

Table 3. Distribution of participants' knowledge and practice levels on the harmful effects of prolonged, unprotected sun exposure in Sibu, Sarawak, Malaysia (n=300)

Variable	Category	Frequency (n)	Percentage (%)
Knowledge	Average and above	169	56.0
	Below Average	133	44.0
Practice Level	High	45	14.9
	Moderate	251	83.1
	Low	6	2.0

Table 4 showed that most participants reported 83.1% moderate levels of sun protection practice, compared to 14.9% in the high group and 2.1% in the low group. Most participants practice sun protection for various reasons, including the desire to look good (75.5%), a sense of vulnerability (11.9%), a sense of fear (47.7%), and peer pressure (15.6%).

Table 4. Distribution of participants' desire to look good, sense of vulnerability or fear, and peer pressure

Reasons for using sun protection	Frequency (n)	Percentage (%)
Desire to Look Good	228	75.5
Sense of Vulnerability	36	11.9
Sense of Fear	144	47.7
Peer Pressure	47	15.6

No significant difference between age (p= 0.928), ethnicity (p= 0.316), education (p= 0.919), occupation (p= 0.581), and practice level towards sun protection from sun exposure. There is a significant difference between gender and practice level towards sun protection from sun exposure (p= 0.022). Female respondents were more using sun protection productions than males.

Table 5. Association between age, gender, ethnicity, education and occupation, and Level of sun protection practices towards prolonged sun exposure

Variables	Category	Practice Level						p
		High		Moderate		Low		
		N	%	N	%	N	%	
Age Group	< 20 yr	3	12.5	20	83.3	1	4.2	0.928
	20 - 29 yr	32	14.3	186	83.4	5	2.2	
	30 - 39 yr	7	21.2	26	78.8	0	0.0	
	40 - 49 yr	1	20.0	4	80.0	0	0.0	
	>50yr	2	11.8	15	88.2	0	0.0	
Gender	Male	5	5.9	78	91.8	2	2.4	0.022*
	Female	40	18.4	173	79.7	4	1.8	
Ethnicity	Chinese	15	15.6	76	79.2	5	5.2	0.316
	Iban	6	9.1	60	90.9	0	0.0	
	Malay	10	14.3	59	84.3	1	1.4	
	Orang Ulu	1	33.3	2	66.7	0	0.0	
	Melanau	4	17.4	19	82.6	0	0.0	
	Bidayuh	0	0.0	5	100.0	0	0.0	
	Others	9	23.1	30	76.9	0	0.0	
Education	No Formal Education	1	16.7	5	83.3	0	0.0	0.919

Variables	Category	Practice Level						p
		High		Moderate		Low		
		N	%	N	%	N	%	
	PMR	0	0.0	4	100.0	0	0.0	
	SPM	10	10.0	88	88.0	2	2.0	
	STPM	14	17.1	66	80.5	2	2.4	
	Bachelor degree	18	18.6	77	79.4	2	2.1	
	Postgraduate	2	15.4	11	84.6	0	0.0	
Occupation	Employed	26	13.5	161	83.9	5	2.6	0.581
	Student	18	18.6	78	80.4	1	1.0	
	Un-Employed	1	7.7	12	92.3	0	0.0	

DISCUSSION

The study found that Chinese individuals have the greatest knowledge, followed by Malays and Iban. Those with a bachelor's degree have greater knowledge of the sun's harmful effects. Employed individuals also demonstrate greater knowledge of the adverse effects of sun exposure. The most used sun protection method among people in Sibu was wearing long-sleeved clothing (48%) and the least used sun protection method was sunscreen usage and staying indoors (26.8%). Another study found that among people in Sibu, the most used sun protection method was wearing long-sleeved clothing, with 48% of individuals utilizing this method. On the other hand, sunscreen application and staying indoors were the least preferred sun protection methods, with only 26.8% of individuals opting for these strategies (Nouri et al., 2023).

Female participants who were of young adult age (20-29 years old), Chinese and/or Malay race, still studying and with high education level were found statistically more practice on sun protection and the harmful side effects of prolonged, unprotected sun exposure. The female gender demonstrated a high level of practice on sun protection measures compared to the male gender. the significant difference in sun protection practices between genders. Studies often reveal significant differences in sun protection practices between genders. Generally, women tend to be more proactive about sun protection compared to men. This difference may be influenced by several factors. Women often have higher levels of awareness about the risks of sun exposure, possibly due to a greater focus on skincare and beauty routines. Women are more likely to use sun protection products such as sunscreen, hats, and sunglasses. Men might use these less frequently, possibly due to perceived inconvenience or a lack of habit. In terms of behavioral factors, women might seek shade or avoid peak sun hours more often than men. Men, on the other hand, might engage in more outdoor activities without taking adequate sun protection measures. Another possible reason is health concerns. Women may be more conscious of the long-term effects of sun damage, including skin aging and the risk of skin cancer, which motivates them to adopt better sun protection habits. Studies have shown that young females, especially those in educational settings, exhibit a greater understanding of sun protection practices and the risks associated with excessive sun exposure (Al-Ghamdi et al., 2015; Harth et al., 1995; Selcuk et al., 2019).

This also coincided with Yan et al. (2015) finding that women as well as individuals of a younger adult age and higher education level were performing sunprotective behaviors more often than men and individuals of older age and lower education level (Yan et al., 2015). On the other hand, ethnicity/race as well as age, education level,

and occupation status were found to be not significant. As for participants' reasons for knowledge and usage of sun protection, a majority had reported practicing sun protection methods for beauty purposes (desire to look good) compared to other reasons (sense of vulnerability or fear and peer pressure). Moreover, while it is expected that individuals who had a sense of vulnerability or fear and experienced peer pressure were inclined to practice sun protection, the results showed the opposite.

Another study showed that most participants reported practicing sun protection to prevent skin damage that affects their physical appearance, overshadowing other factors such as a sense of vulnerability or fear, and peer pressure. Individuals who experienced a sense of vulnerability or fear or faced peer pressure regarding sun protection were less likely to engage in sun protection practices, contrary to expectations. It highlighted that personal comfort, appearance, and expectations of authority figures are more important rather than other reasons (Paul et al., 2008).

In Lunsford's study, Hispanic women used sun protection to protect their looks and prevent premature aging rather than being concerned about skin cancer (Buchanan Lunsford et al., 2018). The study had a considerable impact on people's sun protection practices, particularly in preventing skin damage that impacts their physical appearance.

In conclusion, more than half of the public has adequate knowledge about the harmful effects of prolonged, unprotected sun exposure. However, the practice of sun protection is moderate. Females have a more in-depth knowledge and higher level of sun protection practices compared to males. Knowledge of the harmful effects of sun exposure varies among different age groups, gender, ethnicity, education level, and occupational status.

It emphasizes the importance of targeted interventions to bridge the gap between knowledge and the practice of sun protection. Females and individuals with higher education levels demonstrated better sun protection practices. Thus, there is a need to enhance awareness and encourage consistent sun protection behaviors across all demographic segments. Furthermore, educational initiatives tailored to specific demographic characteristics, such as ethnicity and educational background, may help improve overall sun protection practices and reduce the incidence of sun-related skin damage and skin cancer. Future research should explore participants' knowledge and awareness of more particular aspects of skin cancer utilizing a more diverse and large population sample.

This research, conducted using a cross-sectional descriptive method, has limitations such as a non-probability convenience sampling method, which may lead to selection bias, and a female majority (71.9%), making it difficult to compare knowledge of the harmful effects of prolonged, unprotected sun exposure between genders.

AUTHOR CONTRIBUTION

Dr. Nay LWin: Conceptualization, methodology, data collection, analysis, writing – original draft preparation. Dr. Hlaing Thaw Dar: Data collection, validation, writing – review and editing. Dr. Soe Min Htut: Data collection, validation, writing – review and editing.

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CONFLICT OF INTEREST

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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