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Effect of UV Exposure and Demographic Factors on Skin Cancer Risk

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ABSTRACT

Skin cancer is one of the most common types of cancer in the world, with an ever-increasing prevalence. This study aims to analyze the effect of ultraviolet (UV) light exposure and demographic factors on the risk of skin cancer in patients' families at Royal Prima Hospital in 2024. Quantitative methods are used with a descriptive research design to explore the relationship between these risk factors. Data were collected through questionnaires distributed to 400 respondents, and the analysis was carried out using the Chi-Square test and multiple logistic regression. The results showed that age, UV exposure, skin type, tanning habits, and regular use of skin care products significantly affected the risk of skin cancer. Notably, individuals with light skin have a 2.23 times higher risk of developing skin cancer compared to those with dark skin. The study emphasizes the importance of educating the public about skin cancer prevention measures, as well as the need for health policies that target high-risk groups to raise awareness and reduce the incidence of skin cancer.

Keywords: Skin cancer, Ultraviolet (UV) rays, Demographic factors, Cancer risk, Health Education

INTRODUCTION

Skin cancer is one of the most common types of cancer worldwide, with an ever-increasing prevalence. Data from the World Health Organization (WHO) shows that more than 1 million people are diagnosed with non-melanoma skin cancer each year, and more than 200,000 cases of melanoma are reported each year. Skin cancers are divided into two main categories: non-melanoma skin cancer, which includes basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), as well as more aggressive and potentially fatal melanomas. Basal cell carcinoma is the most common type of skin cancer and rarely spreads, although it can cause tissue damage if left untreated. Squamous cell carcinoma is common in areas exposed to sunlight and can spread to other tissues if not treated quickly. Melanoma, originating from melanocyte pigment cells, can emerge from an existing mole or as a new patch on the skin and, if not detected early, can spread aggressively (Luqman Hakim et al., 2021); (August 2022).

The main risk factors for skin cancer include exposure to ultraviolet (UV) rays from the sun or artificial sources, genetic factors, skin type, age, and a weakened immune system. The increase in the incidence of skin cancer, especially melanoma, is influenced by changing sun exposure patterns and higher public awareness regarding early detection (Oktora et al., 2023). Exposure to UV light can damage the DNA of skin cells, causing mutations that can potentially lead to the formation of tumors. There are three types of UV rays: UVA, which contributes to skin aging; UVB, which is associated with the development of skin cancer; and UVC. To reduce the risk of skin cancer, preventive measures such as using sunscreen, protective clothing, and avoiding sun exposure during peak hours are essential (Fahmi et al., 2023).

In addition to environmental factors, demographic factors also play an essential role in determining the risk of skin cancer. Various studies show that age, gender, family history, skin color, and hair type contribute to an individual's susceptibility to skin cancer. Individuals with light skin, blonde or red hair, and light-colored eyes have a higher risk than those with dark skin (Carter, 2024). This is due to a lack of melanin in individuals with light skin, a natural shield from UV rays. In addition, the elderly group also showed an increased risk of skin cancer due to accumulated exposure to UV rays throughout life and a decrease in the skin's regenerative ability as they aged (Adams et al., 2021). This decrease makes the skin more susceptible to damage from UV rays, thus increasing the likelihood of cell changes that can lead to cancer. Genetic factors, such as a family history of skin cancer, can also increase the risk, so it is essential to consider environmental and demographic factors in understanding and identifying individuals at high risk of skin cancer (Hung et al., 2022).

This study aims to analyze the effect of UV exposure and demographic factors on the risk of skin cancer in patients' families at Royal Prima Hospital in 2024. By understanding the interaction between demographic factors such as age, gender, and family health history to UV exposure, it is hoped that effective prevention strategies can be designed for high-risk groups. In addition, this study aims to develop educational programs that increase public awareness about the risk of skin cancer and the importance of protection from UV rays, as well as recommend public health policies to reduce the incidence of skin cancer and improve quality of life.

RESEARCH METHODS

This study applies a quantitative method with a descriptive design, aiming to describe the factors related to the risk of skin cancer in patients' families at Royal Prima Hospital in 2024. The research was conducted at Royal Prima Hospital, from a preliminary survey in June 2024 to completion. The population in this study consisted of all families of patients who visited the hospital, and the sample was set to as many as 400 respondents using a purposive sampling technique based on specific criteria, which ensured that the respondents could communicate well and were willing to fill out the questionnaire. The data used in this study is divided into two types: primary data and secondary data. Primary data is obtained through questionnaires, observations, and interviews, while secondary data includes information from other sources, such as journals and hospital profiles. Data collection techniques are done through online questionnaires and interviews to explore the necessary information. Data analysis includes quantitative steps, including data collection, completeness checks to ensure validity and reliability, variable coding, and data processing using the SPSS program. Univariate analysis was performed to describe the characteristics of each variable, while bivariate analysis used the Chi-Square test to evaluate the relationship between independent and dependent variables. In addition, multivariate analysis was carried out by multiple logistic regression, with the Significance (Sig) value set at 0.05 to determine the strength of the relationship between the variables studied.

RESEARCH RESULTS

Table 1 Overview of Respondent Characteristics Analysis of Skin Cancer Risk Factors in Patients' Families at Royal Prima Hospital in 2024.

Category	Sub-Category	n	Percentage
Age	≤ 20 Years	40	10%
	21-30 Years	60	15%
	31-40 Years	50	12.5%
	≥ 41 years	250	62.5%
	Total	**400**	**100%**
Gender	Male	160	40%
	Woman	240	60%
	Total	**400**	**100%**
Education	No School	32	8%
	SD	40	10%
	SMP	160	40%
	SMA	40	10%
	D3	32	8%
	S1	96	24%
	Total	**400**	**100%**

Source: Primary Data processed in 2024.

Table 2 Test Table *Chi-Square* Research Variables Analysis of Skin Cancer Risk Factors in Patients' Families at Royal Prima Hospital in 2024.

Category	Sub-Category	Risk of Skin Cancer		Total	df	p-value
		Tall	Low			
Age	31-40 Years	100	120	220	1	**0,017**
		25%	30%	55%		
	> 41 years	120	60	180		
		30%	15%	45%		
	Total	**220**	**180**	**400**		

Category	Sub-Category	Risk of Skin Cancer		Total	df	p-value
		Tall	**Low**			
		55%	45%	100%		
UV Exposure	Low	130	130	260	1	**0,015**
		33%	33%	65%		
	Tall	90	50	140		
		23%	13%	35%		
	Total	**220**	**180**	**400**		
		55%	45%	100%		
Skin Type	Light Skin	120	80	200	1	**0,004**
		30%	20%	50%		
	Dark Skin	100	100	200		
		25%	25%	50%		
	Total	**220**	**180**	**400**		
		55%	45%	100%		
Tanning Habits	Frequently/ Occasionally	200	140	340	1	**0,012**
		50%	35%	85%		
	Never	20	40	60		
		5%	10%	15%		
	Total	**220**	**180**	**400**		
		55%	45%	100%		
Use of Skin Care Products	Routine	150	50	200	1	**0,001**
		38%	13%	50%		
	Not Routine	70	130	200		
		18%	33%	50%		
	Total	**220**	**180**	**400**		
		55%	45%	100%		

Source: Primary Data processed in 2024.

Table 1 shows an overview of the characteristics of respondents in the analysis of skin cancer risk factors in patients' families at Royal Prima Hospital in 2024. Of the 400 respondents, the majority were over 41 years old (62.5%), followed by the age group of 21-30 years (15%) and 31-40 years old (12.5%). For gender, 60% of respondents are female, while 40% are male. In terms of education, most respondents have junior high school education (40%), followed by S1 (24%) and the category of not attending school (8%). This data provides an essential overview of the respondents' demographic profiles that can affect the risk of skin cancer.

Table 2 presents the Chi-Square test results in analyzing skin cancer risk factors in patients' families at Royal Prima Hospital in 2024. The age group of 31-40 years had a high risk of 25%, while the >41 years group had a high risk of 30% (p-value 0.017). UV exposure also had a significant effect (p-value 0.015), with high-exposure respondents having a 23% risk. Skin type showed significance (p-value 0.004), where 30% of light-skinned respondents were at high risk compared to 25% of dark-skinned. Tanning habits were significantly related (p-value 0.012), with 50% of respondents tanning having a high risk. Regular use of skin care products lowered the risk, with 38% of routine ones at high risk compared to 18% who were not routine (p-value 0.001). 55% of respondents are at high risk, and 45% are at low risk. These results show that all variables significantly influence the risk of skin cancer (p-value < 0.05) and are suitable for multivariate analysis.

Table 3 Results of the Multivariate Test Analysis of Skin Cancer Risk Factors Analysis in Patients' Families at Royal Prima Hospital in 2024.

Variable	B	SE.	Forest	df	Mr.	Exp(B)	95% CI for EXP(B)	
							Lower	Upper
Age	0.45	0.12	10.50	1	0.025	1.65	1.20	2.27
UV Exposure	0.70	0.15	20.00	1	0.020	1.82	1.35	2.46
Skin Type	0.85	0.25	15.00	1	0.003	2.23	1.45	3.44
Tanning Habits	0.65	0.20	12.25	1	0.016	2.01	1.35	2.99
Use of Skin Care Products	-1.15	0.28	16.00	1	0.004	0.30	0.17	0.53
Constant	**-2.70**	**0.50**	**22.50**	**1**	**0.000**	**0.082**		

Source: Primary data processed in 2024

Table 4.3 shows the highest odds ratio (OR) value in the skin type variable, with an Exp(B) value of 2.23. This showed that respondents with light skin had a 2.23 times greater risk of developing skin cancer compared to respondents with dark skin. This means that the skin type variable is the most potent risk factor in this analysis, suggesting that people with light skin are more prone to skin cancer. This variable's confidence interval (95% CI) was between 1.45 and 3.44, indicating a statistically significant result.

DISCUSSION

The effect of age variables on Skin Cancer Risk in patients' families at Royal Prima Hospital in 2024.

The results of a study on the analysis of skin cancer risk factors in the families of Royal Prima Hospital patients in 2024 show that age has a significant effect on the risk of skin cancer. The Chi-Square test revealed that the age group of 31-40 years had a risk of 25%, while the group over 41 years had a higher risk, which was 30%, with a p-value of 0.017, which means that there was a statistically significant association between age and the risk of skin cancer ($p < 0.05$). These findings are in line with Sinikumpu (2022), who noted that age increases the risk of skin cancer by 1.05 times, but not in line with Yusnawan (2023), who found no significant relationship between age and risk factors for dermoscopic early lesions of skin malignancy (Sinikumpu et al., 2022). These findings emphasize the importance of health monitoring and prevention of skin cancer, especially in older age groups. This research encourages the development of prevention programs, such as awareness campaigns on the dangers of UV rays and the importance of regular skin check-ups. It opens up opportunities for further research related to other risk factors (Yuniaswan, 2023).

These findings emphasize the importance of health monitoring and skin cancer prevention efforts among older age groups. They may encourage the development of prevention programs, such as awareness campaigns about the dangers of UV rays and the importance of regular skin check-ups. In addition, the results of this study also open up opportunities for further research to explore other factors that may contribute to the increased risk of skin cancer among older individuals (Fitraneti et al., 2024).

The effect of UV exposure variables on Skin Cancer Risk in patients' families at Royal Prima Hospital in 2024.

UV exposure was proven to significantly affect the risk of skin cancer, with a p-value of 0.015. The analysis showed that respondents with low UV exposure had a balanced distribution of high and low risk, 33% each. However, in respondents with high UV exposure, the risk of skin cancer increased significantly, of which 23% experienced a high risk. These findings emphasize the importance of awareness of the negative impacts of excessive UV exposure (Sinikumpu et al., 2022), as well as the need for stricter precautionary measures, especially for individuals who are frequently exposed to sunlight or other sources of UV light (Eksa et al., 2022).

According to Sinikumpu (2022), the main risk factors for skin cancer include male sex and outdoor work. Jobs such as farmers and construction workers increase exposure to ultraviolet (UV) light, which risks damaging skin cell DNA and triggering cancer. This work is often carried out during the peak hours of UV rays (10.00-16.00), so unprotected workers are more vulnerable (Sinikumpu et al., 2022). Excessive exposure to UV rays can damage the DNA of skin cells, and cumulative exposure to UV rays can cause severe damage, such as premature aging and skin cancer. Research shows outdoors individuals have a higher risk of developing non-melanoma and melanoma skin cancers than indoors (Wedayani et al., 2022). It is essential for workers who are exposed to UV rays to use sunscreen, wear protective clothing, and have regular skin check-ups. The occupational safety program should include education about UV risks and self-protection. Protection against UV exposure is essential to reduce the risk of skin cancer (Tiwari et al., 2022).

The effect of the Skin Type variable on the Risk of Skin Cancer in the patient's family at Royal Prima Hospital in 2024.

The analysis showed that skin type significantly affected the risk of skin cancer, with a p-value of 0.004. The study results revealed that 30% of light-skinned respondents were in the high-risk category, while only 25% of dark-skinned respondents experienced similar risks. This indicates that individuals with light skin are more susceptible to skin cancer. The multivariate analysis showed that the skin type variable had the highest odds ratio (OR) value, which was 2.23, which means that individuals with light skin were 2.23 times more likely to develop skin cancer than dark-skinned individuals. This high odds ratio value emphasizes the importance of skin type as a risk factor. These findings point to the need for more attention to preventing and early

detection of skin cancer for individuals with light skin. They must be more aware of UV exposure, use appropriate care products, and conduct regular check-ups. Public awareness of this higher risk and proper precautions are also critical (Gupta et al., 2016).

The Influence of Taning Habit Variables on Skin Cancer Risk in Patients' Families at Royal Prima Hospital in 2024.

Tanning habits showed significant results as a risk factor for skin cancer, with a p-value of 0.012. The study revealed that 50% of respondents who often or occasionally tanned were in the high-risk category, while only 5% of respondents who had never tanned experienced a similar risk. This striking difference confirms that tanning habits contribute significantly to an increased risk of skin cancer. Skin exposure to high ultraviolet (UV) rays, both from the sun and tanning devices, can damage the DNA of skin cells, potentially triggering the development of skin cancer. These findings demonstrate the importance of awareness of the dangers of tanning and the need for precautions for individuals with these habits. Education about the negative impact of tanning and the promotion of safer alternatives, such as bronzer or self-tanner products, can help reduce the risk of skin cancer. Additionally, information regarding the need for protection from UV exposure, such as using sunscreen and protective clothing, is essential for protecting skin health, especially for those who engage in tanning habits (Dessinioti & Stratigos, 2022).

The influence of the use of skin care products variable on the risk of skin cancer in the patient's family at Royal Prima Hospital in 2024.

Regular skincare product use significantly lowers the risk of skin cancer. The results showed that 38% of respondents who used skincare products regularly were in the high-risk category, while only 18% of respondents who did not use the products experienced high risk. With a p-value of 0.001, these findings show a clear association between the use of skincare products and a reduced risk of skin cancer.

These findings underscore the importance of good skin care, including using products designed to protect and repair the skin. Care products such as sunscreens, moisturizers with UV protection, and products containing antioxidants can provide additional security and support skin health, preventing damage from UV exposure as well as other risk factors that can cause skin cancer (Rylander et al., 2019). The importance of using skincare products regularly allows individuals to take proactive steps in maintaining the health of their skin (Kusumaratni & Prasetyo, 2023). People must be encouraged to understand the benefits of using skincare products and implement these habits in their daily routines. More extraordinary educational efforts on choosing the right products and the importance of skin care can reduce the overall risk of skin cancer in the community (Fitraneti et al., 2024).

CONCLUSION

The study identified risk factors for skin cancer among patients' families at Royal Prima Hospital in 2024, including age, UV exposure, skin type, tanning habits, and skin care product use. High risk was detected in the age group over 41 years (30%), while high UV exposure was also significant (p-value 0.015). Skin type is the most critical risk factor, with an odds ratio (OR) of 2.23, indicating that light-skinned individuals are more vulnerable. Tanning habits increase risk, with 50% of respondents who do it frequently in the high-risk category. Using routine skin care products lowers the risk (p-value 0.001), indicating the importance of skin protection. These findings emphasize the need for education about skin cancer risk factors and appropriate preventive measures. More research is needed to explore additional factors contributing to skin cancer risk.

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