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Research Article

Depression and Anxiety as Risk Factors for Vitiligo

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Abstract: vitiligo is a disease characterized by the selective loss of melanocytes, resulting in non-scaly chalk-white macules. There is no hypothesis that can clearly explain the scientific cause of vitiligo. However, some studies have indicated that stress and emotional pressure factors, such as anxiety, may contribute to the development or exacerbation of this condition. Research Objective: this study aims to determine whether there is a relationship between depression and vitiligo, whether there is a relationship between anxiety and vitiligo, whether there is a relationship between smoking and vitiligo, and whether there is a relationship between depression and anxiety with vitiligo**.** Method: analytical observational research using a cross-sectional method is the research design employed. Purposive sampling is used to select the population based on inclusion and exclusion criteria, resulting in 53 responses. This study was conducted by interviewing patients using the Beck Depression Inventory and Beck Anxiety Inventory questionnaires, assisted by the researcher. Data analysis used univariate, bivariate, and multivariate analysis. Results: findings indicate that the significance value of Pearson chi-square is 0.001 < 0.05, meaning there is a significant relationship between depression and vitiligo. There is a significant relationship between anxiety and vitiligo with a significance value of Pearson chi-square 0.003 < 0.05. Simultaneously, depression and anxiety have a significant relationship with vitiligo. Conclusion: from the research results, it can be concluded that 30% of depression and anxiety can be the cause of vitiligo occurrences. Based on these conclusions, the suggestion that can be used as a consideration is that this research can be used as a basis for further research that links risk factors with the severity of vitiligo.

Keywords: Anxiety; Depression; Risk factor association; Smoking; Vitiligo.

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1. Introduction

Estimates of the worldwide prevalence of vitiligo vary widely, with estimates ranging from 0.004% to 2.28%. Two million people in the US, one in 200 in Northern Europe, 4% in India, and 0.19% in China are affected.(Hidayati, Maulida, Earlia, & Liana, 2023). Not much research has been done on this disease in Indonesia.(Ministry of Health, 2018). Approximately 0.1-2% of the world's population, no different from the prevalence in Indonesia, is affected by this disease, regardless of age and gender.(Hidayati et al., 2023).

Studies conductedPadmakar, Ramudu, Kumari, and Pal (2023), revealed that the prevalence of depression was higher, namely 89.5% in the case group compared to the control group.Depression can affect the immune system and produce chemical changes in the body. These chemical changes can trigger or worsen autoimmune conditions, such as vitiligo, in some people. Research has also

shown that emotional changes and psychological stress can accelerate the progression of vitiligo in some patients.(Touil, Mounts, & De Jager, 2023).Research supports this statement, namelySilpa-Archa et al. (2020),claims that vitiligo can be caused by depression. However, research does not support this claim, namelyMasykurin, Wardani, and Pramuningtyas (2021)The study confirmed that there is no relationship between the prevalence of vitiligo and depression.

The general prevalence of anxiety in vitiligo patients is 35.8%, there is a significant difference, namely male patients are lower than female patients, but the clinical relevance of this problem is still debated.(Kussainova et al., 2020).The scientific cause of vitiligo is unclear. However, some studies have shown that stress and emotional distress, such as anxiety, may contribute to the development or exacerbation of the condition. The body's response to stress can affect the immune system and cause chemical changes in the body, which can further contribute to autoimmune conditions like vitiligo, where the skin's pigment cells are attacked by the immune system.(Touil et al., 2023).Research supports this statement, namely Hamidizadeh et al. (2020), which states that there is a relationship between anxiety and the occurrence of vitiligo. However,research that does not support this statement, namelyKussainova et al. (2020),claimed that there was no significant correlation between the prevalence of vitiligo and anxiety, so this finding is still debatable.

Based on the still controversial research findings and the lack of research examining both risk factors together and to determine which risk factor is most influential in causing vitiligo, researchers are therefore interested in conducting this study. Therefore, this study aims to determine whether there is a relationship between depression and the occurrence of vitiligo, and whether there is a relationship between anxiety and the occurrence of vitiligo, and to determine the relationship between depression and anxiety with the occurrence of vitiligo. This study is believed to provide enlightenment regarding the relationship between depression and anxiety with the occurrence of vitiligo. Furthermore, this study is expected to increase our knowledge about vitiligo, especially related to its risk factors, thus allowing for more appropriate and effective prevention and treatment of patients. This helps increase public knowledge and understanding of vitiligo and those who suffer from it. Through further research, it is believed that this research can indirectly help those suffering from vitiligo.

2. Materials and Method

A cross-sectional analytical observational research methodology was used. This study aimed to examine the relationship between depression and anxiety and the incidence of vitiligo in patients at UNS Hospital (Sebelas Maret University). The study population consisted of active patients diagnosed with vitiligo at the Dermatology and Venereology Polyclinic at UNS Hospital in 2023. Using a purposive sampling approach, the study population was selected based on the inclusion and exclusion criteria. According toSugiyono (2019)Purposive sampling is a method used to select samples while still considering certain factors. The sample size of the study was calculated using the Unpaired Categorical Analytic formula with a calculation result of 53 respondents. This study was conducted by interviewing patients using the Beck Depression Inventory and Beck Anxiety Inventory questionnaires, accompanied by the researcher. Data analysis used was univariate, bivariate, and multivariate data analysis.

3. Results and Discussion

Univariate Analysis

Univariate analysis is a statistical method used to present and analyze data on a single variable. Its purpose is to provide a deeper understanding of the characteristics or properties of a variable. In this context, percentages are used to describe the extent to which a characteristic appears in a data sample. The following are the results of a univariate analysis.

Table 1. Respondent characteristics

Variables		Vitiligo F	No Vitiligo F	Total
Gender				
	Man	9	11	20
	Woman	18	15	33
Age				
	20 - 30 years	6	5	11
	30 - 40 years	15	14	29
	40 - 50 years	6	7	13
Depression				
	Yes	18	6	24
	No	9	20	29
Anxiety				
	Minimal - Light	17	25	42
	Medium - Heavy	10	1	11
Smoke				
	Yes	10	11	21
	No	17	15	32

Source: Data Processing (2023)

Based on the data provided, it can be explained that the majority of those experiencing vitiligo are women, namely 18 respondents. Vitiligo respondents predominantly occurred in the 30-40 year age range, namely 14 respondents. Respondents infected with vitiligo mostly experienced depression, namely 18 respondents. Respondents infected with vitiligo more often experienced minimal to mild anxiety, namely 17 respondents. Respondents infected with vitiligo were more likely to not smoke, namely 17 respondents.

Bivariate Analysis

Bivariate analysis is a statistical method for assessing how two variables in a data collection relate to each other. The primary goal is to determine whether there is a correlation or substantial relationship between the two variables. The Chi-square statistical test is used in bivariate analysis, particularly in unpaired groups, to assess the significance of the relationship between categorical variables. The results are as follows:

a. The Relationship Between Depression and Vitiligo

Table 2. Relationship between Depression and Vitiligo

Depression	Vitiligo						*p*-value
	Yes		No		Amount		
	F	%	F	%	F	%	
Yes	18	34	6	11.3	24	45.3	
No	9	17	20	37.7	29	54.7	0.001
Total	27	50.9	27	49.1	53	100	

Source: Data Processing (2023)

Based on the results of Table 2 above, it is known that the most respondents were those who did not have vitiligo and did not experience depression (37.7%), and the fewest were respondents who did not have vitiligo but experienced depression (11.3%). The results of statistical tests using Chi-Square analysis obtained a p-value of 0.001 or ($p < 0.05$), which means there is a significant relationship between depression and the incidence of vitiligo.

b. The Relationship between Anxiety and Vitiligo

Table 3. Relationship between Anxiety and Vitiligo

Anxiety	Vitiligo						*p*-value
	Yes		No		Amount		
	F	%	F	%	F	%	
Minimal - Light	17	32.1	25	47.2	42	79.2	
Medium - Heavy	10	18.9	1	1.9	11	20.8	0.003
Total	27	50.9	26	49.1	53	100	

Source: Data Processing (2023)

Based on the results of table 3 above, it is known that the most respondents were not infected with vitiligo but experienced minimal to mild anxiety (47.2%), and the fewest were respondents who were not infected with vitiligo but experienced moderate to severe anxiety (1.9%). The results of statistical tests using Chi-Square analysis obtained a p-value of 0.003 or ($p < 0.05$), which means there is a significant relationship between anxiety and the occurrence of vitiligo.

Multivariate Analysis

Multivariate analysis was performed to determine the most dominant independent variable in relation to the dependent variable through the use of a logistic regression test, with a significance value (p-value) of less than 0.05. In this context, logistic regression was used because the dependent variable is binary. Through this test, we can evaluate the extent to which the independent variables contribute to changes in the dependent variable and identify which has the most significant influence. The results are as follows:

Table 4. Relationship between depression and anxiety with vitiligo

Variables	Coefficient	P value	Exp (B)	Nagelkerke R Square
Depression	**-1,269**	**0.069**	**0.281**	**0.300**
Anxiety	**-1,833**	**0.125**	**0.160**	

Source: Data Processing (2023)

Based on Table 4 above, it is known that the variables that impact the occurrence of vitiligo are depression and anxiety with a p-value <0.001. In the table, depression has a 0.281 higher chance of vitiligo compared to anxiety, which only has a 0.16 chance. The strength is seen from the odds ratio from largest to smallest. From the table above, the Nagelkerke R Square value is 0.300. This means that vitiligo in patients can be explained by depression and anxiety by 30%. Therefore, there are 70% (100 - 30) other factors outside the research model that can explain vitiligo.

Discussion

a. Relationship between Age and Gender

Findings from research by Sawant et al. (2019) state that vitiligo occurs more frequently in the 20-40 year age range. This can be triggered by environmental and immunological factors that can influence the development of vitiligo at certain ages. This is in line with this study, namely the age range that most often experiences vitiligo is 30-40 years. Several environmental factors that can trigger the onset of vitiligo include sun exposure, chemicals, and skin injury. Immunological factors can also play an important role in the development of vitiligo, where the immune system can attack and damage melanocytes, the cells responsible for skin pigment production. In addition, genetic factors can also play a role in the development of vitiligo at certain ages.

Based on this research data, it is stated that women tend to be more dominant in having vitiligo. The results of the study, Kumar et al. (2023) stated that hormonal and genetic factors play a role in gender differences. Furthermore, research by Sawant et al. (2019) showed that women are more likely to experience greater psychological impacts compared to men. This may be due to differences in coping mechanisms, differences in self-perception, and differences in biological and emotional responses between women and men. Furthermore, this study also suggests that hormonal factors may play a role in these differences, where the hormone estrogen can influence the immune and inflammatory responses in the skin.

b. The Relationship Between Depression and Vitiligo

Based on the results of the bivariate analysis, depression was significantly associated with vitiligo. This means that the level of depression in patients was significantly associated with the incidence of vitiligo. Therefore, it can be assumed that depression is a contributing factor in the onset or development of vitiligo in the patient population studied.

Findings from the researchChen, Li, and Li (2021)consistently support the results of bivariate analysis showing a significant association between depression and vitiligo.Chen, Li, and Li (2021), noted that depression can increase a person's stress levels,

and stress has been known to trigger vitiligo or even trigger flare-ups of the condition. Furthermore, stress can affect the immune system, contributing to vitiligo damage. The study found thatChen, Li, and Li (2021)also highlighted that stress can trigger the production of Reactive Oxygen Species (ROS), which are directly linked to intracellular responses to UV radiation and other environmental factors. Thus, their findings indicate that this pathway, which encompasses depression, stress, and ROS formation, may have significant implications for the onset or progression of vitiligo. The bivariate analysis confirming the association between depression and vitiligo reinforces the observation that psychological factors, particularly depression, are important in understanding skin conditions in the studied population.

c. The Relationship between Anxiety and Vitiligo

Based on the results of the bivariate analysis, anxiety was significantly associated with vitiligo. This means that the level of anxiety in patients was significantly associated with the occurrence of vitiligo. Therefore, it can be assumed that anxiety is a contributing factor in the onset or development of vitiligo.

The findings of previous studies support the results of the bivariate analysis in the current study, which showed a significant correlation between anxiety levels and the incidence of vitiligo. Previous studies, as suggested byTouil et al. (2023), emphasizing that stress can have a mitigating effect or trigger flare-ups (worsening of the condition) and also cause increased ROS in vitiligo, thus affecting the immune system and psychological well-being. Furthermore, the link between anxiety disorders and depression, as explained byKussainova et al. (2020), highlights the complexity of psychological factors that can play a role in skin conditions such as vitiligo.

Another finding byNasser, Raggi El Tahlawi, Abdelfatah, and Soltan (2021), emphasizes the importance of awareness of anxiety in vitiligo patients, given its negative impact on treatment adherence and overall quality of life. Thus, the results of the current study, which confirm the association between anxiety levels and vitiligo, complement and strengthen previous findings, providing additional insight into the role of psychological factors in the dynamics of vitiligo in the studied population.

d. Multivariate Relationship

Based on the results of the multivariate analysis, the variables that impact the occurrence of vitiligo are depression and anxiety with a p-value <0.001. In the table, depression has a 0.281 higher chance of vitiligo compared to anxiety, which only has a 0.16 chance. The strength is seen from the odds ratio from largest to smallest. From the table above, the Nagelkerke R Square value is 0.300. This means that vitiligo in patients can be explained by depression and anxiety by 30%. Therefore, there are 70% (100 - 30) other factors outside the research model that can explain vitiligo.

4. Conclusion

Based on the research findings and discourse of the previous chapter, the following conclusions can be made:

1. Depression has a significant relationship with the incidence of vitiligo.
2. *Anixety*has a significant relationship with the incidence of vitiligo.

3. Hamultivariate analysis results that provide greater influencein vitiligo patients is depression.

Based on these conclusions, the suggestion that can be used as a consideration is that this research can be used as a basis for further research that links risk factors with the severity of vitiligo.

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