

<https://doi.org/10.48047/AFJBS.6.7.2024.2751-2774>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

EFFECT OF EDUCATIONAL PROGRAM ABOUT HEALTH PROMOTION ON VITILIGO PATIENTS' QUALITY OF LIFE

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Article History
Volume6, Issue7, April 2024
Received: 3 June 2024
Accepted: 20 June 2024
Published: 27 June 2024
doi:10.48047/AFJBS.6.7.2024.2751-2774

ABSTRACT

Background: Vitiligo, is a chronic disease manifested by partial or total loss of melanocytes with impaired quality of life (QoL)

Aim: explore the effect of educational program about health promotion on vitiligo patients' quality of life.

Methods: The study involved 55 vitiligo patients undergoing ultraviolet therapy at dermatological outpatient clinics in El- Salam and Al-Hayat hospitals, affiliated to the Egypt Health Care Authority in Port Said Government, Egypt. Employing a quasi-experimental research design, the study conducted pre-post and follow-up assessments to explore the effect of an educational program on patient knowledge and quality of life. Data collection involved two main tools: a structured interview schedule to assess patient knowledge about vitiligo and a scale to measure the quality of life among vitiligo patients.

Results: In the pre-intervention phase, only 1.8% of vitiligo patients aged under 20 years had total satisfactory knowledge, whereas this increased significantly to 92.7% in the post-intervention phase, although it slightly decreased to 56.4% in the follow-up phase. The mean quality of life scores (\pm SD) were 2.93 ± 0.62 in the pre/post phases and 2.67 ± 0.68 in the follow-up phase. A statistically significant positive correlation was observed between the patients' knowledge levels and their quality of life across all phases of the program.

Conclusion: Highly statistically significant improvements were observed immediately after the implementation phase in both the total level of knowledge and the quality of life among the studied patients. Furthermore, the educational program successfully achieved its aim of positively changing knowledge and quality of life regarding vitiligo disease.

Recommendations: Continuous educational and supportive programs are recommended for vitiligo patients and their family members who are at higher risk for QoL impairment.

Key words: Health Promotion, Quality of Life, Vitiligo.

INTRODUCTION

The origin of word vitiligo was suggested to be derived from the word vituli in Latin, which meaning "white appearance," or word vitium" which represent meaning blemish. Vitiligo is a chronic condition is characterized by the loss of melanocytes, resulting in depigmented patches on the skin, often leading to social stigma (Tham, Linder & Olivry, 2019). It can occur equally between sexes, but is more common in darker-skinned populations, typically appearing between ages 20-30 but can occur later (Aragones et al., 2023). Vitiligo can have occurred in three clinical presentations: segmental, non-segmental, and mixed/unclassified. Despite various proposed theories including autoimmune, genetic, and oxidative stress mechanisms, the exact cause remains elusive (Grochocka et al.,2023).

Vitiligo, considered unpredictable, but it linked to various risk factors such as genetic predisposition, autoimmune disorders like thyroid issues, sun exposure, severe skin trauma, and stress, particularly prolonged mental stress believed to influence hormone changes responsible for skin alterations (Latipov, 2022). Despite its multifactorial and complex nature, vitiligo lacks a definitive explanation, making treatment challenging. Efforts to understand its mechanisms and develop effective treatments persist, with a focus on halting disease progression, stabilizing hypo-pigmented lesions, and preventing relapse through combination therapies (Armijos et al., 2023; Gupta et al., 2018).

According to the World Health Organization (WHO), Quality of Life (QoL) is defined as an individual's perception of their position in life in relation to their culture, goals, expectations, standards, and concerns, aiming for overall well-being. QoL encompasses various dimensions including physical, psychological, independence, social relations, environmental, and spiritual aspects (Aragones et al., 2023). Despite not posing significant health risks, vitiligo is heavily stigmatized, particularly affecting social, professional, and self-esteem aspects, especially among women and adolescents, thus impacting their QoL (Marchioro et al., 2022). The condition's cosmetic implications can lead to impaired QoL in daily activities, employment, and psychosocial well-being, with psychological burdens such as depression exacerbating the effects, particularly when lesions are visible or on sensitive areas (Bibeau et al., 2022).

One of the crucial nurse's roles is to targeted psychosocial support to patients as well as to educate those to lifestyle modification that has positive effect on vitiligo risk factors

and to improve disease outcome that include physical activity, stress management and well-balanced diet (Abd-El Mohsen and Mohamed, 2019).

Significance of the study:

Vitiligo poses a significant global health concern, affecting an estimated 0.1% to over 8% of the world's population, with around 100 million individuals affected globally. Prevalence varies across regions, with higher rates observed in Africa, Europe, and Oceania compared to North America and Asia. Incidence rates in countries like India, Egypt, and Japan range from 1.25% to 6% (Abd-El Mohsen and Mohamed 2019; Khatab, Elshnawie & Weheda, 2021). Onset typically occurs between ages 20 and 30 but can affect individuals of all ages, including children, where it accounts for up to 3.5% of cases

Despite not being life-threatening, vitiligo significantly impacts patients' social, psychological, and physical well-being, leading to social rejection, discrimination, and hindrances in professional settings (Tushir, Yadav, Kumar & Joshi, 2023). This often results in feelings of embarrassment, low self-esteem, social isolation, depression, and stigmatization (Tsadik, Teklemedhin, Mehari Atey, Gidey & Desta, 2020).

Furthermore, inadequate awareness and misconceptions about vitiligo contribute to poor medical care, personal behaviors, and compliance with treatment regimens, exacerbating patients' challenges. Additionally, the lack of health education programs and research addressing these issues, particularly in regions like Egypt, further underscores the need for interventions to improve the quality of life for vitiligo patients. Thus, this study aimed to explore the effect of a health promotion educational program on enhancing the quality of life among vitiligo patients.

Aim of the Study:

The aim of the study was to explore the effect of educational program about health promotion on vitiligo patients' quality of life

Hypothesis: -

1. Knowledge of patients regarding vitiligo will be significantly improved after implementation of educational program about health promotion.

2. Quality of Life for patients with vitiligo will be significantly improved after implementation (follow up phase) of educational program about health promotion.

Methods:

The study utilized a quasi-experimental design employing a one-group pre/post-test approach with a follow-up assessment after three months. Subjects underwent pretesting, participated in a vitiligo health promotion program, and completed post-testing immediately afterward. A subsequent follow-up evaluation was conducted to assess the program's effects. The research was conducted at dermatology outpatient clinics specializing in vitiligo patients undergoing ultraviolet therapy within the Egypt Health Care Authority in Port Said Government. The study included two hospitals: El-Salam Hospital in the Al-Sharq district and Al-Hayat Hospital in the Port Fouad district. El-Salam Hospital featured a dermatology outpatient clinic comprising administrative, examination, and ultraviolet therapy rooms. Conversely, Al-Hayat Hospital housed a single large room within its dermatology outpatient clinic, with a designated section for examination and a private area for ultraviolet therapy covered by curtains.

Sample size

The sample size was determined by using the following equation (Dobson, 1984).

$$\text{Sample Size (n)} = \frac{Z^2}{\Delta^2} P (100 - P)$$

Where:

P: The expected prevalence of Vitiligo was =3.36% (Khatab et al., 2021).

Z: A percentile of standard normal distribution determined by 95% confidence level = 1.96

Δ: The width of the confidence interval = 5.

$$\text{Sample Size (n)} = \frac{1.96^2}{5^2} 3.36 \times (100 - 3.36) = 49.9 \approx 50 \text{ patients}$$

The calculated sample size was 50 patients. Due to the design effects (1.25), expected non-participating rate (10%).

The final sample size was 55 patients.

The study utilized a non-probability, purposive sampling technique to select vitiligo patients based on their accessibility to the designated setting and adherence to specific inclusion criteria. Inclusion criteria comprised patients undergoing ultraviolet therapy for six months or more, aged between 18 and 65 years, diagnosed with vitiligo for at least six months, and devoid of other diagnosed skin diseases. This approach ensured that the selected participants met the necessary requirements for the study, facilitating a focused examination of the effects of the health promotion program on the targeted population.

Tools of Data Collection:**Tool (I): Patient's knowledge interview schedule about vitiligo disease:**

Tool (I), the Patient's Knowledge Interview Schedule about vitiligo disease, was adapted from (Abd El-Razik, Ghanem, Mahran & Saleh, 2020) and conducted in Arabic. It comprised two parts: Part 1 focused on gathering socio-demographic information such as age, gender, marital status, education level, occupation, workplace, residence, and economic status. Part 2 aimed to assess patients' knowledge about vitiligo through nine items covering aspects like the definition of vitiligo, its nature, risk factors in both genders, types, symptoms, causes (including immune disorders, psychological stress, sun exposure, injuries, and burns), and essential dietary patterns enhancing immunity. Each item was scored as either Yes (2) or No (0), with a maximum possible score of 18 indicating a satisfactory level of knowledge if the patient scored $\geq 70\%$, and an unsatisfactory level if scoring less than 70%. This tool enabled a structured evaluation of vitiligo patients' understanding of the disease and related factors, offering valuable insights for healthcare professionals to tailor educational interventions effectively.

Tool (II): Vitiligo patient's quality of life Scale:

Tool (II), the Vitiligo Patient's Quality of Life Scale, was developed by Ay, Şenol, & Yücelten, (2013) and translated into Arabic by experts from the Faculty of Arts. This scale, consisting of 25 questions, evaluates the quality of life of vitiligo patients across various domains including pain, irritation, itching, embarrassment, self-esteem, and use of makeup or clothing to conceal vitiligo. Responses are scored using a four-point Likert scale (1-4), with options ranging from "never" to "all the time". Each question contributes to the total score, which ranges from 0 to 100, with higher scores indicating poorer quality of life. This tool enables a comprehensive assessment of the impact of vitiligo on patients' daily lives, facilitating targeted interventions to improve their overall well-being.

Validity and reliability of tools:

The Patient's Knowledge Interview Schedule about vitiligo disease (Tool I) underwent content validity assessment by a panel of five experts, ensuring its clarity, relevance, and comprehensiveness. NO modifications were made. Meanwhile, the Vitiligo Patient's Quality of Life Scale (Tool II) was validated through convergent validity, showing a strong correlation with the dermatology life quality index (DLQI). Reliability analyses revealed high internal consistency for both tools, with Tool I demonstrating a Cronbach's

alpha coefficient of 0.758 and Tool II exhibiting a coefficient of 0.92 among vitiligo patients, indicating consistent measurement across its items. These findings underscore the robustness of both instruments in assessing vitiligo patients' knowledge and quality of life, providing valuable insights for clinical practice and research in the field.

Pilot Study:

The pilot study was carried out on 10% (6 vitiligo patients), who selected randomly from previously mentioned setting before starting data collection phase for two continuous weeks. The purposes of the pilot study were to test applicability, to evaluate the content and clarity of questionnaire, to reconstruct the questionnaire if necessary, and estimate the time needs to fill questionnaire. It also helped to find out any problems and obstacles that might interfere with data collection. No modification had been occurred in the tools. Those patients who shared in the pilot study were included in the study sample.

Field Work:

The study unfolded across four distinct phases: Assessment, Planning, Implementation, and Evaluation, spanning a twelve-month period from June 1, 2022, to the end of May 2023. During Phase I, the Assessment phase, the study sample was recruited, and a pre-tested questionnaire was administered to assess patients' socio-demographic data, medical history, knowledge about vitiligo, and their quality of life. The researcher ensured confidentiality and conducted interviews with patients, spending approximately 30 minutes with each participant. Phase II, the Planning phase, involved designing an educational program aimed at enhancing vitiligo patients' knowledge and quality of life. The program, developed based on initial assessments and literature, underwent scrutiny by a panel of seven experts. A comprehensive educational booklet, rich in Arabic language content and illustrated with color pictures, was created to facilitate understanding and engagement among patients.

Phase III, the Program Implementation stage, saw the execution of the educational program for vitiligo patients undergoing ultraviolet therapy at dermatology outpatient clinics in Elsalam and Elhayah hospitals in Port Said city. Patients were grouped with total eight group in two hospitals, with sessions held twice a week over four consecutive weeks in each group, totaling eight sessions per group. The program, spanning six months, emphasized active participation, starting each session with a recap and clear objectives. Various teaching methods and educational media were utilized, ensuring

comprehensive coverage of program content. Patients were encouraged to ask questions and given copies of the educational booklet for future reference.

Finally, Phase IV, the Evaluation stage, involved distributing the same tools used in the pre-test to assess the program's impact. Two post-tests were conducted: immediately after the program sessions and three months later for follow-up evaluation. The program's effectiveness was gauged by comparing pre-test and post-test results, focusing on improvements in patients' knowledge and adoption of program guidelines in their daily lives to enhance their quality of life. This comprehensive approach ensured a thorough assessment of the educational intervention's efficacy and its sustained impact over time.

Ethical Consideration:

Prior to commencing the study, approval was obtained from the Scientific Research Ethics Committee at the Faculty of Nursing, Port Said University, on August 6, 2023 (Ref: NUR 6/8/2023). Ethical considerations were meticulously adhered to throughout all phases of the research. This included seeking permission from the directors of the participating hospitals after explaining the study's objectives. Additionally, participants were provided with a concise overview of the study, ensuring their understanding of the research purpose and the confidentiality of the information gathered, assuring them that data would solely be used for research purposes. Furthermore, participants were informed of their right to withdraw from the study at any point if they so desired, ensuring their autonomy and comfort throughout the research process. These ethical measures underscored the commitment to upholding participant rights and welfare throughout the study.

Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, The Kolmogorov-Smirnov test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, and standard deviation, median. Significance of the obtained results was judged at the 5% level. Chi-square test was used for categorical variables, to compare between different Categories. Fisher's Exact or Monte Carlo correction was used for correction for chi-square when more than 20% of the cells have expected count less than 5. Cochran's test was used for non-parametric test for binary response variable and Post

Hoc Test (Dunn's) for pairwise comparisons. ANOVA with repeated measures was used for normally distributed quantitative variables, to compare between more than two periods or stages and Post Hoc Test (adjusted Bonferroni) for pairwise comparison. Pearson coefficient was used to correlate between two normally distributed quantitative variables

Results:

Table (1) revealed that 32.7 % of the vitiligo patients aged <20 years with Mean±SD= 33.67 ± 15.98. And about 60.0 % of studied patients were female, and about 50.9 % were single. Concerning to level of education, 38.2% had secondary education, while 7.3% had high middle (technical) education. As regard of occupational status, 32.7 % of studied patients are working and about 61.1% of those who are working have manual or crafting work, while 16.7% have hard work. Also, the table showed that 83.6% habituated in rural area, Eventually, the same table clarified that 72.7% reported that they had sufficient income.

Table (2) As it is evident in this table, 74.5% of studied patients had correct knowledge regarding area of is vitiligo disease considering as a communicable disease that transmit through touch or sharing patients' objects (nature of vitiligo disease and mode of transmission) in pre- intervention phase and reached 94.5% in post- intervention phase, compared to 98.2% at follow up phase.

As well as this table also indicated that 67.3% of studied patients had correct knowledge regarding area of vitiligo symptoms in pre- intervention phase compared to 20.0% & 25.5% in post& follow up intervention phase respectively. Moreover, 70.9% hadn't knowledge regarding area of vitiligo definition in pre- intervention phase while it improved to 0.0% at post-intervention phase compared to 3.6% at follow up phase. Moreover, there were statistically significant differences in all items except for nature of vitiligo disease and mode of transmission at throughout program phases. (pre/post /follow up intervention phase) ($P < 0.001$).

Figure (1): displayed that 1.8% of studied vitiligo patients had total satisfactory knowledge in pre intervention phase. While, it reached to 92.7 % in post intervention phase compared with 56.4 % in follow up phase. These were statistical significant differences from pre to post and follow up phases in total knowledge score ($P < 0.001$).

Table (3): Showed that 92.7% of studied vitiligo patient were at all-time concerning about vitiligo spreading to other parts of their body in pre/post intervention phase, in comparison of follow up phase, it reached to 90.9% On the other hand, the results noticed that 90.0% of studied vitiligo patient had anxiety as vitiligo being permanent in pre/post intervention phase, in comparison of 89.1% at follow up phase. Moreover, 78.2% of studied patients had

an uncomfortable feeling with questions asked to them about their vitiligo in pre/post intervention phase, and it reached to 52.7% in follow up phase, also 90.9% of studied vitiligo patient were at all-time difficulty keeping up with vitiligo therapy (spending too much time or money) in pre/post intervention phase. while it reached to 92.7% in follow up phase.

finally, the table showed that there were statistically significant differences throughout the program phases as in areas of, felling of embarrassment due to vitiligo ($P = 0.023$) & using specific clothes to cover up vitiligo ($p < 0.001$) & low self-esteem due to vitiligo ($p = 0.038$) & felling unwanted due to vitiligo ($p < 0.001$) & uncomfortable feeling when looking in mirror due to vitiligo ($p = 0.001$) & difficulty with sun exposure or protection due to vitiligo & vitiligo affected vacation plans & Impact on what you do on your free time, activities, and hobbies & Any challenges at school or work due to vitiligo. And felling any uncomfortable feeling by question about vitiligo ($p < 0.001^*$).

Table (4): revealed that the mean score of quality of life for studied vitiligo patients was 2.93 ± 0.62 in pre/post phases compared to 2.67 ± 0.68 at follow up phase. with statistically significant differences between the program phases ($p = 0.01$).

Table (5) indicated that there was statistically significant positive correlation between knowledge of studied vitiligo patients and their quality of life in pre and follow up phases at ($P = 0.002$) ($P = 0.001$).

Table (6) presented the results of univariate and multivariate linear regression analyses conducted on sociodemographic data from a post-phase study with a sample size of 55 individuals, examining their impact on knowledge. In the univariate analysis, age (≥ 50) and education (University) emerged as statistically significant predictors of knowledge, marked by p-values less than 0.05. The multivariate analysis retained variables with $p < 0.05$, revealing that in this model, age (≥ 50) maintained its significance ($p = 0.007$) with a negative coefficient of -3.179. This suggested a decline in knowledge for individuals aged 50 or above. Additionally, education (University) remained statistically significant ($p < 0.001$) with a positive coefficient of 4.155, indicating a positive association between university education and knowledge. Conversely, variables such as sex, marital status, occupational status, and residence did not demonstrate statistically significant relationships with knowledge in the multivariate analysis.

Table (7) presented that in the univariate analysis, several sociodemographic and medical history variables were explored. Notably, in the multivariate analysis, age (≥ 50) exhibited no significant impact on Quality of life, while education (University) revealed a significant negative

association ($p = 0.049$) with a coefficient of -4.415 . Rural residence emerged as a statistically significant positive predictor ($p = 0.041$) with a coefficient of 16.664 . Among medical history factors, the duration of suffering from vitiligo (More than 12 months) had a significant negative impact ($p = 0.382$) with a coefficient of -4.095 . Other variables, such as sex, marital status, occupational status, side effects from current or previous treatments, affected body areas, and the speed of disease progression, did not demonstrate statistically significant associations with Quality of life in the multivariate model.

Table (1): Distribution of the studied vitiligo patients according to their socio-demographic characteristics (n = 55)

Items	No.	%
Age		
<20	18	32.7
20-<35	14	25.5
35-<50	8	14.5
≥ 50	15	27.3
Min. – Max	16.0 – 63.0	
Mean \pm SD	33.67 \pm 15.98	
Median	28.0	
Sex		
Male	22	40.0
Female	33	60.0
Marital status		
Single	28	50.9
Married	21	38.2
Divorced	2	3.6
Widowed	4	7.3
level of education		
Can't read and write	8	14.5
Middle Education	11	20.0
Secondary education	21	38.2
Technical education	4	7.3
University education	11	20.0
Occupational status		
Working	18	32.7
Not working	37	67.3
Occupation or profession (n = 18)		
Office work	4	22.2
Manual or crafting work	11	61.1
Hard work	3	16.7
Place of residence		
Rural	46	83.6
Urban	9	16.4
Family income		
not enough	40	72.7
Enough	15	27.3

Table (2): Comparison between patients' knowledge about vitiligo throughout the program phases (n = 55)

Items	Pre		Post		Follow up		P
	No.	%	No.	%	No.	%	
Definition of vitiligo disease							
It is a dermatological disease that hasn't any noticeable symptoms	1	1.8	0	0.0	0	0.0	<0.001*
It is an acquired disease that increasing melanin production that result in changes in skin color	6	10.9	3	5.5	3	5.5	
It is a disease that affect melanocyte cells that produce melanin substance causing distraction of this substance leading to white batches free from pigmentation	9	16.4	52	94.5	50	90.9	
Don't know	39	70.9	0	0.0	2	3.6	
Vitiligo is considered a communicable disease that is transmitted through touch or sharing patients' objects							
Yes	5	9.1	3	5.5	0	0.0	0.232
No	41	74.5	52	94.5	54	98.2	
Don't know	9	16.4	0	0.0	1	1.8	
Vitiligo disease is more among							
Man, more than women	1	1.8	0	0.0	0	0.0	<0.001*
Women more than men	0	0.0	0	0.0	2	3.6	
Appears in Men and women equally	2	3.6	52	94.5	34	61.8	
Don't know	52	94.5	3	5.5	19	34.5	
Types of vitiligo							
Partial vitiligo	1	1.8	3	5.5	0	0.0	<0.001*
Generalized vitiligo	0	0.0	0	0.0	0	0.0	
All of the above	5	9.1	49	89.1	31	56.4	
Don't know	49	89.1	3	5.5	24	43.6	
Symptoms of vitiligo? #							
Appearance of easily noticeable white patches that is more frequently in sun exposed body parts	37	67.3	11	20.0	14	25.5	<0.001*
Early whitening of hair places such as scalp, eyelashes, eyebrow, and beard	0	0.0	5	9.1	10	18.2	0.005*
Change the color of the mucous layers in	0	0.0	1	1.8	1	1.8	0.607
All of them	1	1.8	43	78.2	35	63.6	<0.001*
Don't know	17	30.9	0	0.0	2	3.6	<0.001*
An immune disorder considered as an default causes of vitiligo disease							
Yes	15	27.3	53	96.4	39	70.9	<0.001*
No	7	12.7	2	3.6	6	10.9	
Don't know	33	60.0	0	0.0	10	18.2	
The severity and spread of vitiligo increase with exposure to psychological problems and stressors							
Yes	35	63.6	54	98.2	50	90.9	<0.001*
No	1	1.8	0	0.0	3	5.5	
Don't know	19	34.5	1	1.8	2	3.6	
The severity and spread of vitiligo increase with directly exposure to sun, injuries and burns							
Yes	19	34.5	54	98.2	52	94.5	<0.001*
No	4	7.3	0	0.0	1	1.8	
Don't know	32	58.2	1	1.8	2	3.6	
The essential nutrients that help in raise immunity							
Vitamins, Folic acid (ascorbic acid) and anti-oxidents	11	20.0	53	96.4	54	98.2	<0.001*
Salts and soft drinks	0	0.0	0	0.0	0	0.0	
Sugar and starches	1	1.8	0	0.0	1	1.8	
Don't know	43	78.2	2	3.6	0	0.0	

Q: Cochran's test

Fr: Friedman test

#: More than one answer

p: p value for comparing between the three studied periods

*: Statistically significant at $p \leq 0.05$

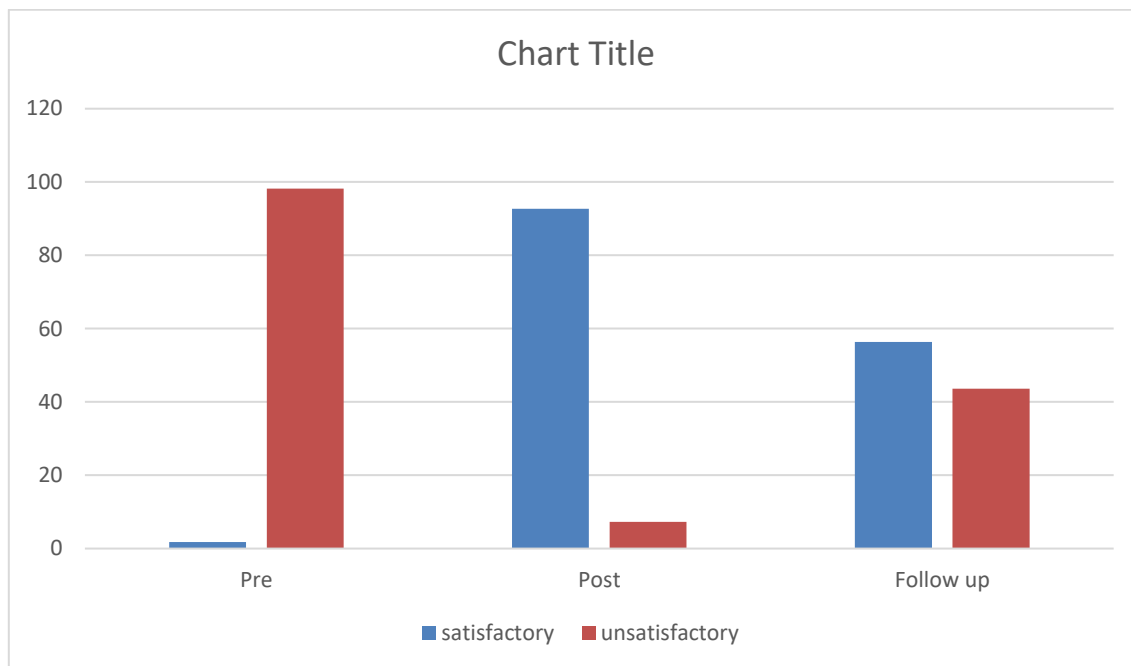


Figure (1): Total score of patients' knowledge about vitiligo throughout the program phases (n=55).

SD: Standard deviation

F: F test (ANOVA) with repeated measures

Q: Cochran's test

p: p-value for comparing between the studied periods.

*: Statistically significant at $p \leq 0.05$

Table (3): Comparison of the studied vitiligo patient according to their quality of life throughout the program phase (n = 55)

Items	Pre								Post								Follow up								P
	Never		Sometimes		Often		All the time		Never		Sometimes		Often		All the time		Never		Sometimes		Often		All the time		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Do you have																									
Pain, irritation, or itching due to vitiligo	27	49.1	3	5.5	10	18.2	15	27.3	27	49.1	3	5.5	10	18.2	15	27.3	29	52.7	2	3.6	11	20.0	13	23.6	0.867
Feeling embarrassed due to your appearance with vitiligo	12	21.8	1	1.8	8	14.5	34	61.8	12	21.8	1	1.8	8	14.5	34	61.8	16	29.1	3	5.5	4	7.3	32	58.2	0.023*
Feeling uneasy about others staring at your vitiligo	11	20.0	1	1.8	9	16.4	34	61.8	11	20.0	1	1.8	9	16.4	34	61.8	16	29.1	1	1.8	6	10.9	32	58.2	0.076
Using make-up to conceal vitiligo?	40	72.7	4	7.3	1	1.8	10	18.2	40	72.7	4	7.3	1	1.8	10	18.2	42	76.4	2	3.6	2	3.6	9	16.4	0.913
Using clothing specifically to cover up vitiligo	18	32.7	0	0.0	4	7.3	33	60.0	18	32.7	0	0.0	4	7.3	33	60.0	28	50.9	1	1.8	3	5.5	23	41.8	<0.001*
Low self-esteem because of vitiligo	9	16.4	0	0.0	5	9.1	41	74.5	9	16.4	0	0.0	5	9.1	41	74.5	15	27.3	0	0.0	6	10.9	34	61.8	0.038*
Feeling not wanting others to see your vitiligo	6	10.9	1	1.8	3	5.5	45	81.8	6	10.9	1	1.8	3	5.5	45	81.8	14	25.5	2	3.6	4	7.3	35	63.6	<0.001*
Concerning vitiligo spreading to other body parts	2	3.6	1	1.8	1	1.8	51	92.7	2	3.6	1	1.8	1	1.8	51	92.7	4	7.3	0	0.0	1	1.8	50	90.9	0.867
Concern about skin cancer due to vitiligo	7	12.7	1	1.8	1	1.8	46	83.6	7	12.7	1	1.8	1	1.8	46	83.6	5	9.1	0	0.0	0	0.0	50	90.9	0.202
Anxiety as vitiligo is permanent	1	1.8	2	3.6	2	3.6	50	90.9	1	1.8	2	3.6	2	3.6	50	90.9	6	10.9	0	0.0	0	0.0	49	89.1	0.895
Worried that your children might inherit vitiligo from you	3	5.5	2	3.6	1	1.8	49	89.1	3	5.5	2	3.6	1	1.8	49	89.1	5	9.1	0	0.0	0	0.0	50	90.9	0.895
Uncomfortable feeling when looking in mirror due to vitiligo	9	16.4	2	3.6	4	7.3	40	72.7	9	16.4	2	3.6	4	7.3	40	72.7	20	36.4	2	3.6	2	3.6	31	56.4	0.001*
Stayed away from crowded areas due to vitiligo	19	34.5	3	5.5	16	29.1	17	30.9	19	34.5	3	5.5	16	29.1	17	30.9	18	32.7	10	18.2	12	21.8	15	27.3	0.368
Difficulty with sun exposure or protection due to your vitiligo	8	14.5	2	3.6	7	12.7	38	69.1	8	14.5	2	3.6	7	12.7	38	69.1	19	34.5	4	7.3	4	7.3	28	50.9	<0.001*
Vitiligo affected your vacation plans	13	23.6	2	3.6	8	14.5	32	58.2	13	23.6	2	3.6	8	14.5	32	58.2	20	36.4	6	10.9	9	16.4	20	36.4	<0.001*
Impact on what you do on your free time, your activities, and hobbies	17	30.9	1	1.8	6	10.9	31	56.4	17	30.9	1	1.8	6	10.9	31	56.4	27	49.1	4	7.3	7	12.7	17	30.9	<0.001*
Any challenges at school or work due to vitiligo	19	34.5	2	3.6	2	3.6	32	58.2	19	34.5	2	3.6	2	3.6	32	58.2	30	54.5	2	3.6	6	10.9	17	30.9	0.001*
Any uncomfortable feeling by question about vitiligo	7	12.7	2	3.6	3	5.5	43	78.2	7	12.7	2	3.6	3	5.5	43	78.2	16	29.1	4	7.3	6	10.9	29	52.7	<0.001*
Feeling of isolated due to vitiligo	34	61.8	4	7.3	4	7.3	13	23.6	34	61.8	4	7.3	4	7.3	13	23.6	38	69.1	2	3.6	5	9.1	10	18.2	0.368
Issues with your partner due to vitiligo (n = 21)	9	42.9	1	4.8	3	14.3	8	38.1	9	42.9	1	4.8	3	14.3	8	38.1	13	61.9	0	0.0	1	4.8	7	33.3	0.165
Avoid physical contact with other due to vitiligo	40	72.7	0	0.0	8	14.5	7	12.7	40	72.7	0	0.0	8	14.5	7	12.7	41	74.5	4	7.3	3	5.5	7	12.7	0.441
Family issues due to vitiligo	38	69.1	0	0.0	5	9.1	12	21.8	38	69.1	0	0.0	5	9.1	12	21.8	35	63.6	3	5.5	6	10.9	11	20.0	0.913
Uneasy feelings about sharing personal items with the household due to vitiligo	37	67.3	3	5.5	2	3.6	13	23.6	37	67.3	3	5.5	2	3.6	13	23.6	36	65.5	1	1.8	2	3.6	16	29.1	0.926
Difficulty keeping up with vitiligo therapy	1	1.8	2	3.6	2	3.6	50	90.9	1	1.8	2	3.6	2	3.6	50	90.9	1	1.8	0	0.0	3	5.5	51	92.7	0.819
problems in sexual relations due to vitiligo (n = 21)	11	52.4	0	0.0	2	9.5	8	38.1	11	52.4	0	0.0	2	9.5	8	38.1	13	61.9	1	4.8	1	4.8	6	28.6	3.600

Fr: Friedman testp: p value for comparing between the three studied periods *: Statistically significant at p ≤ 0.0

Table (4): Total quality of life among studied vitiligo patients throughout the program phases (n = 55)

	Pre	Post	Follow up	p	
Average					
Min. – Max.	1.39 – 3.96	1.39 – 3.96	1.48 – 3.78	0.001*	
Mean ± SD.	2.93 ± 0.62	2.93 ± 0.62	2.67 ± 0.68		
% Score					
Min. – Max.	13.04 – 98.55	13.04 – 98.55	16.0 – 92.75		
Mean ± SD.	64.46 ± 20.82	64.46 ± 20.82	55.69 ± 22.77		

SD: Standard deviation F: F test (ANOVA) with repeated measures

p: p-value for comparing between the studied periods

*: Statistically significant at $p \leq 0.05$

Table (5): Correlation between patients' knowledge about vitiligo disease and their quality of life (n = 55)

Vitiligo patient's quality of life	Patients' knowledge		
	Pre	Post	Follow up
R	0.409*	0.166	0.445*
P	0.002*	0.225	0.001*

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

Table (6): Univariate and multivariate Linear regression analysis for the parameters affecting knowledge in post-phase (n=55) for Sociodemographic data.

Items	Univariate		#Multivariate	
	p	B (LL – UL 95% C.I)	P	B (LL – UL 95% C.I)
Age (≥ 50)	0.047*	-2.598 (-5.166 – -0.030)	0.007*	-3.179 (-5.449 – -0.908)
Sex (Female)	0.745	-1.061 (-7.565 – 5.443)		
Marital status (Married)	0.236	-3.873 (-10.350 – 2.605)		
Education (University)	0.001*	3.801 (1.664 – 5.938)	<0.001*	4.155 (2.128 – 6.181)
Occupational (Working)	0.940	-0.255 (-7.052 – 6.542)		
Residence (Rural)	0.292	-4.523 (-13.054 – 4.008)		

B: Unstandardized Coefficients

C.I: Confidence interval

LL: Lower limit

UL: Upper Limit

#: All variables with $p < 0.05$ was included in the multivariate

*: Statistically significant at $p \leq 0.05$

Table (7): Univariate and multivariate Linear regression analysis for the parameters affecting Quality of life in follow up phase (n = 55) for sociodemographic data & medical history.

Items	Univariate		#Multivariate	
	p	B (LL – UL 95%C.I)	p	B (LL – UL 95%C.I)
Sociodemographic data				
Age (≥ 50)	0.186	3.412 (-1.697 – 8.521)		
Sex (female)	0.450	4.789 (-7.829 – 17.406)		
Marital status (Married)	0.377	5.637(-7.061 – 18.335)		
Education (university)	0.013*	-5.629(-9.999–1.259)	0.049*	-4.415 (-8.808 – -0.021)
Occupational (working)	0.509	-4.370(-17.561–8.821)		
Residence (rural)	0.010*	20.887(5.104–36.671)	0.041*	16.664 (0.747 – 32.582)
Medical history				
side effects from the current treatment	0.253	-7.938(-21.721–5.845)		
Family history of vitiligo disease	0.932	0.538(-12.147–13.224)		
Side effects from previous treatment	0.915	-1.062(-20.996–18.872)		
Duration of suffering from vitiligo disease (More than 12 months)	0.382	-4.095(-13.415 – 5.224)		
Affected exposed body area:				
Face	0.399	-5.231 (-17.579 – 7.117)		
Hand	0.564	-3.639 (-16.199 – 8.921)		
Feet/foot	0.802	1.570 (-10.955–14.094)		
Vitiligo disease grows and spreads quickly	0.342	6.492 (-7.075 – 20.059)		

B: Unstandardized Coefficients

C.I: Confidence interval

LL: Lower limit

UL: Upper Limit

#: All variables with $p < 0.05$ was included in the multivariate

*: Statistically significant at $p \leq 0.05$

Discussion

Vitiligo's impact on quality of life (QoL) is significant, as it can lead to cosmetic disfigurement and social stigma, influenced by societal perceptions of the condition. Addressing knowledge gaps about vitiligo is crucial for better managing QoL. Therefore, this study aimed to explore the effects of an educational program on vitiligo patients' QoL. Findings revealed that most patients initially had poor knowledge about vitiligo in pre intervention phase, but showed significant improvement post-intervention, with continued enhancement in the follow-up phase. Similarly, the study identified poor QoL due to vitiligo in pre/post intervention phase, which improved over follow-up periods.

Specifically, knowledge in pre-intervention, findings highlighted inadequate knowledge among patients, with only a fraction correctly understanding vitiligo's definition and its potential causes such as immune disorders, sun exposure, or injuries. From the researcher's viewpoint, the

lack of accurate and accessible health education programs regarding vitiligo's nature, causes, treatment effectiveness, and duration may contribute to the unsatisfactory knowledge among patients. Furthermore, the reliance on the internet, where misinformation is prevalent, coupled with limited media coverage, particularly on television, may further exacerbate this knowledge gap.

Comparing findings with existing literature (Kotb, Abd El-Hameed & Sabry 2023), in Egypt and (Saeed 2020) in Saudi Arabia reported similar trends of inadequate knowledge among vitiligo patients. Conversely, studies by (El-Gilany, El-Ghobary, Fayed & Mahfouz 2020) in Egypt and (Topal, et al., 2016) in Turkey found higher proportions of patients with satisfactory knowledge about vitiligo, albeit attributing the causes differently. These disparities underscore the need for tailored and culturally sensitive educational interventions to address knowledge gaps effectively among vitiligo patients across diverse populations.

The study's examination of the implemented educational program's effect on vitiligo patients' knowledge revealed a statistically significant improvement in their total knowledge across pre-test, post-test, and follow-up assessments. Specifically, post-test results indicated that the majority of patients attained satisfactory knowledge levels regarding vitiligo disease, particularly in areas such as its definition, risk factors, types, causes, and essential nutrients to mitigate its spread. These findings strongly support the hypothesis that patients' knowledge of vitiligo would improve following the implementation of the educational program on health promotion.

From the researcher's perspective, this notable improvement can be attributed to the tailored nature of the educational program, designed to meet the specific needs of the studied patients and comprehensively cover all essential information for better understanding and acceptance of the disease in daily life. Additionally, the relatively young age demographic of the majority of the patients, ranging from 20 to 35 years, likely facilitated learning and knowledge enhancement. These observations align with similar findings from a study conducted in Egypt by (Abd El-Razik et al., 2020) which demonstrated a statistically significant difference in patients' knowledge levels before and after the implementation of nursing guidelines aimed at improving lifestyle patterns for vitiligo patients.

In the follow-up phase of the study, although total satisfactory knowledge continued to improve, there was a slight decrease compared to the immediate post-test phase. This decline may be attributed to potential forgetting over the three-month period between the two assessments, despite the utilization of videos, colored pictures, and distributed booklets during the educational program. This suggests a

need for program repetition every three to six months to reinforce knowledge retention among vitiligo patients. These findings contrast with study of (Khalil, Elgalad, Hanaa, Shereda and Behairy 2023), which found no statistically significant differences in overall knowledge before and after intervention among participants. However, the current study's results align with (Rachawong 2016) study in Thailand, which demonstrated significant improvements in total knowledge among vitiligo patients immediately after intervention and at follow-up assessments.

Concerning to QOL of studied patients, the findings of the present study explained that the majority of studied vitiligo patients were all-time in pre- post intervention phase, were feeling not wanting other to see their vitiligo sites, concerning about vitiligo spreading to other body parts, concerned about skin cancer due to vitiligo, anxious that vitiligo is permanent and worried that their children inherit vitiligo disease, difficulty keeping up with vitiligo therapy (spending too much time or money). The results also illustrated that more than two third of the studied vitiligo patients had at all-time difficulty with sun exposure or protection due to their vitiligo. And the majority had at all-time felling uncomfortable by question about vitiligo. In addition, the results also illustrated that more than half of studied patients at all-time had vitiligo effect on their vacation plan & had challenges at school or work due to vitiligo& had an impact on what they do on their free time and hobbies.

The researcher's explanation for the observed trends in the study may be multifaceted. Firstly, vitiligo's white patches decrease body beauty and appearance resulting in psychological and emotional stress, stemming from fears of its permanence and the stigma it engenders, likely influences patients' attitudes towards their condition. This is particularly poignant for female patients and those with exposed areas affected by vitiligo, who may experience heightened self-consciousness and negative emotions. Additionally, the time and financial burdens associated with vitiligo treatment, especially its slow progress and the need for long-term management, can further exacerbate patients' stress and apprehension. The difficulty in avoiding peak sun exposure hours, coupled with patients' avoidance of outdoor activities due to fear of exacerbating their condition, underscores the profound impact of vitiligo on patients' daily lives. Moreover, social challenges, such as difficulties in school or workplace environments and societal rejection, may contribute to patients' reluctance to openly discuss their condition or seek support. These factors collectively underscore the complex interplay between the physical, psychological, and social dimensions of living with vitiligo.

The study's findings reveal that in both pre- and post-intervention phases, slightly less than three-quarters of vitiligo patients had never used makeup to conceal their condition, reflecting a similar proportion who had never avoided physical contact with others. Moreover, over two-thirds of patients reported never feeling isolated, experiencing family issues, or feeling uneasy about sharing personal items due to vitiligo. From the researcher's perspective, these patterns may arise from the challenges inherent in managing vitiligo, where conventional methods like makeup or special clothing may prove ineffective, leading patients to forgo these options. Additionally, the lack of significant avoidance behaviors or feelings of isolation may suggest a supportive environment provided by partners, relatives, and families. Interestingly, half of the studied patients were single, indicating potential differences in support networks and coping mechanisms compared to those in relationships.

These findings align with (Khatab et al., 2021) study in Egypt, which similarly reported a high proportion of vitiligo patients not using makeup to conceal their condition. Additionally, they correspond with (Sampogna, et al., 2008). findings in Italy, where a significant portion of patients reported feelings of embarrassment and shame, reflecting the psychosocial impact of vitiligo. However, disparities exist with (Khatab et al., 2021) study, which documented occasional difficulties with sun exposure and challenges at school or work, suggesting contextual differences in experiences of vitiligo patients. Moreover, the current study's results contrast with (Topal et al., 2016) study in Turkey, where a majority of patients reported minimal impacts on school performance and social relationships, highlighting potential cultural variations in perceptions and experiences of vitiligo.

The examination of the implemented educational program's impact on vitiligo patients' quality of life (QOL) revealed statistically significant differences across various aspects. These included feelings of embarrassment, the use of specific clothing to conceal vitiligo, low self-esteem, feeling unwanted, discomfort when looking in the mirror, difficulties with sun exposure, disruptions to vacation plans and leisure activities, challenges in school or work environments, and discomfort with questions about their condition. These findings underscore the profound psychosocial impact of vitiligo on patients' daily lives and activities.

This aligns with (Saeed 2020) study in Saudi Arabia, which found that a significant proportion of vitiligo patients experienced a major effect on their lives due to the condition, with many feeling

strongly affected by societal perceptions. Similarly, (AlGhamdi 2010) study also highlighted the substantial impact of vitiligo on patients' lives and how it influenced others' perceptions of them. These findings collectively emphasize the importance of addressing the psychosocial aspects of vitiligo and providing support to patients to cope with its challenges and implications on their quality of life.

The results of the study further elucidate that a significant proportion of vitiligo patients experienced various challenges and concerns related to their condition. Many patients reported never feeling isolated due to vitiligo, having issues with their partners or family members, feeling uneasy about sharing personal items, and experiencing difficulties in sexual relations. Additionally, a majority of patients expressed ongoing concerns about the spread of vitiligo to other body parts, the risk of skin cancer, and the possibility of passing the condition on to their children. Furthermore, most patients struggled with the demands of vitiligo therapy, including the time and financial investments required.

These findings highlight the multifaceted impact of vitiligo on patients' lives, encompassing psychological distress, social challenges, and financial burdens. The persistent nature of these concerns suggests that addressing the psychosocial aspects of vitiligo requires long-term interventions that go beyond medical treatment alone. Indeed, as evidenced by similar studies such as the one conducted by (Abd El-Razik et al., 2020), implementing comprehensive guidelines and interventions can significantly impact patients' lifestyle patterns and psychological well-being. However, disparities in findings compared to other studies, such as that of (Khatab et al., 2021), underscore the complex and individualized nature of the experiences of vitiligo patients, necessitating tailored approaches to address their unique needs and challenges.

The current study echoes findings from various regions, indicating an improvement in the quality of life (QOL) among vitiligo patients' post-intervention. (Al-Shammari et al., 2021) in Saudi Arabia, (Abd El-Razik et al., 2020) in Egypt, and (Axmedovich, Hamza o'g'li O. J. & Latipov 2021) in Uzbekistan who observed a substantial decrease in QOL scores from 11.4 ± 2.07 to 2.03 ± 0.15 post-intervention, indicative of a better quality of life. Also, he described that there were statistically significant differences in comparison between before and after phases, they were revealed (11.4 ± 2.07 versus 2.03 ± 0.15) ($p < 0.05$). Furthermore, (Alkhutaba, 2023) in Jordan and (Lert and Fai, 2010) in Singapore reported significant improvements in QOL scores pre- and post-intervention, affirming the effectiveness of therapeutic interventions in mitigating the psychosocial impacts of vitiligo. These

studies collectively underscore the importance of interventions in enhancing the well-being of vitiligo patients globally.

The results indicated that there was a statistically significant positive correlation between knowledge of studied vitiligo patients and their quality of life in pre/post and follow up phases. This is similar to (Rachawong, 2016) at Thailand, who conducted a study in the name of "Interventions to improve knowledge and attitude toward vitiligo" as the data demonstrated that there is positive the relationship between knowledge and attitude revealed that sufficient knowledge tended to have more positive attitudes towards vitiligo pre-post intervention phase. This association was statistically significant ($p < 0.004$) also, the finding of current study was in the same context with study of (Zhang et al., 2023). in studying of "Disease Awareness and Treatment Preferences in Vitiligo patients: A Cross-sectional Study in China" which conducted in China. who revealed that insufficient knowledge was associated with a higher burden of disease and low QoL and as there was positive significant association between knowledge and QoL.

The regression analyses conducted on sociodemographic data in the post-phase study revealed significant associations between age, education, and knowledge levels among vitiligo patients. Age demonstrated a negative correlation with knowledge levels, indicating a decline in knowledge among older individuals. This finding suggests the importance of tailored interventions and cognitive support strategies to address the specific needs of aging populations. Conversely, education, particularly attainment at the university level, emerged as a strong predictor of higher knowledge levels. Higher education is known to expand cognitive capacities and foster lifelong learning, highlighting its role in enhancing knowledge acquisition and retention.

These results align with findings from (Zhang et al., 2023) in China, where age was negatively associated with vitiligo knowledge, and lower educational attainment was linked to insufficient knowledge about the condition. Additionally, the current findings resonate with studies such as (Salthouse 2019) in Virginia, which demonstrated a decline in cognitive abilities, including knowledge retention and acquisition, with advancing age. Similarly, (Ritchie and Tucker-Drob, 2018). in Texas found that education positively impacts intelligence, emphasizing the transformative role of education in enhancing cognitive abilities and knowledge acquisition.

In the evaluation of regression analysis during the follow-up phase, it was found that age did not significantly impact Quality of Life (QoL) among vitiligo patients aged fifteen or older. This suggests that age may not be a determining factor in QoL, indicating potential resilience or effective coping mechanisms among older individuals. This result contrasts with studies like (Radtke, Schäfer, Gajur, Langenbruch & Augustin, 2009) in Germany, which suggested that older age might correlate with lower QoL due to factors such as increased comorbidities or psychological stress.

Conversely, education level, particularly obtaining a university degree, showed a significant negative association with QoL. While this may seem unexpected given the socioeconomic advantages linked to higher education, it could stem from different perceptions of QoL among patients with higher education. These individuals may have higher expectations and greater dissatisfaction with their vitiligo state despite having access to more resources. Conversely, patients with lower education levels may experience frustration and depression due to a lack of information about the disease and poorer treatment outcomes.

Moreover, rural residence emerged as a statistically significant positive predictor of QoL. This could be attributed to the tighter-knit communities and reduced urban stress typically found in rural areas, fostering greater acceptance of vitiligo among rural populations. This finding is consistent with research by (Vallerand et al., 2021) in the United States, which noted that rural environments provide supportive communities and less urban stress, potentially enhancing QoL for individuals with vitiligo.

Regarding medical history factors, the duration of suffering from vitiligo for more than twelve months showed a significant negative impact on Quality of Life (QoL). This may be explained by the increasing burden on lifestyle, activities, income, and the heightened stressors faced by individuals with vitiligo over time. This result aligns with a study by Alkhateeb, Bennett, Thody, Fain, & Spritz (2003) in the UK, which indicated that longer disease duration can lead to heightened psychological distress and reduced QoL. This underscores the importance of early intervention and support mechanisms to mitigate the negative impact of vitiligo on patients' well-being. It's noteworthy that none of the other variables demonstrated statistically significant associations with QoL in the multivariate model, underscoring the complex interplay of factors influencing QoL and highlighting the need for multifaceted approaches in assessing and addressing QoL in individuals with vitiligo.

Conclusion

The findings of this study generally indicated that almost all of the study patients had unsatisfactory knowledge and impaired quality of life among vitiligo patients before educational program implementation. After the implementation of the health educational program, there were marked improvement in knowledge among studied patients immediately after educational program implementation. Also, there was a remarkable improvement in their knowledge and QoL with highly statistically significant differences between pre-post- and follow-up phases. Therefore, the implementation of educational program was successful in proving the hypothesis of the study in improvement of knowledge & QoL of the studied vitiligo patients.

Recommendation

Based on the study's findings, it is recommended to implement targeted community awareness campaigns through various media channels to educate the public about vitiligo, thereby promoting social acceptance and understanding. Additionally, ensuring access to psychological health professionals for vitiligo patients can provide crucial support for their psychological well-being. Continuous educational and supportive programs tailored to patients and their families are also essential for improving their quality of life. Moreover, training healthcare providers, particularly nursing staff, in the management of vitiligo and lifestyle interventions can further enhance patient care and outcomes.

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