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- **Basic Research**

## **Effect of Applying Roy's Adaptation Model on Quality of Life for Patients with Vitiligo**

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### **Abstract**

**Background:** Vitiligo is a widespread skin condition described by immune-mediated destruction of melanocytes, which has a negative impact on quality of life and increased patients' stigmatization. **Aim:** This study aimed to evaluate the effect of applying Roy's adaptation model on quality of life for patients with vitiligo. **Research design:** A quasi-experimental design was used. **Setting:** The study was conducted at Dermatology and Leprosy Clinics in Benha City, Egypt. **Sample:** A purposive sample included 146 vitiligo patients and equally separated into two groups (study 73 patients and control 73 patients). **Tools:** Three tools were used, **I:** An interviewing questionnaire consisted of three parts, patients' demographic characteristics, patients' past and present medical history and patients' knowledge regarding vitiligo. **II:** Dermatology life quality index questionnaire to assess quality of life for vitiligo patients. **III:** Roy's adaptation model to assess vitiligo patients' adaptive behavior. **Results:** The present study revealed that all studied patients complained of skin whitening, had affected face and were feeling embarrassed from society's view. There was a significant improvement in the total levels of study group's knowledge, quality of life and adaptive behavior post one and three months of Roy's adaptation model implementation compared with control group. Also, dermatology life quality score post Roy's Adaptation model implementation was best predicted among study group by age, marital status, total knowledge and total adaptive behavior respectively and among control group by marital status, occupation, monthly income, and total adaptive behavior respectively. **Conclusion:** Applying Roy's adaptation model effectively improved knowledge, quality of life and adaptive behavior among study group patients. **Recommendations:** Designing care program based on Roy's adaptation model to enhance vitiligo patients' quality of life and adaptive behavior.

**Key words:** Roy Adaptation Model, Quality of Life, Patients, Vitiligo.

## Introduction

Vitiligo is a skin condition causing an acquired pigmentation disorder in which melanocytes are destroyed. It is distinguished by white skin patches. The condition affects between 0.1 and 2% of people worldwide, regardless of ethnicity or gender. According to reports, the illness is more common in the second and third decade of life (**Tanacan & Atakan, 2020**). Numerous variables may contribute to the pathogenesis of vitiligo, which is still poorly understood. The acquired hypopigmentation that distinguishes vitiligo has a wide range of potential causes, including autoimmune and oxidative stress. It is generally known that oxidative stress plays a key role in the melanocyte degeneration that initiates vitiligo's etiopathogenesis (**Keraryi & Hakami, 2022**).

Vitiligo is caused by malfunctioning melanocytes that manufacture pigment and are then attacked by immune cells. This causes the pigment to deteriorate in the skin's affected parts. Understanding of the etiology of vitiligo has advanced significantly in recent years, and it is now clearly recognized as an autoimmune disease that is influenced by genetic and environmental variables in addition to problems in metabolism, oxidative stress, and cell detachment. It is thought that pernicious anemia and vitamin B12 deficiency are more common in vitiligo patients. Homocysteine levels are mostly influenced by vitamin B12 and folic acid, and a nutritional shortage in any of these two vitamins causes hyperhomocysteinemia (**Bae et al., 2020**).

Although vitiligo is not a life-threatening condition, it is a physical deformity that can cause individuals to experience a variety of psychological, social, occupational, and family issues because the lesions can appear at noticeable areas and may be accompanied by itching. As a result, individuals may experience symptoms of the disease daily and deal with a variety of issues, including stress from work, relationships, and marriage (**Bader et al., 2023**).

Management of vitiligo needs a recognition about the pathophysiology of the condition as well as reasonable expectations on the importance of long-term treatment. However, many patients believe that their medical care was ineffective or that medical professionals rejected their vitiligo as superficial or unimportant. Patients with vitiligo who have different disease characteristics must be understood in terms of their experiences. Additionally, it is important to comprehend the diagnosis, treatment, and disease burden of vitiligo from the viewpoints of patients and medical professionals, including collaborative decision-making (**Annette & Costa, 2020**).

The Quality of Life (QoL) of patients is significantly and permanently affected by vitiligo, despite the fact that it is frequently thought of as a cosmetic condition. Patient may experience a range of emotional and functional issues, including depression, which can negatively influence quality of life and have substantial psychosocial consequences, including stigmatization, distress, depression, anxiety, low self-esteem, social

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discrimination, and effects on sexual function. Vitiligo has diverse effects on QoL in patients with various clinical and demographic characteristics. In the majority of earlier research, women displayed more QoL impairment than males did, as did young patients in comparison to elderly patients, married women with vitiligo in comparison to singles, and patients with involvement on exposed sites in comparison to those on unexposed sites (**Chen et al., 2019**).

One of the nursing models developed for greater understanding of the concept of adaptation is Roy's Adaptation Model (RAM). Four components were offered based on Roy's adaptation model, including physiological mode, self-concept mode, role function mode, and interdependence mode. This model states that the nurse carefully and meticulously examines each patient through observation and interview, identifies any maladaptive behavior, and then creates exact educational care plans to correct those maladaptive behaviors (**Abdel-Mordy et al., 2021**).

Physiological mode is a reflection of the physiological activity of all the body's cells, tissues, organs, and systems. The self-concept mode is concerned with the person's self-perceptions, beliefs and feelings. Psychological perceptions, ideals, objectives, moral as well as body sensation and the capacity to communicate sensations, are also fundamental needs for maintaining psychological integrity. The role that one plays in society and the actions that go along with that role are both included in the role function mode. Relationships and interactions with other people, as well as the giving and receiving of love, respect, and worth, are all part of the interdependent mode (**Wang et al., 2020; Marzieh & Mitra, 2022**).

The Community Health Nurse (CHN) plays a crucial part in preserving self-worth, reducing depression, anxiety and stigmatization, enhancing general quality of life, and assisting with disease adaptation. CHN serves as an excellent resource for patient support, by allowing patients to express themselves and connect with others who have their condition. In addition, CHN instructs patients to avoid irritants, excessive temperature and humidity changes, other factors and also how to apply topical medications properly (**Nazar e al., 2022**)

#### **Significance of the study:**

Prevalence of vitiligo varies nationally and ranges from 0.5% to 2.0% worldwide. Vitiligo affects 1-2% of the Egyptian population. According to various research, the prevalence ranged from 3.3% to 10%. Men had a prevalence rate of 1%, while women had a rate of 2%. (**Ma et al., 2022; Fawzy et al., 2022**). According to a study conducted in Egypt at the Damanhur Teaching Hospital, vitiligo prevalence was 0.86%, and it was slightly more prevalent in rural areas as well as among females. Additionally, across-sectional research of 185 students from two primary schools in Zagazig City revealed that

the prevalence rate for vitiligo in Egypt rural parts was higher (3.6%) (Abdallah et al., 2020).

**Aim of the study:**

The study aimed to evaluate the effect of applying Roy's adaptation model on quality of life for patients with vitiligo.

**Research objectives**

- Assessing patients' knowledge regarding vitiligo.
- Assessing quality of life for patients with vitiligo.
- Assessing adaptive behavior for patients with vitiligo.
- Designing, implementing and evaluating the effect of Roy's adaptation model on knowledge and quality of life for patients with vitiligo.

**Research hypothesis**

Knowledge, quality of life and adaptive behavior for patients with vitiligo who will receive the Roy's adaptation model implementation will be improved than those who will not receive it.

**Subjects and method:****Research design:**

A Quasi- experimental design was used in this study (two groups; study and control - pre, post one and post three months test).

**Setting:**

The study was conducted at Dermatology and Leprosy Clinics in Benha City, Egypt. This setting is serving a large sector of Qalubeyia Governorate and the surrounding areas and provide treatment and care for patients with vitiligo.

**Sampling:**

**Sample type and criteria:** A Purposive sample was utilized which included 146 patients diagnosed with vitiligo and have the following inclusion criteria:

- Aged  $\geq 25$  years.
- Diagnosed with vitiligo for more than one year.
- Accepted to participate in the study.

The **exclusion** criteria included:

- Pregnant women
- Suffering from another chronic disease.
- Participating in another similar study.

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**Sample Size:** The equation of Stephen Thampsons (**Fearon et al., 2017**) was employed to calculate the sample size:

$$n = \frac{N \times p(1-p)}{((N-1) \times (d^2 \div z^2)) + p(1-p)} = 146$$

**N** = Population size = 1500 vitiligo patients during the year 2022.

**p** = Ratio provides a neutral property is equal to 0.12,

**d** = the error rate is equal to 0.0, and

**z** = Class standard responding to the level of significance equal to 1.96.

The sample size= 146 patients with vitiligo divided randomly into two groups (control and study groups). Each group equally comprised 73 patients, the study group received the RAM implementation, while the control group received the basic care.

### **Tools of data collection:**

Three tools were used for data collection.

**Tool (I): An interviewing questionnaire:** The researchers designed questionnaire after reviewing the related literature and written in simplified Arabic language and composed of three parts:

**Part I:** Studied patients' demographic data containing seven closed ended questions in form of multiple-choice type such as age, gender, marital status, educational level, occupation, residence and monthly income.

**Part II: A-** Past medical history of studied patients which included four questions about time since diagnosis (in years), age of disease onset, presence of family history and kinship degree.

**B-** Present medical history of studied patients including 4 questions about current complain, site of vitiligo, psychological problems and current treatment.

**Part III:** studied patients' knowledge regarding vitiligo which included (7) closed ended questions about meaning, risk factors, manifestations, diagnostic methods of vitiligo, treatment modalities, complications and obstacles facing vitiligo patients.

### **Scoring system**

Each correctly complete answer received a score (2), while correctly incomplete answer received a score (1) and "don't know" responses received a score (0). The total knowledge scores varied from 0 to 14 and were categorized as follows: good if the total score was greater than or equals 75% ( $\geq 11$  scores), average if it was 50 < 75% ( $7 < 11$  scores), and poor if it was less than 50% ( $< 7$  scores).

**Tool (II): Dermatology Life Quality Index (DLQI) questionnaire,** adopted from (**Basra et al., 2008**), modified by the researchers and used to assess quality of life for patients with

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dermatologic diseases, The DLQI questionnaire is self-explanatory and can be simply handed to the patient. DLQI questionnaire included 10 items related to patient's symptoms and feelings, daily activities, leisure, work, sexual difficulties, personal relationships and treatment. Such as (Itchy, store, painful or stinging skin, being embarrassed or self-conscious because of skin, skin interfered with going shopping or looking after home or garden, .... etc.)

### Scoring system

Each item has four answers based on four points Likert scale score., each answer scored from 0-3. In which,

- Very much = 3
- Alot = 2
- A little =1
- Not at all =0.

The DLQI is calculated by summing the score of each question resulting in a maximum of 30 and a minimum of 0. The higher the score, the more quality of life is impaired. The total score of DLQI can be interpreted as follows:

**0–1** means no effect at all

**2–5** means a small effect

**6–10** moderate effect

**11–20** large effect

**21–30** extremely large effect on patient's life quality.

**Tool (III): Roy's Adaptation Model:** It was adopted from (Roy, 2009) and consisted of four modes, each mode is composed of some questions to measure the extent of adaptation of vitiligo patients as follows

- A- **Physiological mode:** it was consisted of 32 questions related oxygenation, nutrition, elimination, caring of skin, activity and rest, protection of skin, senses, endocrine functions and fluids and electrolytes for patients with vitiligo.
- B- **Self-concept mode,** it included 8 questions to assess the studied patients coping abilities with daily difficulties after experiencing vitiligo such as self-esteem, problem-solving, and seeking social and financial support and self in relation with others.
- C- **Role function:** it was comprised of 6 items to measure the perceived difficulties in meeting roles after having vitiligo such as familial roles, work difficulties, having problem in getting married and having sexual problems because of skin disease.

**D- Role interdependence** included 6 questions regarding good relationships with the neighbors, interaction with the friends and relatives, restrictions toward social relations and isolation from people as a result from the disease.

### **Scoring system**

The answer was given a score based on three-point Likert scale as the following: (2) for Always, (1) for sometimes, and (0) for Never. The total score ranged from 0- 104 with the higher score indicated more adaptive behavior for vitiligo patients. The studied patients' adaptation can be classified as high if  $\geq 75\%$  (79-104 scores), moderate if  $50 < 75\%$  (52-78 score) and low if  $< 50\%$  ( $< 52$  score)

### **Validity of the content:**

Five specialists from the Community Health Nursing Department evaluated the tools' content regarding comprehensiveness, relevance, and appropriateness. The comments they provided focused on the scoring system, consistency, and tool structure. The experts considered the tools' content was valid and the requested modifications were made.

### **Reliability**

Reliability of knowledge questionnaire was determined using Cronbach's alpha coefficient which was **0.815**, dermatology life quality index questionnaire was **0.940** and Roy adaptation model **0.876**. This only proves that this tool is an instrument with good reliability.

### **Ethical considerations**

This study was approved by the Benha University Faculty of Nursing's Scientific Research Ethical Committee. Patients with vitiligo were individually notified about the goal of the study, to get their best cooperation, and to maintain confidentiality of the data. The studied patients were informed by the researchers that taking part in the study was completely voluntary and that all information provided was kept private. The studied patients also had the complete right to withdraw from the study at any time without a reason. This withdrawal would not have any effect on the quality of the patient's hospital care.

### **Pilot study**

It was conducted on 10% (14) of the vitiligo patients to evaluate the tools applicability and time required to complete the questionnaires. Repetitive or irrelevant questions were removed in order to make the needed modifications. Patients with vitiligo who were enrolled for the pilot study were involved in the total study sample.

### **Field work**

First, the researchers received official permission from the heads of the Dermatology and Leprosy Clinics in Benha City to carry out the study. After that, the researchers

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interviewed and greeted the research subjects. The study setting was visited by the researchers two days a week from 9 am to 12 pm (Saturday and Monday). Individualized patient interviews were conducted, on average 6–7 patients per week. Vitiligo patients were interviewed while they are waiting for receiving treatment or examination. The present study lasted for nine months, from the beginning of November 2022 to the end of July 2023. The Roy adaption model was applied for the study group through four essential phases: assessment, planning, implementation, and evaluation.

#### **A- Assessment phase:**

Throughout this phase, vitiligo patients were interviewed, permission to participate in the study was asked for, and the study's objectives were described. Then, each patient had a separate interview to assess their demographic characteristics, medical history, as well as knowledge concerning vitiligo. The Dermatology Life Quality Index (DLQI) was also employed by the researchers to evaluate the quality of life of the patients. The patient's ability to adapt to vitiligo was assessed using Roy's adaptation model to also identify behavioral adaptation level. For each patient, the interview took an average of 20 to 30 minutes to complete.

#### **B- Planning phase:**

The educational RAM was constructed taking into consideration the demands and needs mentioned by the patients during the assessment phase, as well as a review of relevant literature and the educational booklet which was presented in Arabic language and included pictures. Research objectives were developed by the researchers and sessions schedules were made. The number of sessions, their content, different teaching methods, and the media were also considered. Patients phone numbers were taken, telephone call schedules were performed in order to communicate with patients for follow up.

#### **C- Implementation phase:**

The RAM implementation was achieved at the previously specified setting. The model was implemented two days weekly. The educational model was provided in five sessions, each lasting 45 to 60 minutes and involving discussion, PowerPoint presentations, demonstration and instructional videos. The sample was separated into 10 groups, with 7-8 patients in each group. Each group received the same sessions. The sessions were given in a wide Hall in the second floor of previous setting. The educational booklet was given to patients at the **first session**, in which the researchers briefly explained the vitiligo condition, including its meaning, risk factors, manifestations, and diagnostic methods. In the **Second session**, the researchers discussed treatment modalities, complications, and obstacles that patients with vitiligo face. Additionally, the **third session's** content covered a description of the DLQI, including its importance, items, and how vitiligo affects quality of life. In the **fourth session**, patients received explanation about the RAM model,

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its meaning and benefits, model presentation, meaning of adaptation, and RAM physiological mode. The researchers covered self-concept, role function, and role interdependence modes in **the fifth session**. After each session, feedback about the previous session was done to ensure understanding and the objectives of the new topics were mentioned.

#### **D- Evaluation stage:**

Posttests were conducted for the control and study groups after one and three months of the Roy adaptation model's implementation via telephone calls or outpatient clinic visits in order to evaluate the Roy adaptation model's effect on the quality of life for vitiligo patients. Vitiligo patients were also telephoned weekly (one call) during follow up to make sure that the adaptive behaviors were followed.

#### **Statistical analysis:**

The SPSS software (version 25) was utilized for the data analysis. The mean, SD, and range were used to express numerical data. Frequency and percentage were utilized for presenting qualitative data. The nominal variables between the two groups were compared using chi-square tests. When the frequency count is less than 5 for more than 20% of the cells, Fisher's exact test was used as an alternative to the chi-square test for lower sample sizes. Independent t-tests were applied to compare the means of the two groups. To examine the correlation between numerical variables, the Pearson method was employed. For multivariate analyses using the dermatological life quality score as the dependent factor, linear regression was applied. It was recognized that a p-value of 0.05 or less was significant, and a p-value of < 0.001 was highly significant

#### **Results**

**Table (1)** shows that 38.4% of the study group and 31% of the control group lies in the age group of 30-<40 with mean age  $39.50 \pm 0.88$  and  $39.52 \pm 0.80$  years respectively. Additionally, 58.9% and 48% of both groups were males respectively, 39.7% and 35.6% of study and control group had high education respectively and 65.8% and 58.9% of both groups were working respectively.

**Table (2)** illustrated that 67.1% of the study group and 75.3% of control group diagnosed with the disease for 3 years or more with mean  $2.58 \pm 0.64$  and  $2.67 \pm 0.62$  years respectively. While 45.2% of both groups had the disease onset at age 30-< 40 years. Moreover, 20% and 21.9% of both groups had family history of vitiligo respectively and 70% and 87.5% of study and control group had second degree of kinship respectively.

**Table (3)** clarifies that all of the study and control groups were complaining of skin whitening and 76.7% and 71.2% of both groups complained of skin redness respectively. Regarding site of vitiligo and psychological problems, all of the study and control groups

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were affected by vitiligo in the face and feeling embarrassed by society's view respectively. Also, 94.5% and 91.8% of both groups received pharmacotherapy treatment.

**Table (4)** presents that there was no a statistically significant difference between the study and control groups regarding all items of knowledge about vitiligo pre Roy's adaptation model implementation ( $p>0.05$ ). While, a highly statistically significant difference was noticed between both groups regarding all items of knowledge post one and three months of Roy's adaptation model implementation ( $p \leq 0.001$ ).

**Figure (1)** shows that 13.7% of the study group had good total knowledge level pre Roy's adaptation model implementation and upgraded to 79.5% and 72.6% post one and three months of Roy's adaptation model implementation respectively. While, pre-Roy's adaptation model implementation 6.9% of control group had good total knowledge level and slightly elevated post one and three months of Roy's adaptation model implementation to 8.2% and 9.6 % respectively.

**Table (5)** explains that pre-Roy's adaptation model implementation, no statistically significant difference was found between study and control group in relation to dermatology life quality items ( $p>0.05$ ). While post one and three months of Roy's adaptation model implementation, highly statistically significant differences were observed between study and control groups concerning dermatology life quality items ( $p<0.001$ ). Also, there was highly statistically significant difference between study and control groups regarding total dermatology life quality post one and three months of Roy's adaptation model implementation ( $p<0.001$ )

**Figure (2)** reveals that pre Roy's adaptation model implementation, none of the study group had moderate effect on patients life, While post one and three months of Roy adaptation model implementation improved to 24.7% and 41.1% respectively. Additionally, none of the control group had moderate effect on patients' life compared with 8.2% and 5.5% post one and three months of Roy's adaptation model implementation respectively.

**Table (6)** shows that pre Roy's adaptation model implementation, no statistically significant difference was noticed ( $p>0.05$ ) between mean scores of study and control groups regarding Roy's adaptation model modes (physiological, self-concept, role function and role interdependence). While post one and three months of Roy's adaptation model implementation, highly statistically significant differences were present between mean scores of study and control groups concerning Roy's adaptation model modes (physiological, self-concept, role function and role interdependence) ( $p<0.001$ ). Also, there was highly statistically significant difference between study and control groups regarding total adaptive behavior post one and three months of Roy's adaptation model implementation ( $p<0.001$ ).

**Figure (3)** clarifies that 72.6% and 65.8% of the study group had high adaptive behavior post one and three months of Roy's adaptation model implementation respectively, in comparison with 12.3% pre Roy's adaptation model implementation. While, 8.2 % of control had had high adaptive behavior pre Roy's adaptation model implementation compared with 11% and 12.3% post one and three months of Roy's adaptation model implementation respectively.

**Table (7)** declares that a statistically significant positive correlation was noticed between study group's total adaptive behavior and total knowledge pre Roy's adaptation model implementation ( $p \leq 0.001$ ), post one and three months of Roy's Adaptation model implementation ( $p \leq 0.05$ ).

**Table (8):** Multivariate linear regression model in this table reveals that dermatology quality of life score post Roy's Adaptation model implementation among patients with vitiligo was best predicted among study group by age, marital status, total knowledge and adaptive behavior ( $p= 0.034^*$ ,  $<0.001^{**}$ ,  $<0.001^{**}$  and  $0.003^*$ , respectively), accounting for 81.8 % of the variance of dermatology quality of life score. As regards control group, it was best predicted by marital status, occupation, monthly income, and total adaptive behavior ( $p= <0.031^*$ ,  $<0.001^{**}$ ,  $0.001^{**}$ , and  $<0.001^{**}$ , respectively), accounting for 97.7 % of the variance of dermatology quality of life score.

**Table 1. Distribution of both studied groups according to their demographic characteristics, study group (n=73), and control group (n= 73).**

Patients' demographic data	Variables	Study group N=73		Control group N=73		X <sup>2</sup>	P value
		No.	%	No.	%		
Age (year)	25-<30	9	12.3	6	8.2	1.049	0.789 <sup>n.s</sup>
	30-<40	28	38.4	31	42.5		
	40 -<50	26	35.6	28	38.3		
	≥ 50	10	13.7	8	11.0		
	<b>Mean ± SD</b>	<b>39.50± 0.88</b>		<b>39.52± 0.80</b>		t= - 0.098	0.922 <sup>n.s</sup>
Gender	Male	43	58.9	48	65.8	0.729	F <sub>Ep</sub> 0.495 <sup>n.s</sup>
	Female	30	41.1	25	34.2		
Marital status	Single	8	11.0	11	15.1	3.126	0.373 <sup>n.s</sup>
	Married	47	64.4	52	71.2		
	Widowed	12	16.4	6	8.2		
	Divorced	6	8.2	4	5.5		
Educational level	Can't read and write	12	16.4	10	13.7	2.128	0.546 <sup>n.s</sup>
	Basic education	13	17.8	10	13.7		
	Secondary education	19	26.1	27	37.0		
	High education	29	39.7	26	35.6		
Occupation	Not Working	25	34.2	30	41.1	0.729	F <sub>Ep</sub> 0.495 <sup>n.s</sup>
	Working	48	65.8	43	58.9		
Residence	Urban	46	63.0	41	56.2	0.711	F <sub>Ep</sub> 0.500 <sup>n.s</sup>
	Rural	27	37.0	32	43.8		
Monthly income	Not enough	38	52.1	42	57.5	0.442	F <sub>Ep</sub> 0.618 <sup>n.s</sup>
	Enough	35	47.9	31	42.5		

(n.s) Not Significant (P&gt;0.05)

F<sub>Ep</sub>: p value for Fisher exact for chi square

**Table 2. Distribution of both studied groups according to their past medical history, study group (n=73), and control group (n= 73).**

Past medical history	Variables	Study group N=73		Control group N=73		X <sup>2</sup>	P value
		No.	%	No.	%		
Time since diagnosis (in years)	< 2 years	6	8.2	6	8.2	1.546	0.462 <sup>n.s</sup>
	2 years-< 3 years	18	24.7	12	16.4		
	3 years or more	49	67.1	55	75.3		
	<b>Mean ± SD</b>	<b>2.58± 0.64</b>		<b>2.67± 0.62</b>		t=-0.784	0.434 <sup>n.s</sup>
Age of disease onset	20-<30 years	13	17.8	18	24.7	1.045	FEp 0.593 <sup>n.s</sup>
	30-< 40years	33	45.2	31	42.5		
	≥ 40 years	27	37.0	24	32.9		
Presence of family history	Yes	20	27.4	16	21.9	0.590	0.565 <sup>n.s</sup>
	No	53	72.6	57	78.1		
If yes, the degree of kinship is	Second degree	14	70.0	14	87.5	1.575	0.257 <sup>n.s</sup>
	Third degree	6	30.0	2	12.5		

(n.s) Not significant (p &gt; 0.005) FEp: p value for Fisher exacts for chi square # not mutually conclusive

**Table 3. Distribution of both studied groups according to their current medical history, study group (n=73), and control group (n= 73).**

Current Medical history	Variables	Study group N=73		Control group N=73		X <sup>2</sup> test	P value
		No.	%	No.	%		
# Current complain	Skin whitening	73	100.0	73	100.0	7.711	0.462 <sup>n.s</sup>
	Skin redness	56	76.7	52	71.2		
	Sunburn	31	42.5	38	52.1		
	Itching	31	42.5	35	47.9		
	Skin inflammation	25	34.2	20	27.4		
# Site of vitiligo	Face	73	100.0	73	100.0	2.068	0.990 <sup>n.s</sup>
	Neck	53	72.6	51	69.9		
	The arms	41	56.2	43	58.9		
	The hands	53	72.6	49	67.1		
	The legs	26	35.6	24	32.9		
	Feet	25	34.2	30	41.1		
# Psychological problems	Loss of self-confidence	45	61.6	49	67.1	2.082	0.721 <sup>n.s</sup>
	Depression	31	42.5	31	42.5		
	Anxiety and stress	54	73.9	55	75.3		
	Feeling embarrassed by society's view	73	100.0	73	100.0		
# Current Treatment	Phototherapy	60	82.2	67	91.8	5.570	0.135 <sup>n.s</sup>
	Local therapy	55	75.3	61	83.6		
	Pharmacotherapy	69	94.5	67	91.8		

(n.s) Not significant (p &gt; 0.05)

# not mutually conclusive

**Table 4. Comparison of patients' knowledge about vitiligo pre, post one and three months of Roy's Adaptation model implementation, study group (n=73), and control group (n= 73).**

Knowledge items	Response	Study group (n=73)						Control group (n=73)						X <sup>2</sup> test P value (1)	X <sup>2</sup> test P value (2)	X <sup>2</sup> test P value (3)
		Pre Roy's Model		Post one month of Roy's model		Post three months of Roy's model		Pre Roy's Model		Post one month of Roy's model		Post three months of Roy's model				
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Meaning of vitiligo	Completely correct	2	2.7	55	75.3	43	58.9	1	1.4	4	5.5	5	6.8	0.970 FE 0.616 <sup>n.s</sup>	82.782 <0.001**	68.083 <0.001**
	Incompletely correct	25	34.2	17	23.3	30	41.1	30	41.1	32	43.8	30	41.1			
	Don't know	46	63.1	1	1.4	0	0.0	42	57.5	37	50.7	38	52.1			
Risk factors of vitiligo	Completely correct	1	1.4	67	91.8	57	78.1	2	2.7	7	9.6	6	8.2	0.697 FE 0.706 <sup>n.s</sup>	99.163 <0.001**	78.437 <0.001**
	Incompletely correct	21	28.8	4	5.5	13	17.8	24	32.9	26	35.6	26	35.6			
	Don't know	51	69.8	2	2.7	3	4.1	47	64.4	40	54.8	41	56.2			
Manifestations of vitiligo	Completely correct	4	5.5	55	75.4	47	64.4	1	1.4	3	4.1	4	5.5	2.877 FE 0.237 <sup>n.s</sup>	82.271 <0.001**	69.546 <0.001**
	Incompletely correct	24	32.9	15	20.5	24	32.9	31	42.4	33	45.2	31	42.4			
	Don't know	45	61.6	3	4.1	2	2.7	41	56.2	37	50.7	38	52.1			
Diagnostic methods of vitiligo	Completely correct	2	2.7	36	49.3	30	41.1	2	2.7	4	5.5	8	11.0	1.076 FE 0.584 <sup>n.s</sup>	59.941 <0.001**	47.350 <0.001**
	Incompletely correct	24	32.9	36	49.3	43	58.9	30	41.1	32	43.8	32	43.8			
	Don't know	47	64.4	1	1.4	0	0.0	41	56.2	37	50.7	33	45.2			
Treatment modalities of vitiligo	Completely correct	3	4.1	67	91.8	58	79.5	2	2.7	3	4.1	6	8.2	0.378 FE 0.828 <sup>n.s</sup>	113.284 <0.001**	79.767 <0.001**
	Incompletely correct	38	52.1	6	8.2	15	20.5	41	56.2	46	63.0	43	58.9			
	Don't know	32	43.8	0	0.0	0	0.0	30	41.1	24	32.9	24	32.9			
complications of vitiligo	Completely correct	1	1.4	61	83.6	52	71.2	3	4.1	3	4.1	4	5.5	1.132 FE 0.568 <sup>n.s</sup>	94.168 <0.001**	73.963 <0.001**
	Incompletely correct	32	43.8	9	12.3	18	24.7	33	45.2	41	56.2	32	43.8			
	Don't know	40	54.8	3	4.1	3	4.1	37	50.7	29	39.7	37	50.7			
Obstacles facing vitiligo patients	Completely correct	2	2.7	60	82.2	51	69.9	2	2.7	5	6.8	5	6.8	1.092 FE 0.579 <sup>n.s</sup>	84.469 <0.001**	64.699 <0.001**
	Incompletely correct	42	57.5	11	15.1	19	26.0	48	65.8	48	65.8	42	57.5			
	Don't know	29	39.8	2	2.7	3	4.1	23	31.5	20	13.4	26	35.7			

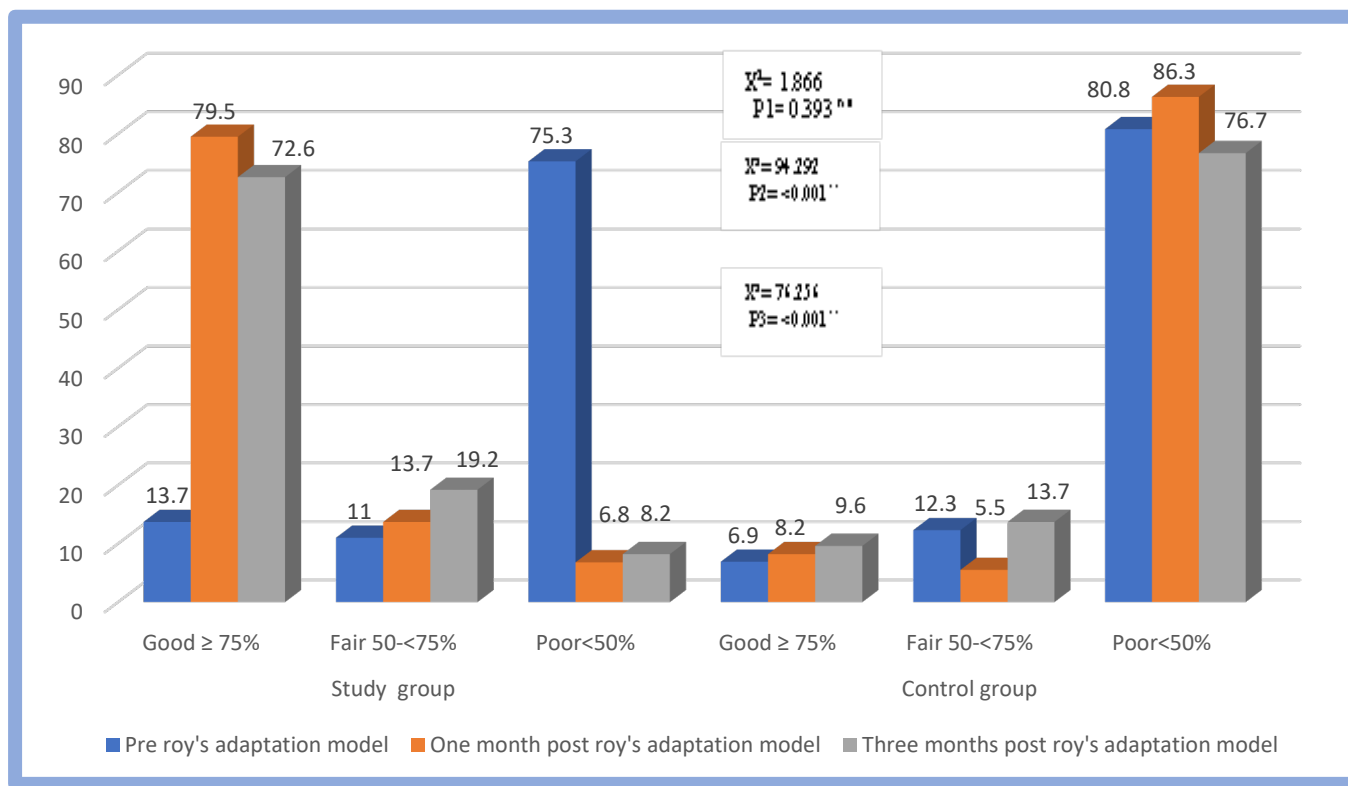
(FE) p value for Fisher exact for chi square

Not significant (p > 0.05)

\*\* Highly significant (p ≤ 0.001)

- (1) control group (pre Roy's Adaptation) vs study group (pre Roy's Adaptation)
- (2) control groups (post 1 month of Roy's Adaptation) vs study groups (post 1 month of Roy's Adaptation)
- (3) control groups (post 3 months of Roy's Adaptation) vs study groups (post 3 months of Roy's Adaptation)

**Figure (1): Comparison of patients' total knowledge level about vitiligo pre, post one and three months of Roy's Adaptation model implementation, study group (n=73), and control group (n= 73).**



Not significant ( $p > 0.05$ )

\*\* Highly significant ( $p \leq 0.00$ )

- (1) control group (pre Roy's Adaptation) vs study group (pre Roy's Adaptation)
- (2) control groups (post 1 month of Roy's Adaptation) vs study groups (post 1 month of Roy's Adaptation)
- (3) control groups (post 3 months of Roy's Adaptation) vs study groups (post 3 months of Roy's Adaptation)

**Table 5. Comparison of dermatology life quality among patients with vitiligo pre, post one and three months of Roy's Adaptation model implementation, study group (n=73), and control group (n= 73).**

Dermatology life quality	Study group (n=73)			Control group (n=73)			t- test P value (1)	t- test P value (2)	t- test P value (3)
	Pre Roy's Adaptation Model	post one month of Roy's Adaptation model	post 3 months of Roy's Adaptation model	Pre Roy's Adaptation Model	Post one month of Roy's Adaptation model	Post 3 months of Roy's Adaptation model			
	$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$			
Itchy, store, painful or stinging skin	2.55± 0.50	0.41± 0.49	0.49± 0.50	2.52± 0.50	2.59± 0.49	2.59± 0.49	0.330 0.742 <sup>n.s</sup>	-26.562 <0.001**	-25.354 <0.001**
Being embarrassed or self-conscious because of skin	2.12± 0.62	0.42± 0.49	0.42± 0.49	2.14± 0.61	2.08± 0.64	2.08± 0.64	-0.135 0.893 <sup>n.s</sup>	-17.465 <0.001**	-17.465 <0.001**
Skin interfered with going shopping or looking after home or garden	2.08± 0.39	0.49± 0.50	0.58± 0.49	2.16± 0.37	2.00± 0.58	1.92± 0.64	-1.284 0.201 <sup>n.s</sup>	-16.807 <0.001**	-14.145 <0.001**
The influence on the clothes that is worn	1.97± 0.76	0.41± 0.49	0.49± 0.50	2.01± 0.74	1.58± 0.96	1.66± 0.85	-0.331 0.741 <sup>n.s</sup>	-9.238 <0.001**	-10.041 <0.001**
The effect of skin on any social or leisure activities	1.86± 0.42	0.42± 0.49	0.51± 0.50	1.85± 0.39	1.75± 0.43	1.75± 0.43	0.203 0.840 <sup>n.s</sup>	-17.192 <0.001**	-16.024 <0.001**
Difficulty made by skin for doing any sport	1.95± 0.33	0.33± 0.47	0.49± 0.50	1.84± 0.36	1.59± 0.64	1.59± 0.64	1.680 0.095 <sup>n.s</sup>	-13.504 <0.001**	-11.477 <0.001**
Skin prevented from working or studying	1.52± 0.60	0.41± 0.49	0.49± 0.50	1.48± 0.50	1.33± 0.47	1.33± 0.47	0.447 0.656 <sup>n.s</sup>	-11.448 <0.001**	-10.336 <0.001**
Skin created problems with partner or any of close friends or relatives	1.45± 0.60	0.42± 0.49	0.42± 0.49	1.39± 0.49	1.42± 0.49	1.42± 0.49	0.602 0.548 <sup>n.s</sup>	-12.139 <0.001**	-12.139 <0.001**
Skin caused any sexual difficulties	1.77± 0.49	0.33± 0.47	0.49± 0.50	1.71± 0.46	1.59± 0.49	1.59± 0.49	0.702 0.484 <sup>n.s</sup>	-15.720 <0.001**	-13.257 <0.001**
A problem has the treatment for the skin been	2.01± 0.82	0.41± 0.49	0.49± 0.50	2.04± 0.79	1.99± 0.72	1.99± 0.72	-0.205 0.838 <sup>n.s</sup>	-15.448 <0.001**	-14.566 <0.001**
<b>Total</b>	19.29± 1.24	4.07± 1.94	4.89±2.30	19.16± 1.17	17.92± 2.18	17.91± 2.09	0.618 0.537 <sup>n.s</sup>	-40.581 <0.001**	-35.732 <0.001**

**Not significant (p > 0.05)****\*\* Highly significant (p ≤ 0.001)**

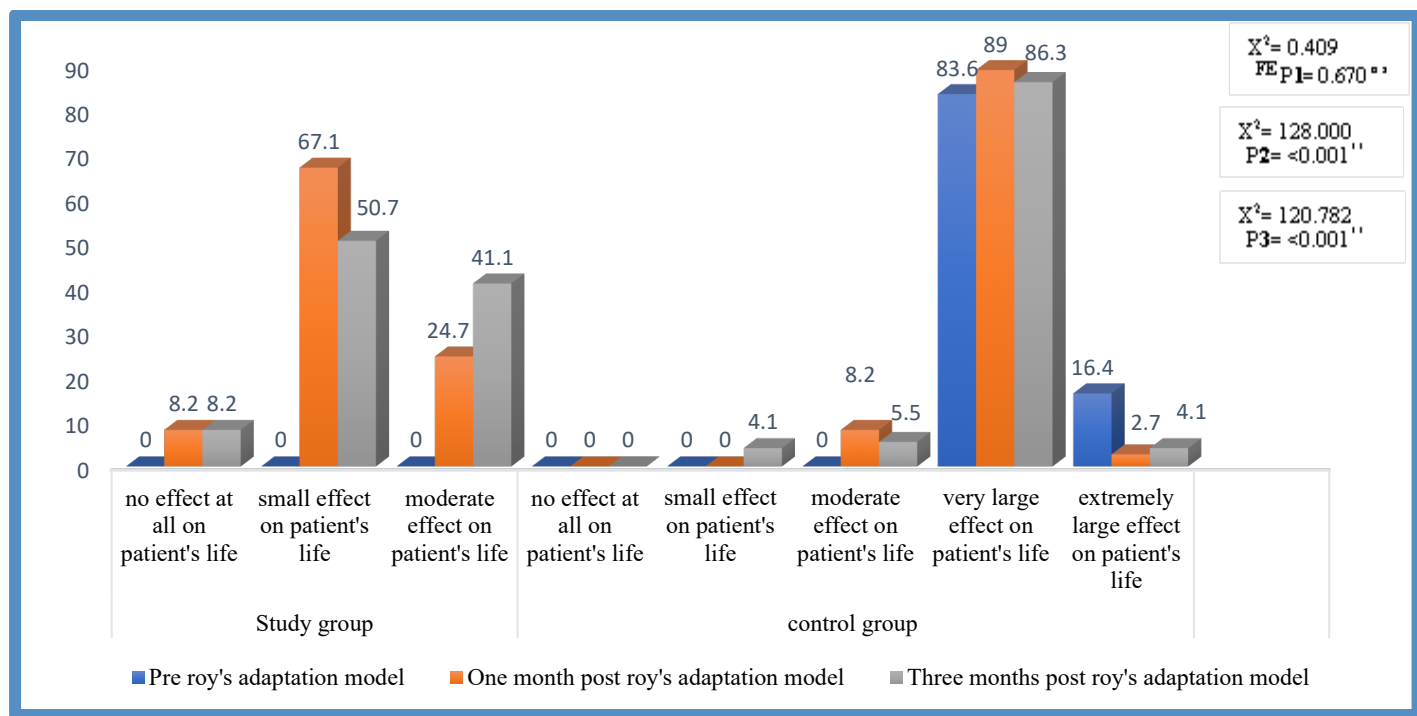
(1) control group (pre Roy's Adaptation) vs study group (pre Roy's Adaptation)

(2) control groups (post 1 month of Roy's Adaptation) vs study groups (post 1 month of Roy's Adaptation)

(3) control groups (post 3 months of Roy's Adaptation) vs study groups (post 3 months of Roy's Adaptation)



**Figure (3): Comparison of total levels of dermatology life quality among patients with vitiligo pre, post one and three months of Roy's Adaptation model implementation, study group (n=73), and control group (n= 73).**



- (1) control group (pre Roy's Adaptation) vs study group (pre Roy's Adaptation)
- (2) control groups (post 1 month of Roy's Adaptation) vs study groups (post 1 month of Roy's Adaptation)
- (3) control groups (post 3 months of Roy's Adaptation) vs study groups (post 3 months of Roy's Adaptation)

**Table 6. Comparison of adaptive behavior among patients with vitiligo pre, post one and three months of Roy's Adaptation model implementation, control group (n=73), and study group (n= 73).**

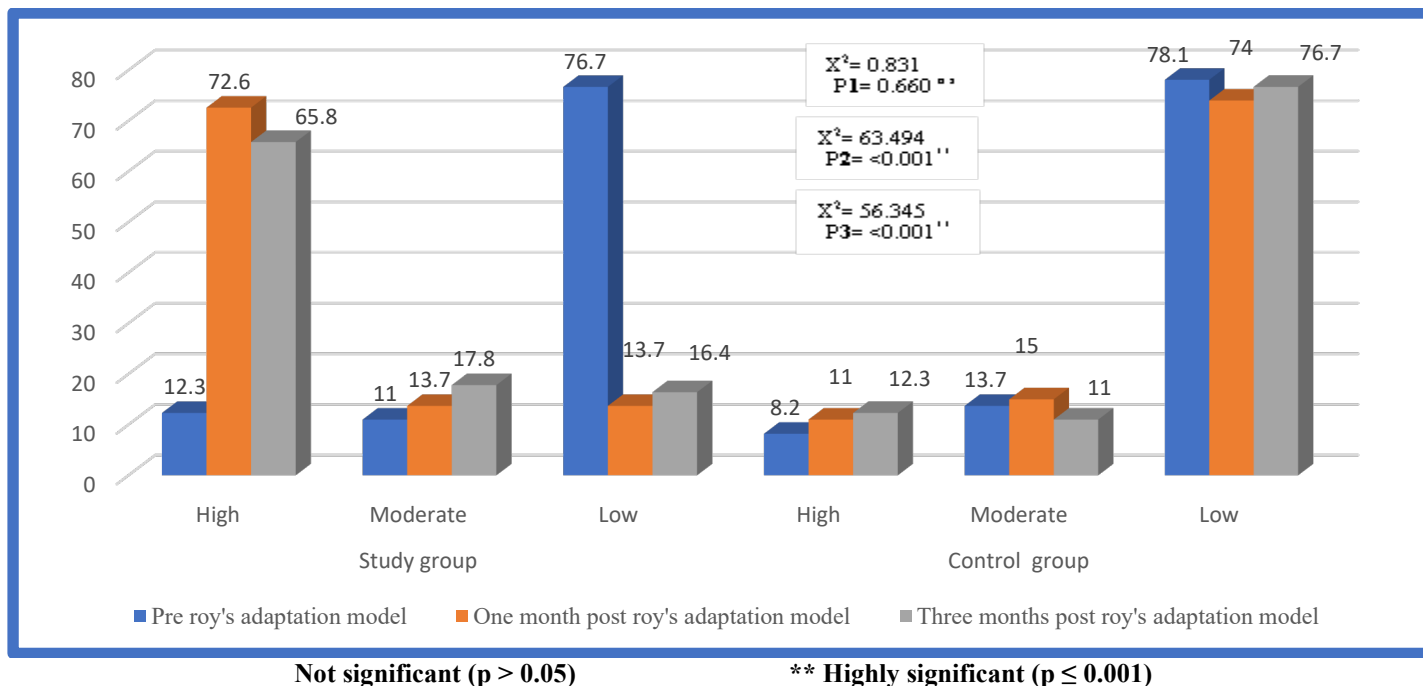
Modes of Roy adaptation	Study group (n=73)			% of mean post three months of Roy's model	Control group (n=73)			% of mean post three months of Roy's model	t- test P value (1)	t- test P value (2)	t- test P value (3)
	Pre Roy's Adaptation Model	post one month of Roy's Adaptation model	post three months of Roy's Adaptation model		Pre Roy's Adaptation Model	post one month of Roy's Adaptation model	post three months of Roy's Adaptation model				
	$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$		$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$				
Physiological mode	19.75± 6.76	64.37± 7.35	60.63± 6.02	79.8 %	19.57± 6.67	19.78± 6.78	20.12± 7.03	26.5 %	0.160 0.873 <sup>n.s</sup>	38.114 <0.001*	37.384 <0.001*
Self-concept mode	2.29± 1.24	9.63± 1.87	9.21± 1.85	76.8%	2.23± 1.23	2.26± 1.23	2.35± 1.28	19.6%	-0.268 0.789 <sup>n.s</sup>	28.119 <0.001*	26.035 <0.001*
Role function	1.84± 1.56	7.67± 0.62	6.73± 0.92	84.1%	1.73± 1.49	1.75± 1.52	1.86± 1.65	23.3%	-0.433 0.666 <sup>n.s</sup>	30.671 <0.001*	21.986 <0.001*
Role interdependence	1.81± 1.14	6.71± 1.67	5.95± 1.47	74.4%	1.66± 1.03	1.84± 1.18	1.93± 1.22	15.3%	-0.838 0.403 <sup>n.s</sup>	20.379 <0.001*	17.962 <0.001*
Total	25.37±8.87	88.38± 10.77	82.52± 9.49		25.51± 8.88	25.63± 9.09	26.27±9.61		0.618 0.537 <sup>n.s</sup>	-40.581 <0.001*	-35.732 <0.001*

*Not significant (p > 0.05)*

*\*\* Highly significant (p ≤ 0.001)*

- (1) control group (pre Roy's Adaptation) vs study group (pre Roy's Adaptation)
- (2) control groups (post 1 month of Roy's Adaptation) vs study groups (post 1 month of Roy's Adaptation)
- (3) control groups (post 3 months of Roy's Adaptation) vs study groups (post 3 months of Roy's Adaptation)

**Figure (4): Comparison of total adaptive behavior among patients with vitiligo pre, post one and three months of Roy's Adaptation model implementation, study group (n=73), and control group (n= 73).**



- (1) control group (pre Roy's Adaptation) vs study group (pre Roy's Adaptation)
- (2) control groups (post 1 month of Roy's Adaptation) vs study groups (post 1 month of Roy's Adaptation)
- (3) control groups (post 3 months of Roy's Adaptation) vs study groups (post 3 months of Roy's Adaptation)

**Table 7. Correlation coefficient between total knowledge, and adaptive behavior among patients with vitiligo pre, post one and three months of Roy's Adaptation model implementation, study group (n=73), and control group (n= 73).**

Total knowledge	Total adaptive behavior					
	Pre Roy's Adaptation model		Post one month of Roy's Adaptation model		Post three months of Roy's Adaptation model	
	R	P value	r	P value	r	P value
Study group	0.690	<0.001**	0.312	0.007*	0.295	0.011*
Control group	0.088	0.457 <sup>n.s</sup>	0.131	0.270 <sup>n.s</sup>	0.037	0.756 <sup>n.s</sup>

N.s Not Statistically significant  $p > 0.05$  \* Statistically significant  $p \leq 0.05$  \*\* Highly Statistically significant  $p \leq 0.001$

**Table 8. Multiple linear regression analysis for predictor variables of dermatology life quality among patients with vitiligo post three months of Roy's Adaptation model implementation, study (n=73), and control group (n=73).**

Dermatology life quality	Study group (n=73)					Control group (n=73)				
	Standardized Coefficients	Unstandardized Coefficients		T	Sig.	Standardized Coefficients	Unstandardized Coefficients		t	Sig.
		Beta	B				Std. Error	Beta		
(Constant)	8.855	3.023		2.930	.005	17.002	1.831		9.285	.000
Age	-1.058	.402	-.406	-2.631	.011*	.259	.370	.099	.701	.486
Marital status	1.493	.441	.487	3.383	.001**	-.402	.471	-.129	-.854	.396
Occupation	.037	.023	.571	1.590	.117	-.191	.545	-.045	-.351	.727
Monthly income	.348	.448	.101	.778	.439	.923	.558	.219	1.656	.103
Time since diagnosis	.014	.386	.007	.036	.972	.992	.452	.295	2.194	.032*
Family history	.275	.172	.591	1.595	.115	-2.009	.647	-.399	-3.106	.003*
Total knowledge	-3.508	.546	-.340	-6.429	<.001**	-.129	.086	-.161	-1.508	.136
Total adaptive behavior	.336	.164	-.251	-2.046	.045*	.038	.028	-.176	-1.371	.175
<b>Adjusted R<sup>2</sup>= 0.712 P = &lt;0.001**</b>						<b>Adjusted R<sup>2</sup>= 0.590 P = &lt;0.001**</b>				

(B) Beta Co-Efficient (SEB) Standard Error \* Statistically significant  $p \leq 0.05$  \*\* Highly Statistically significant  $p \leq 0.001$

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## Discussion

Skin diseases constitute a major public health issue that frequently affects social, psychological, and physiological aspects of health. Adjustment to these effects, particularly for individuals with skin diseases, is not entirely obvious. One of these diseases is vitiligo which has adverse effects on quality of life and increases stigmatization of those who suffer from it. The ability to comprehend the effects of diseases and enhance the standard of nursing care is now crucial in a more holistic approach to management. The Roy Adaptation Model is among the most effective conceptual frameworks for directing patient intervention. It focuses on how patients adjust to change and directs the delivery of patient interventions for enhancing adaptive responses in each mode (physiological, self-concept, interdependence, and role function) (Mohammed et al., 2022; Bibeau et al., 2023). So, the researchers carried out this study to evaluate the effect applying Roy's adaptation model on quality of life for patients with vitiligo.

Regarding studied patients' demographic characteristics, the present study showed that more than one third of the study group and more than two fifths of the control group lies in the age group of 30-<40 years with mean age  $39.50 \pm 0.88$  and  $39.52 \pm 0.80$  years respectively. Additionally, nearly more than half and less than two thirds of both groups were males respectively, more than one third of study and control groups had high education and more than half of the study and control groups were working. These findings were supported by **Sarma et al. (2020)**, who conducted a study in India about "A nationwide, multicentric case-control study on vitiligo to elicit the magnitude and correlates" and reported that the mean age of patients was  $30.12 \pm 17.97$  years and  $30.41 \pm 17.46$  years among cases and controls, respectively and the number of working participants in case and control groups were 165 and 163 respectively. These findings were incongruent with **Morales-Sánchez et al. (2017)**, who conducted the study in Mexico City on 150 patients with vitiligo about impact of vitiligo on quality of life and reported that of their study group more than two thirds were women (68.7%) and less than one third were men (31.3%).

Concerning past medical history of the studied patients, the existing study revealed that more than two thirds of the study group and nearly three quarters of the control group diagnosed with vitiligo disease for 3 years or more respectively. While less than half of both groups had the disease onset at age 30-< 40 years. Moreover, more than one quarter of the study group and more than one fifth of the control group had family history of vitiligo respectively. These results disagreed with **Weheda et al. (2021)**, who carried out a study in Egypt on 100 patients about quality of life of patients with vitiligo and found that less than half of their studied patients have disease from 12 months or more and less than three fifths (58%) of studied patients had no family history of developing vitiligo. In addition, these findings were not in accordance with **Sarma et al. (2020)**, who reported that in 46% of cases, the condition began before the age of 20. Family members in the first, second, and

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third degrees were impacted in 60.04%, 24.78%, and 15.18% of the cases, respectively. Also, mean age at onset were  $30.12 \pm 17.97$  years and  $25.14 \pm 7.48$  years of cases and control respectively.

Concerning the current medical history of studied patients, the current study demonstrated that all the study and control groups complained of skin whitening, had face affected and were feeling embarrassed from the society's view. Also, majority of study and most of control groups received pharmacotherapy treatment. These finding agreed with **Ezzedine et al. (2021)**, who performed a study on 168 patients titled psychosocial effects of vitiligo in USA and reported that all patients were affected by vitiligo in the face and in the greater body surface area involvement. Also, these results were disagreed with **Weheda et al. (2021)**, who found that 13% of patients receiving phototherapy treatment and 54% had feelings of embarrassment, 43% had low self-esteem and 51% were socially isolated. Furthermore, the above findings agreed with **Kanokrungrsee et al. (2021)**, who explained that vitiligo mainly affects the face in the area of innervation of the trigeminal nerve, following this in terms of frequency, the thoracic, cervical, lumbar and sacral innervated areas

As regards the studied patients' knowledge about vitiligo, this study showed that there was no statistically significant difference between the study and control groups regarding knowledge items of vitiligo pre Roy's adaptation model ( $p > 0.05$ ). However, a highly statistically significant difference was noticed between both groups regarding all items of knowledge post one and three months of Roy's adaptation model implementation ( $p \leq 0.001$ ). These findings were supported by **Abdel-Hady et al. (2020)**, who conducted a study entitled "Knowledge of patients, relatives and non-relatives and their attitude towards vitiligo" shows, that 88% of patients and their relatives have sufficient knowledge about vitiligo. This might be due to appropriate teaching methods and good learning material were used, and giving patients opportunity to ask questions. Furthermore, patients with vitiligo are more concerned with the disease, looking for its causes, triggering factors and treatment. Also, exposure to an affected person provides a better chance to know more about the disease.

Concerning studied patients' total knowledge level about vitiligo, the current study's findings showed that post one and three months of Roy's adaptation model implementation, nearly the majority of the study group and less than three quarters of control group had good total knowledge levels. While pre-Roy adaptation model implementation more than tenth of control group had good total knowledge level. These findings were supported by **Keraryi & Hakami (2022)**, who conducted a study about does the Saudi population have sufficient awareness of vitiligo and found that most of the respondents (83.7%) had an adequate knowledge level of vitiligo. Also, these findings study were supported by **Asati et al. (2016)**, who conducted a study about A hospital-based study on knowledge and attitude

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related to vitiligo among adults in India and reported that the overall knowledge score was good for 66.3% and poor for 33.7% of the participants. From the researchers' point of view, this result may be related to the positive effect of Roy adaptation model implementation on studied patients with vitiligo leading to the improvement of their knowledge

Concerning studied patients QoL, the result of the current study indicated that, pre-Roy adaptation model implementation, no statistically significant difference was found between study and control group in relation to dermatology life quality items ( $p>0.05$ ). While post one and three months of Roy adaptation model implementation, highly statistically significant differences were observed between study and control groups concerning dermatology life quality items ( $p<0.001$ ). Also, there was highly statistically significant difference between study and control groups regarding total dermatology life quality post one and three months of Roy adaptation model implementation ( $p<0.001$ ). These findings study was supported by **Chen et al. (2019)**, who completed a study on 884 respondents in China about "Quality of life of adult vitiligo patients using camouflage and found that a highly statistically significant differences among vitiligo patients were observed concerning dermatology life quality items ( $p<0.001$ ). In addition, these findings were reinforced by **Hooshmand & Shayan (2021)**, who conducted a study about "impact of vitiligo on quality of life of patient in Herat Afghanistan (n=170 patients) and reported that vitiligo has a moderate effect on patients' QoL in Herat Afghanistan. This might be due to after implementing Roy's adaptation model the patients' knowledge was upgraded and their adaptive behavior enhanced which in turn affected the patients different aspects of QOL.

Concerning total levels of patients' life quality, the existing study denoted that, pre Roy's adaptation model implementation, none of the study group had moderate effect on patients quality of life, while post one and three months of Roy adaptation model implementation less than one quarter and more than two fifths had moderate effect respectively. These findings were incongruent with **Bader et al. (2023)**, who studied psychosocial status and quality of life among vitiligo patients in phototherapy unit at Benha University Hospital, Egypt and found that more than half of their studied patients have severe impact of vitiligo on quality of life. While less than one-fifth of their studied patients have mild impact of vitiligo on quality of life. This result might be relevant to that to the patient's quality of life was influenced in different areas as symptoms, feelings, work, leisure relations and marriage and following implementation of RAM the patients QoL improved due to improvement in RAM modes of adaptation

Regarding studied patients' adaptive behaviors, post one and three months of Roy adaptation model implementation, highly statistically significant differences were present between mean scores of study and control groups concerning Roy adaptation model modes (physiological, self-concept, role function and role interdependence) ( $p<0.001$ ). These

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findings agreed with **Zhang et al. (2021)**, who studied psychosocial adaptation among people with chronic skin disease in India and stated that people with chronic skin disease had both positive and negative psychosocial adaptation. Positive psychosocial adaptation could replace negative adaptation, which would significantly lessen the impact of disease and enhance the quality of life for people with chronic skin disease, if healthcare professionals could intervene in a timely manner before or after the onset of a patient's negative psychosocial adaptation. This might be due to the physical and psychosocial health problems resulting from the disease reduce patients' ability to adapt to the disease and deal with others, so promoting adaptive behaviors based on the Roy model ensures, maintains, and promotes the health of individuals.

Regarding total adaptive behavior of studied patients, the present study revealed that less than three quarters and less than two thirds of the study group had high adaptive behavior post one and three months of Roy's adaptation model implementation respectively, in comparison with more than tenth pre Roy's adaptation model implementation. This might reflect the positive effect of the Roy's adaptation model implementation on improving adaptive behaviors among patients with vitiligo and in turn affected quality of life.

The present study declared that a statistically significant positive correlation was found between study group's total adaptive behavior and total knowledge pre Roy's adaptation model implementation ( $p \leq 0.001$ ), post one and three months of Roy's Adaptation model implementation ( $p \leq 0.05$ ). These findings were not consisted with **Bader et al. (2023)**, who reported that there was a statistically significant negative correlation between the patients' total self-esteem and their overall body image, social problems, and quality of life-related effects from vitiligo at ( $P= 0.000$ ). this might be attributed to the patients' education affect their adaptive behavior. As when the patients understanding increased about the disease, their ability to adapt with physical, psychological and social difficulties also increased.

Regarding linear regression analysis for predictors of life quality , the current study revealed that dermatology quality of life score was best predicted post Roy's Adaptation model implementation among study group by age, marital status, total knowledge and adaptive behavior ( $p= 0.034^*$ ,  $<0.001^{**}$ ,  $<0.001^{**}$  and  $0.003^*$ , respectively), and among control group, was best predicted by marital status, occupation, monthly income, and total adaptive behavior ( $p= <0.031^*$ ,  $<0.001^{**}$ ,  $0.001^{**}$ , and  $<0.001^{**}$ , respectively). These findings were consistent with **Neena et al. (2019)**, who stated that there was significant correlation between marital status and vitiligo quality of life as they found that single patients with vitiligo had a significantly higher impairment of quality of life than married ones. Additionally, these results disagreed with **Hooshmand & Shayan (2021)**, the DLQI score was significantly related to the age, type of disease, treatment history, and employment status. Compared to males', females' QoL was more impaired in feeling and

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type of clothing. Also, these findings were in congruent with **Bader et al. (2023)**, who reported that there were significant relations between body image, social problems and impact of vitiligo on quality of life. This might be due to vitiligo patients QoL affected by different factors as demographic characteristics especially age and marital status and knowledge which increase understanding about the disease and adaptive behavior, all these factors help vitiligo patients to live with a good quality of life.

### **Conclusion**

Based on the findings of the current study and research hypothesis, Roy's adaptation model application was successful in enhancing the knowledge, quality of life, and adaptive behavior of the study group patients with vitiligo. Therefore, the hypothesis and study aim were fulfilled.

### **Recommendations:**

Based on the result of the current study, the following are recommended:

- Designing care program based on Roy's adaptation model to enhance vitiligo patients' quality of life and adaptive behavior.
- Providing an educational booklet to all Dermatology outpatient clinics at Benha City to be accessible for all patients with vitiligo.
- Replication of the study needed to be carried out in various settings using a larger sample size to generalize results.

### **Acknowledgments**

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## المخلص العربي

### تأثير تطبيق نموذج روي للتكيف علي جودة الحياة لمرضى البهاق

**الخلفية:** البهاق هو حالة جلدية منتشرة على نطاق واسع توصف بالتدمير المناعي للخلايا الصبغية، مما يؤثر سلبيًا على نوعية حياة المرضى ويزيد من وصم المصابين بالمرض.

**الهدف:** تهدف الدراسة إلى تقييم تأثير تطبيق نموذج روي للتكيف علي جودة الحياة لمرضى البهاق.

**تصميم البحث:** تم استخدام تصميم شبه تجريبي لإجراء الدراسة.

**مكان الدراسة:** أجريت الدراسة في عيادات الجلدية والجذام في مدينة بنها، مصر.

**العينة:** تم اختيار عينة غرضية 146 مريض مقسمين إلى مجموعتين متساويتين، مجموعة الدراسة ومجموعة المراقبة.

**الأدوات:** تم استخدام ثلاث أدوات، (1): استبيان المقابلة يتكون من ثلاثة أجزاء، الخصائص الديموغرافية للمرضى، والتاريخ الطبي السابق والحالي للمريض ومعلومات المرضى تجاه البهاق. (2): استبيان جودة الحياة للأمراض الجلدية. (3): نموذج روي للتكيف لتقييم السلوك التكيفي لمرضى البهاق.

**النتائج:** كشفت الدراسة الحالية أن جميع المرضى الذين شملتهم الدراسة اشتكوا من ابيضاض الجلد وتأثر الوجه وكانوا يشعرون بالحرج من نظرة المجتمع ووجد تحسن كبير في المستويات الإجمالية للمعلومات وجودة الحياة والسلوك التكيفي لمجموعة الدراسة بعد شهر وثلاثة أشهر من تطبيق نموذج روي للتكيف مقارنة بالمجموعة الضابطة. أيضًا، كان أفضل احتمال للعوامل التي تؤثر على نتائج جودة الحياة في الأمراض الجلدية بعد تطبيق نموذج روي للتكيف بين مجموعة الدراسة هو العمر والحالة الاجتماعية والمعلومات والسلوك التكيفي الإجمالي (قيمة الاحتمال =  $0.034^*$ ،  $>0.001^{**}$ ،  $>0.001^{**}$  و  $0.003^*$ ) على التوالي وكان أفضل توقع بين المجموعة الضابطة من خلال الحالة الاجتماعية والوظيفة والدخل الشهري وإجمالي السلوك التكيفي ( $p = <0.031^*$ ،  $<0.001^{**}$ ، و  $>0.001^{**}$ ) على التوالي

**الخلاصة:** أدى تطبيق نموذج روي للتكيف إلى تحسين معلومات وجودة الحياة والسلوك التكيفي لدى مرضى مجموعة الدراسة بشكل فعال.

**التوصيات:** تصميم برنامج رعاية يعتمد على نموذج روي للتكيف لتحسين جودة حياة مرضى البهاق وسلوكهم التكيفي.