



Effect of Adaptation Model Application on Adolescent Students' Self-Concept and Promoted Health Behavior during Puberty

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ABSTRACT

Adolescence is a crucial time of physical and psychological changes in which young people begin to establish social and unique identities. The research aimed to evaluate the impact of the adaptation model on adolescent students' self-concept and promote health behavior during puberty. This research was conducted as quasi-experimental design done at secondary nursing school in teaching hospital at Benha city. A convenient sample of 113 adolescent students was included in this research. Four data collection tools were utilized, including a structured interviewing questionnaire, Adolescents' Self-concept Short Scale, Puberty health behavior questionnaire, and Roy's Adaptation Model construct scale. Results of this research revealed that there was a highly statistically significant difference in all items of studied adolescent students' self-concept and healthy behaviors during puberty before and after four months of adaptation model application ($p \leq 0.001$). This research concluded that application of Roy's Adaptation Model was effective in improving self-concept and enhancing promoted healthy behavior among adolescent students during puberty. This research proposes to benefit from the positive impact of this model as a guide for advancing care training programs to face challenges of adaptation in this period.

Key-words: *Adaptation model, Adolescent students, Health behavior, Puberty, Self-concept,*

Introduction

Adolescence is a crucial period in a girl's life, marked by physical, behavioral, cognitive, emotional, and social developmental changes. Adolescence is characterized by rapid physical growth, body composition, metabolic changes, brain development, psychological and sexual maturation, and social roles (Péter, 2023).

Puberty in girls involves physical changes such as weight gain, height increase, pubic hair development, hip widening, and menstrual onset. Psychologically, girls undergo significant self-image, attitude, and relationships changes, and sudden social,

academic, and environmental influences can occur (Saadah, et al., 2022). But when the adolescent experiences disabilities in addition to pubertal changes, these difficulties are exacerbated (Aghaee-Chaghooshi, et al., 2023).

Adolescent girls may have a smooth pubertal stage and acquire a positive attitude towards sex, marriage, parenthood, and family if girls can accept changes in body functioning and other aspects of puberty development. Therefore, adolescent girls require an explanation of the universally occurring puberty process and the changes that can be anticipated (Methun, et al., 2022).

Self-concept, which embodies an individual's thoughts, feelings, and beliefs, is one of the most important and potent

regulators of puberty development (*Mathiyalagan Martin and Maheswari, 2022*). The idea of "I" is a complicated personal framework whose growth is extremely delicate, particularly during adolescence. The non-evaluative and non-judgmental aspects of mindfulness are believed to support self-acceptance in terms of one's self-concept (*Clevinger et al., 2020*).

Self-concept is a hierarchical concept shaped by beliefs, influenced by others, situations, and cultures. Undeveloped self-concept can lead to risk factors in teenagers' lives, affecting future actions (*Palenzuela-Luise et al., 2022*).

Self-concept significantly influences adolescents' lifestyle and health habits, necessitating assessment of habits for better health management and modification of harmful attitudes to prevent harmful habits (*Dempsey et al., 2023*).

Health promotion involves theories and practices promoting better living and health conditions, but teenagers with inadequate health literacy often have poorer health status (*Karimi, et al., 2019*).

Teenagers usually lack the space or chance to inquire about puberty-related changes or seek information, despite the health demands associated with this stage of life (*Peng et al., 2022*). Adolescents often struggle with self-esteem due to lack of information, uncertainty about sexual and physical development, and body image dissatisfaction, which can lead to depressive symptoms, increased body mass index, and unhealthy eating habits (*Tort-Nasarre et al., 2023*). Therefore, teens must comprehend these significant adjustments and possess the coping mechanisms necessary to get through this crucial time (*Ochi and Dwivedi, 2023*).

A nursing intervention that supports teenage girls in adjusting to puberty, choosing a course of treatment, and tracking results can be organized using a variety of methods. To get the programme started on the correct track and in the proper direction, the first stage in the educational planning process is selecting a health education model (*Eghbal et al.,*

2023). In line with this idea, an adaptation model was developed to evaluate girls' puberty adaptation, maintain adaptive behaviors, and identify stimuli that may stimulate non-adaptive ones. (*Turan Miral and Hotun Sahin, 2022*).

One of the most important pedagogical models in health education is the ROY adaptation model. This approach suggests that an individual's motivation and choice to adopt healthy practices may progress. (*Barkhordari-Sharifabad et al., 2020*). Educational programs on self-concept and health behaviors can positively influence adolescents' risk behavior, increasing knowledge and awareness in the field through supervisory meetings and programs (*Lichner, et al., 2021*).

Nurses assist clients and families in developing care management plans, focusing on adolescents' self-concept to optimize quality of life. By applying Roy's adaptation concepts and theories, nursing care is more effective (*Bang, et al., 2022*).

Significance of the research:

1.3 billion adolescents worldwide make up 16% of the population aged 10-19, with Egypt's young population rapidly growing (*UNICEF, 2023*). Around 17 million adolescents aged 10-19 make up 19% of the total population, while 9 million youth aged 20-24 make up almost one-third of the Egyptian population (*Central Agency for Public Mobilization and Statistics, CAPMAS 2019*).

Adolescents have varying self-concepts, reflecting overall self-worth. Educational training should focus on developing knowledge, attitudes, values, and skills for a healthy life, raising self-esteem, resisting peer pressure, and increasing health-seeking behavior, thereby promoting a healthy lifestyle (*Yao, et al., 2022*).

Aim of the research

The research aimed to evaluate the effect of adaptation model application on adolescent students' self-concept and promoted health behavior during puberty.

Research hypotheses:

H1- Adolescent students will exhibit better self-concept after application of adaptation model than before.

H1- Adolescent students will show better promoted health behavior after application of adaptation model than before.

Conceptual definitions:

Roy's adaptation model: is a model that shows how an individual reacts and responds to environmental stimuli (*Roussia et al., 2023*).

Self-concept: is the consciousness or understanding of oneself, which encompasses one's worldview, level of life satisfaction, capacity for self-appreciation or self-harm, capacity to assess one's own skills, and impressions of oneself (*Ismail et al., 2022*)

Promoted health behaviors: are a self-directed behaviors intended to preserve and enhance an individual's health and welfare and that are complimentary components of healthy lifestyles (*Gurusamy et al., 2022*).

Puberty: is a series of physical changes that last until girl reaches adulthood. These changes allow the adolescent body to become mature and ready for sexual reproduction. Puberty begins at the age of 10-11 years, and it lasts until 15 or 17 years old (*Yao et al., 2022*).

2. Subjects and method:**2.1. Research Design**

Pre- and posttest designs of a quasi-experimental design (An empirical interventional study without randomization that aims to ascertain the causal impact of an intervention on the target population is called a quasi-experiment (*Iowa State University of Science and Technology, 2020*) were used to achieve the study's aim.

2.2. Setting

The study was carried out at a secondary nursing school in Benha City that is connected to the general authority of educational hospitals and institutes. It composed of three classes, two laboratories for computer training, two laboratories for clinical training, library room, special room for

changing students' clothes and office of manager.

2.3. Sampling

A convenient sample of 113 adolescent students (all adolescent students in the three grades of secondary nursing school for the academic year 2022/2023).

2.4 Tools of Data Collection

Four tools were used for collecting data:

2.4.1. First tool: - A Structured Interviewing Questionnaire

The researchers created it after reading relevant literature. It consisted of three main parts:

First part: Personnel data of the studied adolescent students which included age, grade level, residence, parents' educational level.

Second part: Menstrual history of the studied students which included age of menarche, regularity, interval, amount and duration of menstruation.

Third part: Knowledge of the studied adolescent students regarding puberty. The researchers created it after looking through relevant literature. (*Eghbal et al., 2023, Coast & Strong ., 2019*) to assess adolescent students' knowledge regarding puberty. It was consisted of 10 items (definition of puberty, age of appearance of pubertal signs, early puberty symptoms in girls, later puberty symptoms, hormonal changes of puberty, psychological changes, emotional changes during puberty, premenstrual syndrome symptoms, types of puberty and factors affecting onset of puberty). Additionally, adolescent students were asked about source of information regarding puberty.

Scoring system:

Response	Score	Knowledge level	Total knowledge score
Completely correct	2	Good	75% to 100%. (15-20)degree
Incompletely correct	1	Average	50% to less than 75 % (10-15 degree)
Unknown	0	Poor	Less than 50%. (<10degree)

2.4.2. Second tool: Adolescents' Self-concept Short Scale:

It was adapted from (Veiga & Leite, 2016) and was concerned with self-concept of studied adolescent students regarding puberty development. The total items of this scale are 30 items divided into six dimensions (anxiety, physical appearance, behavior, popularity, happiness and intellectual status). Each dimension contains 5 items

Scoring system:

Response for items (2, 5, 6, 8, 12,14,17,18 ,23,24,26)	Response for the remaining items (Inverse items)	Score	Total self - concept type	Total self - concept score
Total agreement	Total disagreement	6	Good	75% to 100%. (135-180) degree
Agreement	Disagreement	5		
More agreement than disagreement	More disagreement than agreement	4	Fair	50% to less than 75 % (90-135 degree)
More disagreement than agreement	More agreement than disagreement	3		
Disagreement	Agreement	2	Poor	Less than 50%. (<90 degree)
Total disagreement	Total agreement	1		

2.4.3. Third Tool: Puberty health behavior questionnaire:

The tool was designed by the researchers after reviewing related literature (Sundgot-Borgen, 2020, Alimohammadi, 2018) to assess promoted health behavior of adolescent girls regarding puberty, which was assessed using a three-point rating system (always, sometime and never) which encompassed of 25 items regarding puberty development divided into five dimensions including (personnel hygiene, dealing with internal clothes, healthy behavior regarding acne and other promoted behavior)

Scoring system:-

Answer	Score	Puberty health behavior level	Total puberty health behavior score
Always	3	Good	75% to 100%.
Sometimes	2	Moderate	50% to less than 75 %
Never	1	Bad	Less than 50%.

2.4.4. Fourth Tool: - Roy's Adaptation Model Construct Scale (RAMS):

This tool was adapted from (Roy and Andrews, 2009). The RAM construct scale was used to investigate the adaptation level of students. RAM containing 30 items in four adaptive modes. The physiological mode (6items), self-concept mode (9 items), role function mode (6 items) and the interdependence mode (9 items).

Scoring system:

Response	Score	Adaptation level	Total adaptation score
Strongly agree	3	Highly adaptive	75% to 100% .
Neither agree nor disagree	2	Moderately adaptive	60% to less than 75 %
Strongly disagree	1	Slightly adaptive	Less than 60%.

2.5. Method

The following steps were followed when conducting the research:

2.5.1 Administrative Approval

A written letter was obtained from the Faculty of nursing Dean, then directed to secondary nursing school director. The Benha University Faculty of Nursing Ethical Committee approved the conduct of this study. After outlining the goal of the study, the directors of the previously mentioned settings formally granted permission to carry it out. Every woman participating in the study was asked for her agreement at the time of data collection, following appropriate explanation.

2.5.2. Validity

Three expertise in the nursing fields assessed the content validity of tool by reviewing the tool. The panel's recommendations were implemented into the tools for clarity of sentences, consistency of content, relevance, simplicity and applicability of the tools. Changes were made in response to insightful feedback, such as changing some terms to indicate the most appropriate meaning for unclear items.

2.5.3. Reliability

The reliability of the tools was performed to confirm its internal consistency. The Cronbach's alpha coefficient for the tool I (Adolescent girl's knowledge assessment sheet) was 0.85 and tool II (Adolescents' Self-concept Short Scale) was 0.91 and for the tool III (Puberty health behavior) was 0.79 and for Roy's Adaptation Model Construct Scale was 0.89. (Vaske, et al., 2017).

2.5.4. Ethical considerations

The Scientific Research Ethics Committee of the Faculty of Nursing at Benha University granted permission to carry out this study in order to fulfill its objectives. The research aim was clarified to each adolescent student before applying the tools. Each adolescent student was informed about time throughout the research. Adolescent students gave their oral consent to participate in the study and to withdraw at any time. The research tools were ensured that there was no harm for participant during data collection and didn't touch participant's dignity, religious and cultural aspects. The research didn't have any physical, psychological or social risk to the participants. The tools respect human rights and didn't include any immoral statements.

2.5.5. A Pilot study

A pilot study was conducted with 12 adolescent students, representing 10% of the total sample, to evaluate the tools' applicability, clarity, and content validity as well as the amount of time required for data collection. Based on the data analysis results, no changes were made, so the study sample consisted of the adolescent students who participated in the pilot study.

2.5.6. Field Work

The study started from the beginning of January 2023 to the end of September 2023

covering period of nine months. The researcher visited the pre mentioned setting from 12 pm to 2 pm 3 days per week (Sunday, Tuesday and Thursday).

In order to prepare the necessary tools for data collection, the researchers read local and international literatures about the various aspects of the research problem. Three experts in the field were then given these tools to test their appropriateness, clarity, and applicability, this helped the researchers understand the magnitude of the problem.

Assessment phase:

This phase aimed at collecting baseline adolescent students' data to determine educational needs. The researchers attended the study setting, introduced themselves, welcomed each student, and then stated the importance and aim of this research, scheduled visits, and frequency of sessions to participated students to assure adherence to interventions. The researchers then took the student's participation consent.

The researcher distributed (tool No. I) to students to assess personnel data, menstrual history and students' knowledge regarding puberty (pretest). Then Adolescents' Self-concept Short Scale and puberty health behavior questionnaire were distributed (tool No. II & III). Each sheet took an average time of 10 to 20 minutes to be answered.

Implementation phase:

In order to encourage more adaptive health behavior in the adolescent students, improve communication between the researchers and the students, and expand the possibility of social supports for the development of adaptive behaviors, Roy's Adaptation model (RAM) was implemented. Six steps were involved in using Roy's Adaptation Models:

1-Evaluation of the four adaptive modes' effects on the behaviors of the adolescent students.

The first step involved assessing the adolescent student's maladaptive behaviors in relation to four modes of adaptation using the Roy's Adaptation Model Scale (RAM) (Tool-IV). (as an example, reducing the adolescent's

ability to accept puberty changes as a maladaptive behavior in *Physiologic mode*, inability to recognize the importance of looking presentable and positive in *self - concept mode*, inability to perform well when working in groups in *role function mode*, inability to develop relationships with people and friends in *interdependence mode*).

2- *Categorizing the stimuli as contextual, focal or residual after evaluating:*

In the second step, the stimuli of students' maladaptation behavior were identified and classified into (focal, contextual and residual stimuli). The stimuli that most directly challenge the human adaptive system during puberty are known as focal stimuli (e.g., changes in body composition related to puberty development); All other stimuli that have an impact on the focal stimuli are considered contextual stimuli (menstrual pain, for instance); residual stimuli are outside elements that have an unknown impact on the current circumstance (such as the notion and belief that a woman shouldn't take a shower while she is menstruating, threats to achieve desired needs, withdrawal for fear of physical changes appearing in front of people)."

3- *Provide a nursing diagnosis based on the woman's level of adaptation.*

In the third step, depending on the previous two steps, the appropriate nursing diagnoses were listed in detail by researchers, for example (anxiety related to deficit of knowledge regarding puberty changes, fatigue related to pain caused by onset of menstruation, irritability related to low self-concept caused by unacceptability of body changes during puberty).

4- *Establish goals to encourage healthy behaviors.*

This phase concerned with *establish* a goal to promote adaptation to modify the maladaptive behaviors of adolescent students with supportive materials as Computers, projectors, and PowerPoint software and developing educational plan based on Roy's adaptation model and utilizing role-plays, lectures, and discussions as group education methods

5- *Implement interventions aimed at controlling the stimuli.*

It involved holding four sessions in a different room in the previously mentioned setting, with a break phase in between. Each session lasted roughly twenty to thirty minutes. At the start of the new session, feedback on the previous one was gathered, and as a result, the prepared educational material was thoroughly reviewed again. At the conclusion of the session, each student received information regarding the time of the following ones. Feedback on the previous session and the new session's goals kicked off the following one. At the conclusion of every session, any questions were addressed in order to clear up any confusion.

The first session: The researchers started this session with ensuring that the puberty is a natural transition from child hood to adult hood to help students to accept the body changes which in turn affect the students self-concept then researchers started providing the adolescent students with proper knowledge regarding puberty development as (puberty meaning, puberty stages, types of puberty, characteristics of each stage and hormonal psychological and emotional changes during puberty).

Second session: In order to gather input from the students, the researchers began this session by revising the previous one. The researcher help girl students to identify how to apply healthy behavior to adapt with puberty changes through highlighting the value of maintaining good personal hygiene, such as taking a warm bath every day, giving girls advice on how to keep themselves clean during their periods, and changing sanitary towels frequently, particularly in the first two to three days of their period (girls should wash their vaginal area with soap and water at least twice a day and change menstrual absorbent towels three or four times a day). Girls should also wear wide-leg cotton underwear and wash their special underwear separately from their other clothing.

Third session: The researchers provide adolescent students with complete information

about physiology of menstruation as (menstruation is a periodic vaginal bleeding associated with uterine mucosa shedding), phases of menstruation (follicular, ovulatory and secretory phase), premenstrual syndrome, signs and symptoms of menstruation. Then, the researcher teach adolescent students how to manage their menstrual pain by applying a heating pad or hot water bottle to their lower back and abdomen, taking breaks when necessary, engaging in appropriate exercise like yoga, avoiding caffeine, and maintaining a healthy diet.

Fourth session: In this session the researcher informed students with measures that can help them to adapt with physiological changes as acne (treat it early, treat a few pimples than a breakout, early treatment also can help prevent acne in adult years and reduce scars). Subsequently, the researchers advise students to wear sunscreen-containing moisturizer because sun exposure exacerbates acne and certain medications make skin more vulnerable to ultraviolet radiation. In addition, keep skin safe from objects that press or cause friction by avoiding excessive amounts of cosmetics. *The break phase*

During this phase and after completion of all session, students are encouraged to contact researchers via phone or chat to answer students' questions and promoting engagement in the promoted behaviors.

6- Evaluate the success of the adaptive goals.

Four months following Roy's Adaptation model applications, post-test was applied using the same pretest format (students' knowledge regarding puberty (tool I, part 3), Adolescents' Self-concept Short Scale, puberty health behavior questionnaire and Roy's Adaptation Model Construct Scale (tool No. II, III& IV) to evaluate the effect of (RAM) interventions on adolescent students' knowledge, self-concept and promoted health behavior during puberty and to evaluate whether the adaptive goal has been met.

Statistical Design

Data was checked before being entered into the computer. The data was tabulated and analyzed

using the Statistical Package for Social Sciences (SPSS version 20) for that purpose. The use of descriptive statistics, such as mean, standard deviation, frequency, and percentages, was implemented. Test of significance (chi-square, t test). When $p \leq 0.05$, a significant level value was taken into account. Furthermore, when $p < 0.01$, a highly significant level value was taken into consideration.

Results

Table (1) indicates that, with a mean age of 16.04 ± 0.77 years, 40.7% of the teenage pupils were younger than 16 years old. Regarding grade level, 38.9% of the studied group were in second grade. Also, 54.9% of them live in urban areas. As regards the educational level of adolescents' mothers and fathers (46.9% and 48.7%, respectively), had secondary education.

Table (2) clarifies that 66.7% of the studied adolescent students had menarche at the age group (10–13 years). Also, 73.5% of them had regular menstruation. Besides that, 51.3% of them had intervals of 25–28 days between periods. Regarding the amount of menstrual blood, 57.5% of the studied students had a moderate amount. The duration of the study period for 38.1% of the students was 6-7 days.

Table (3) shows that there was a highly statistically significant difference in adolescent students' knowledge about puberty before and after four months of RAM implementation. ($P \leq 0.001$).

Figure 1 indicates that friends provided knowledge about the onset of puberty to 67.3% of the teenage pupils.

Figure (2) shows that before RAM implementation, 48.7% of adolescent students had poor knowledge about puberty, while 23.9% had good knowledge. While, after four months, 69.9% of the studied students had good knowledge.

Table (4) denotes that there was a highly statistically significant difference in healthy behaviors among adolescent students during puberty before and after four months of RAM implementation ($P \leq 0.001$).

Figure (3) illustrates that before RAM implementation 43.4 % of studied adolescent students had poor healthy behaviors, while 27.4 % of them had good healthy behaviors during puberty. Whereas, after four months of RAM implementation, good healthy behaviors

improved to 62.8% of the studied students and poor healthy behaviors changed to 14.2% during puberty.

Table (5) shows that the total mean scores of RAM and its dimensions before and after four months of intervention were highly significantly different ($P \leq 0.001$). There was improvement in total mean scores of RAM and its dimensions after four months of the intervention compared to before, 14.09 ± 1.98 versus 10.73 ± 2.36 related to physiologic mode, 19.01 ± 4.72 versus 14.76 ± 2.98 related to self-concept mode, 14.62 ± 1.84 versus 10.30 ± 2.19 related to role function mode, 18.97 ± 4.47 versus 14.43 ± 3.21 related to interdependence mode and 66.71 ± 11.67 versus 50.24 ± 7.39 related to total score.

Figure (4) presents that only 8.8% of studied adolescent students were highly adapted to puberty period and 58.4% of them were slightly adapted before RAM implementation, while at four months post RAM implementation, 52.2% of studied adolescent students were highly adapted to puberty period and 11.5% of them were slightly adapted.

Table (6) there was a highly statistically significant difference in the total mean score of self-concept and its dimensions during the pre- and post-implementation phases ($P \leq 0.001$).

Figure (5) displays that 17.7% of studied adolescent students had good self-concept compared to 51.3% of them had poor self-concept before RAM implementation, while at four months post RAM implementation, 61.1% of studied adolescent students had good self-concept compared to 10.6% of them had poor self-concept.

Table (7) reveals a highly significant positive correlation between total RAM score, self-concept, and health behavior scores during puberty before and after four months of RAM implementation ($P \leq 0.001$).

Table (8) indicates a highly significant positive correlation between total knowledge score, self-concept, and health behavior scores during puberty before and after four months of RAM implementation. ($P \leq 0.001$).

Table (1): Distribution of the studied adolescent students regarding personal characteristics (n=113).

Personal characteristics	No.	%
Age (years)		
>15	31	27.4
>16	46	40.7
>17	36	31.9
Mean \pmSD	16.04 \pm0.77	
Grade level		
First grade	35	31.0
Second grade	44	38.9
Third grade	34	30.1
Residence		
Rural	51	45.1
Urban (city)	62	54.9
Educational level of mothers		
Illiterate	1	0.9
Read and write	13	11.5

Secondary education	53	46.9
University education	46	40.7
Educational level of fathers		
Illiterate	3	2.7
Read and write	17	15.0
Secondary education	55	48.7
University education	38	33.6

Table (2): Distribution of the studied adolescent students regarding menstrual history (n=113).

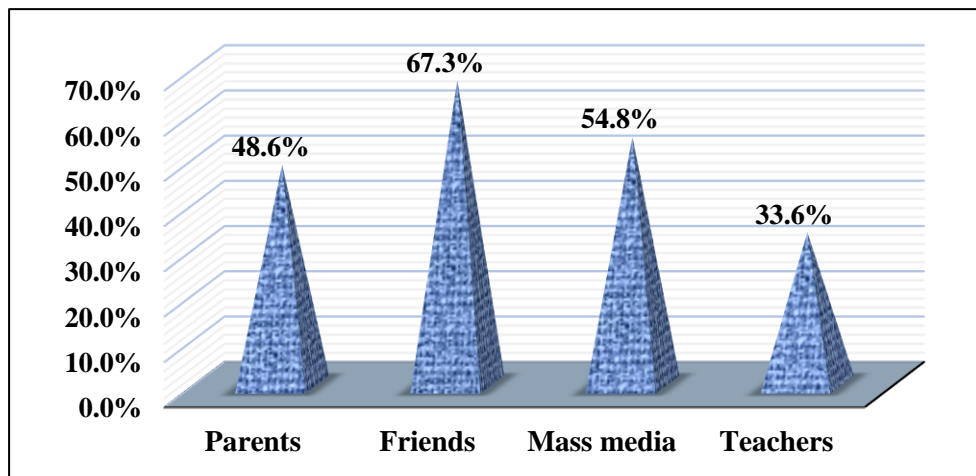
Menstrual history	No.	%
Age at the first period (Menarche)		
<10 years	12	10.6
10-13 years	75	66.4
>13 years	26	23.0
Regularity of menstruation		
Yes	83	73.5
No	30	26.5
Interval of the period		
21 -24 days	19	16.8
25-28 days	58	51.3
29-32 days	22	19.5
33-35 days	14	12.4
Amount of the period		
Very little blood	10	8.8
Little blood	19	16.9
Moderate blood	65	57.5
Strong blood	13	11.5
Very strong blood	6	5.3
Duration of the period		
2-3 days	16	14.2
4-5days	31	27.4
6-7 days	43	38.1
8- 9days	20	17.7
More than 9days	3	2.6

Table (3): Distribution of studied adolescent students regarding knowledge about puberty before and four months after implementation of RAM (n=113).

Knowledge items	Pre-implementation n=113						Four months after RAM implementation n=113						X ²	P-value
	Complete correct answer		Incomplete correct answer		Don't know answer		Complete answer		Incomplete answer		Don't know answer			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
The meaning of puberty	25	22.1	37	32.7	51	45.1	79	69.9	26	23.0	8	7.1	61.2	0.000**
Age of appearance of pubertal signs	21	18.6	35	30.9	57	50.4	80	70.8	21	18.6	12	10.6	67.3	0.000**
First signs of puberty in girls	29	25.7	41	36.3	43	38.1	81	71.7	22	19.5	10	8.8	50.8	0.000**
Later signs of puberty in girls	18	15.9	32	28.3	63	55.8	73	64.6	25	22.1	15	13.3	63.6	0.000**
Hormonal changes of puberty	12	10.6	20	17.7	81	71.7	75	66.4	29	25.7	9	7.9	104.8	0.000**
Psychological changes occur in puberty	27	23.9	38	33.6	48	42.5	74	65.5	27	23.9	12	10.6	45.3	0.000**
Emotional changes occur in puberty	33	29.2	41	36.3	39	34.5	76	67.3	24	21.2	13	11.5	34.4	0.000**
Premenstrual syndrome symptoms	24	21.2	34	30.1	55	48.7	68	60.2	28	24.8	17	15.0	41.6	0.001**
Types of puberty	9	7.9	21	18.6	83	73.5	75	66.4	23	20.4	15	13.3	99.1	0.000**
Factors affects the occurrence of puberty	11	9.7	18	15.9	84	74.3	69	61.0	25	22.1	19	16.8	84.2	0.000**

**A highly statistically significant difference ($P \leq 0.001$)

Figure 1: Percentage distribution of the studied adolescent students regarding sources of information about puberty development



*Answers are not mutually exclusive

Figure (2): Distribution of studied adolescent students regarding total knowledge score about puberty before and four months after implementation of RAM (n=113)

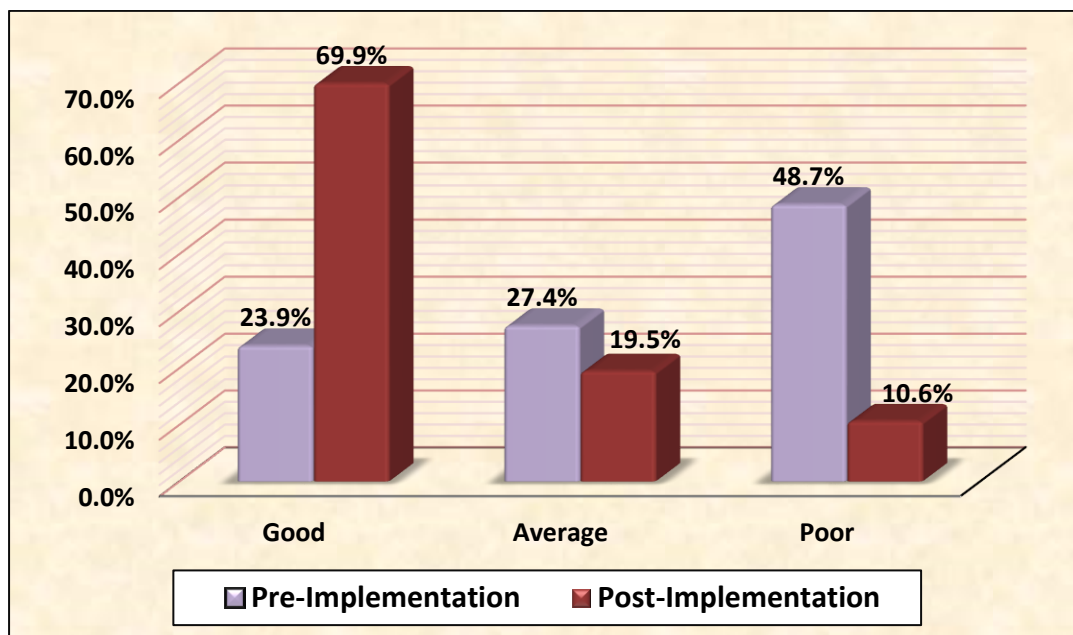


Table (4): Distribution of studied adolescent students' healthy behaviors during puberty before and four months. after RAM implementation (n=113).

Items	Pre-implementation n=113						Four months after RAM implementation n=113						X ²	P-value
	Always		Sometime		Never		Always		Sometime		Never			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Personnel hygiene														
Bathing every day.	32	28.3	41	36.3	40	35.4	61	54.0	34	30.1	18	15.9	18.0	0.000**
Washing the genital organs carefully.	43	38.1	55	48.6	15	13.3	74	65.5	30	26.5	9	8.0	17.0	0.000**
Washing the genital organs with warm water and soap to avoid the bad odor.	29	25.7	35	30.9	49	43.4	69	61.1	28	24.7	16	14.2	33.8	0.000**
Washing the genital organs with light lubricants for sensation with more comfort.	18	15.9	23	20.4	72	63.7	55	48.7	35	30.9	23	20.4	46.5	0.000**
Using special solutions as betadine and Dettol for personal hygiene.	15	13.3	27	23.9	71	62.8	48	42.5	42	37.1	23	20.4	45.0	0.000**
Washing the genital organs from front to back.	25	22.1	33	29.2	55	48.7	62	54.9	34	30.1	17	15.0	35.8	0.000**
Using cotton towels for dryness of genital organs.	27	23.8	43	38.1	43	38.1	58	51.3	39	34.5	16	14.2	23.8	0.000**
Using whitish powder for the pubic area skin.	10	8.8	14	12.4	89	78.8	45	39.8	37	32.7	31	27.5	60.5	0.000**
Using plastic cover to bath to protect myself from infection.	8	7.1	12	10.6	93	82.3	42	37.2	35	31.0	36	31.9	59.5	0.000**
Internal clothes (underwear)														
Avoiding narrow clothes.	22	19.5	37	32.7	54	47.8	47	41.6	35	31.0	31	27.4	15.3	0.000**
Wearing only cotton clothes.	31	27.4	35	31.0	47	41.6	56	49.6	41	36.3	16	14.2	22.9	0.000**
Wearing wide underwear for more comfort is preferable.	28	24.8	34	30.1	51	45.1	47	41.6	44	38.9	22	19.5	17.9	0.000**

Washing special under wear away from all clothes.	33	29.2	42	37.2	38	33.6	67	59.3	40	35.4	6	5.3	34.8	0.000**
Changing under wear at least once or twice daily.	30	26.5	32	28.3	51	45.1	71	62.8	28	24.8	14	12.4	37.9	0.000**
Menstrual care														
Using healthy towels during menstruation	41	36.3	45	39.8	27	23.9	73	64.6	32	28.3	8	7.1	21.4	0.000**
Changing healthy towels frequently	53	46.9	33	29.2	27	23.9	88	77.9	25	22.1	0	0.0	36.7	0.000**
Placing a heating pad or hot water bottle on lower back and abdomen to relieve menstrual pain	15	13.3	32	28.3	66	58.4	64	56.6	27	23.9	22	19.5	52.8	0.000**
Dealing with acne														
Treating acne early	24	21.2	37	32.7	52	46.0	68	60.2	35	31.0	10	8.8	49.5	0.000**
Protect skin from the sun	15	13.3	28	24.8	70	61.9	65	57.5	39	34.5	9	8.0	80.1	0.000**
Avoiding excessive amounts of cosmetics and	33	29.2	39	34.5	41	36.3	65	57.5	35	31.0	13	11.5	25.1	0.000**
Protecting skin from items that create friction or cause pressure	31	27.4	42	37.2	40	35.4	74	65.5	24	21.2	15	13.3	33.8	0.000**
Other promoted behavior														
Eating well balanced diet	28	24.8	37	32.7	48	42.5	62	54.9	32	28.3	19	16.8	25.7	0.000**
Exercising suitable exercise as yoga	11	9.7	23	20.4	79	69.9	66	58.4	28	24.8	19	16.8	76.5	0.000**
Limitation of caffeine intake.	27	23.9	41	36.3	45	39.8	71	62.8	22	19.5	20	17.7	35.1	0.000**
Accepting criticism about changes in my body	10	8.8	28	24.8	75	66.4	68	60.2	29	25.7	16	14.2	81.3	0.000**

****A highly statistically significant difference ($P \leq 0.001$)**

Figure (3): Distribution of studied adolescent students' healthy behaviors during puberty before and four months after implementation of RAM (n=113).

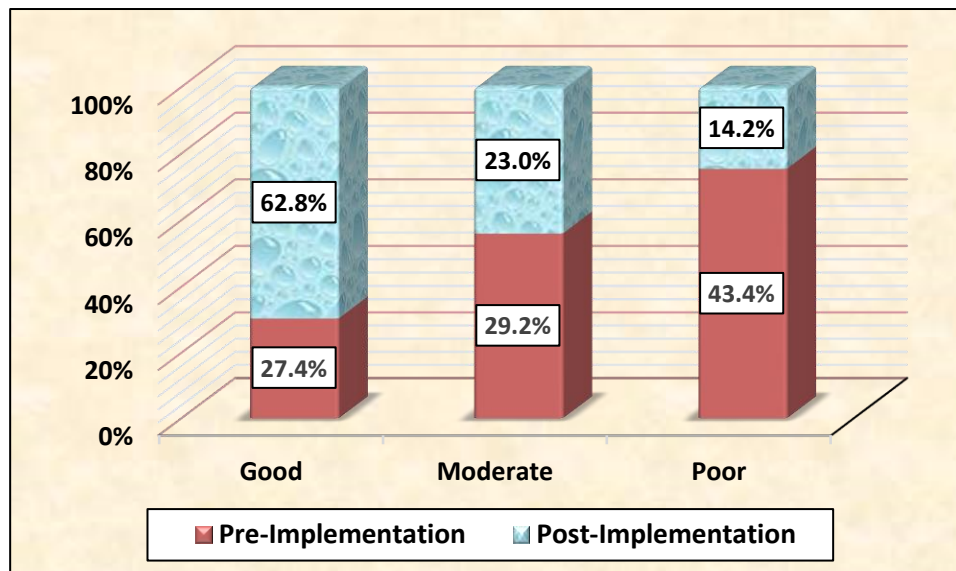


Table (5): Mean and SD of RAM regarding puberty before and after four months of intervention (n=113)

Items	Possible score	Pre-intervention	Four months after intervention	T	p-value
		Mean ± SD	Mean ± SD		
Physiologic Mode	6-18	10.73±2.36	14.09±1.98	18.5	0.000**
Self-concept mode	9-27	14.76±2.98	19.01±4.72	7.93	0.000**
Role function mode	6-18	10.30±2.19	14.62±1.84	21.6	0.000**
Interdependence mode	9-27	14.43±3.21	18.97±4.47	9.58	0.000**
Total score	30-90	50.24±7.39	66.71±11.67	14.26	0.000**

T (Paired Samples Test)

** Highly Significant ($P \leq 0.001$)

Figure (4): Distribution of studied adolescent students regarding total RAM score at pre and four months post implementation (n=113).

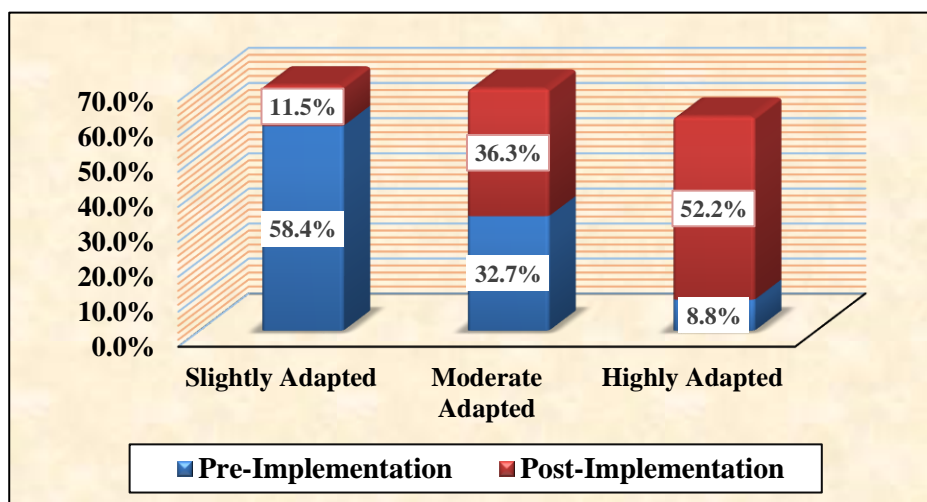


Table (6): Mean and SD of studied adolescent students' self-concept before and after four months of RAM implementation (n=113)

Items	Possible score	Pre-implementation n=113	Four months after RAM implementation n=113	T	p-value
		Mean ± SD	Mean ± SD		
Anxiety	5-30	21.23±3.72	14.05±4.49	29.5	0.000**
Physical appearance	5-30	14.64±3.83	21.82±3.11	25.6	0.000**
Behaviours	5-30	13.90±3.86	22.56±3.54	25.2	0.000**
Popularity	5-30	14.24±3.41	23.44±3.19	29.1	0.000**
Happiness	5-30	12.95±3.74	23.76±3.33	29.8	0.000**
Intellectual status	5-30	16.58±3.22	25.35±3.23	25.9	0.000**
Total self-concept	30-180	86.38±19.94	138.17±16.60	41.60	0.000**

T (Paired Samples Test)

** Highly Significant ($P \leq 0.001$)

Figure (5): Distribution of studied adolescent students' total self-concept before and four months after RAM implementation (n=113)

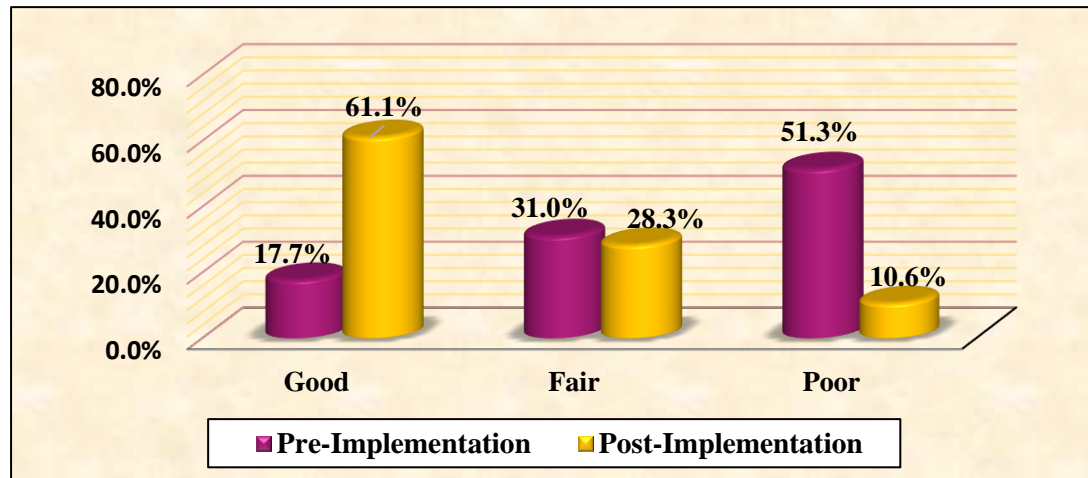


Table (7): Correlation between adolescent students' total adaptation, total self-concept and total health behavior score regarding puberty at pre and four months post implementation (n=113).

Variables	Total RAM score			
	Pre-implementation n=113		Four months after RAM implementation n=113	
	r	p-value	R	p-value
Total self-concept	0.746	0.000**	0.769	0.000**
Total health behavior	0.719	0.000**	0.673	0.000**

r Pearson's test

** Highly Significant ($P \leq 0.001$)

Table (8): Correlation between adolescent students' total knowledge, total self-concept and total health behavior score regarding puberty at pre and four months post implementation (n=113).

Variables	Total knowledge score			
	Pre-implementation n=113		Four months after RAM implementation n=113	
	r	p-value	R	p-value
Total self-concept	0.725	0.000**	0.691	0.000**
Total health behavior	0.865	0.000**	0.758	0.000**

r Pearson's test

** Highly Significant ($P \leq 0.001$)

Discussion

Adolescence is considered as a critical and delicate time of life. The onset of puberty, which marks the beginning of adolescent changes, creates a transition between childhood and adulthood. For several phases of life, puberty is seen as an underlying time. At this point, most adolescents develop their own health habits, which have a big impact on their health-related behaviours as adults. Therefore, this time period of life is vital for health (Eghbal *et al.*, 2023).

Changes in the body, brain, behaviour, cognition, and emotions characterize puberty as a complex, integrated, and coordinated transformation. (Mendle *et al.*, 2019). The development of an ideal self-concept will result in the recognition and introduction of every possible skill possessed, and by doing so, adolescent will be inspired to demonstrate the best own skills (Lubis *et al.*, 2022).

The present research aimed to assess the impact of the adaptation model on adolescent students' self-concept and promote health behavior during puberty. The results of this research confirmed the aforementioned hypotheses which stated that “H1: Adolescent students will exhibit better self-concept after application of adaptation model than before. H2: Adolescent students will show better promoted health behavior after application of adaptation model than before”. This was clarified by discussing the following results:

The current study's findings about the personal traits of the studied adolescents, the results of the current research revealed that more than two fifths of the adolescent students were more than sixteen years old, with a mean age of 16.04 ± 0.77 years. This result agrees with Moghadam *et al.*, 2019 who found that the average age of participants was 14.2 ± 1.21 . Regarding grade level, more than one third of the studied group were in second grade. Also, more than half of them live in urban areas. Researchers thought that personal characteristics are very important when studying adolescent related topics to identify the surrounded environment as well as to understand how to deal with such adolescents, according to their age and mentality.

As regards, educational level of mothers and fathers, nearly half of the adolescent students' parents had secondary education. While Moghadam *et al.*, 2019 found that participated adolescents mentioned that around half of mothers educational level were below diploma and around two-fifth of fathers'

educational level were diploma. From researchers view, parent's education can be an indicator for parent-adolescent relationship.

Regarding sources of information about puberty development, over two thirds of the studied adolescents got their knowledge from peers. This result did not align with the findings of Coast *et al.*, 2019 who mentioned that some studies asked adolescents about source of information related to puberty. In Nepal, most girls preferred learning from a course book. In Turkey, the majority reported health professionals.

The researchers suggested that, the safest source of information at this stage is the mother, books, and the health professionals, but friends may not have enough information, however adolescents resort to friends because of embarrassment from the parents or lack of awareness of how to obtain such information.

Regarding menstrual history of studied adolescent students, this research clarifies that around two thirds of the studied adolescent students had menarche from ten to thirteen years old. Also, nearly three quarters of the studied students had regular menstruation. Besides that, interval and amount of over fifty percent of the studied students were twenty-five to twenty eight days and moderate amount of blood. Also, duration of the period of nearly one fifth of studied students was six to seven days.

This result was inconsistent with Belayneh and Mekuriaw., 2019 who found that around two-thirds of the studied adolescent had menarche from twelve to fifteen years old. And over fifty percent of the studied adolescent had irregular menstruation. Moreover, length of the period of about two-thirds of adolescents in the research was three to five days.

Researchers suggested that menstrual history is very important to identify abnormal patterns of menstruation during adolescence period, and this can help improving potential health issues in adulthood.

Regarding participated adolescent's knowledge, all recent scientific discoveries and technological development urge the acquisition of information that in turn improves understanding of puberty and its role in improving health, development and well-being. It was also mentioned that information about puberty and adolescence has been developed, which in turn affects the normal life of adolescents in many ways (Dorn *et al.*, 2019).

The present research displayed that there was statistical difference with highly significant in each item of studied adolescent students' knowledge about puberty before and four months after Roy Adaptation model implementation. These results was in the same line with a survey done by (*Coast et al., 2019*) and found that three fourths of studied school girls identified as educated about puberty and provided in-depth responses to questions regarding the initial signs of puberty (breast growth, pubic and axillary hair, and acne).

Regarding participated adolescent's total knowledge, the present research cleared that over two thirds of studied adolescents have good knowledge after application of Roy Adaptation Model compared to less than one forth before implementation. This outcome was concurred with *Eghbal et al., 2023* who found improvement in participants' knowledge after one month of program application.

Also, *Coast et al., 2019* mentioned that an Iranian research examining how a puberty health education program affected schoolgirls' knowledge revealed a significant change between outcomes of pre- and post-intervention and authors observed that pre-pubertal girls typically avoided talking about puberty with their mother out of embarrassment and modesty.

Form researchers point of view, the poor information before applying this program according to the adaptation model could be due to the embarrassment of adolescents from families, decrease flexibility in schools during puberty and menstrual age, the lack of educational programs which is very necessary in this field. On the other hand, the clear improvement in adolescent's knowledge after the model implementation indicates the efficiency and positive impact of the educational intervention. Moreover, the topic of research was considered vital and sensitive for adolescents in this period of life so this encourage them for active participation and in turn acquiring necessary information to help for adaptation with puberty changes

Regarding participated adolescent's healthy behaviors, there was significantly improvement in good healthy behaviors after Roy model application compared to before intervention as compliance to personal hygiene instructions and the quality of internal clothes, proper menstrual care, dealing with acne, and other healthy behaviors such as eating healthy and balanced food, exercising suitable exercise, reducing caffeine intake, and accepting

criticism about body changes. These result were in the same line of *Eghbal et al., 2023* results which demonstrated that following the educational intervention, the intervention group's mean scores for adolescent health behaviors increased significantly. leading to higher student adherence to the following adolescent health guidelines and recommendations, such as: appropriate diet and moderate exercise during menstruation, proper genital hygiene, adequate rest and sleep, bathing, cleansing after bowel movements, premenstrual and menstrual pain treatment, acne treatment, timely change and disposal of menstrual pads and the use of suitable underwear.

Belayneh and Mekuriaw., 2019 concluded that majority of adolescent school girls in their study had incorrect hygienic practices regarding menstruation. This indicates a need for designing programs to encourage teen schoolgirls to practice hygienic habits. Also, *National Academies of Sciences, Engineering, and Medicine (NASEM), 2020* prescribed that The Department of Health and Human Services in united states ought to support extra researches which aimed to recognizing, measuring, and assessing the effectiveness of specific components of programs and interventions which centered on promoted healthy behaviors during adolescence.

From the point of view of the researchers, the practice of proper healthy behaviors during puberty can affect all aspects of adolescent's future life, whether physical or even psychological health.

Regarding Roy Adaptation model and its dimensions, there was a highly statistically significantly improvement in total mean scores of four modes of RAM (Physiologic, Self-concept, Role function and Interdependence mode) four months following the implementation compared to before. Additionally, the total scores of dimensions of Roy Adaptation model, more than half of studied adolescent students had highly adapted behaviors related to puberty after four months of intervention.

These results indicated the efficiency of the program according to Roy Model in adapting adolescents to the changes of the adolescence period and thus enhancing their self-concept and healthy behaviors specific to that period. This goes along with *Moghadam et al., 2019* concluded that implementing the Roy adaptation model-based designed program helps adolescents develop a positive self-concept about the changes that come with puberty.

Regarding self-concept of studied adolescent students', there was a highly statistically significant difference in total mean score of self-concept and its dimensions (anxiety, physical appearance, behaviors, popularity, happiness and intellectual status). These results were compatible with *Moghadam et al., 2019* who found that there was a significant difference in the intervention group's self-concept and its dimensions compared to the control group, as well as previous to the intervention.

Regarding total self-concept of studied adolescent students', more than three-fifth of studied adolescent students had good self-concept four months after the implementation compared to less than one fifth before implementation. These results indicate the extent of the positive impact of Roy Adaptation model implementation on the self-concept of adolescents. Also higher self-concept four months after the implementation than before may be due to the studied adolescents identified that all the puberty changes on the body during this period are normal and learned how to adapt to these changes which in turn improve self-concept.

Findings of this research demonstrated a highly statistically positive correlation between total RAM score, total self-concept and health behavior scores at pre and four months post implementation. Based on these results, the researchers confirmed that adapting adolescents to the physical, psychological and social changes related to puberty had a favorable impact on their healthy behaviors and self-concept.

The results of the current research displayed a highly statistically positive correlation between adolescent students' total knowledge, total self-concept and total health behavior score regarding puberty at pre and four months post implementation. This indicates that adolescents' knowledge of everything related to puberty affects their self-concept, as well as practicing healthy behaviors to safely pass this period.

Conclusion

This research concluded the effectiveness of applying Roy's Adaptation Model in improving self-concept and enhancing promoted health behavior among adolescent students during puberty as

there was a highly statistically positive correlation between total RAM score, total self-concept and health behavior scores during puberty before and four

months after Roy's Model implementation. Therefore, the research hypotheses were supported

Recommendations

-This research proposes to benefit from the positive impact of this model as a guide for advancing care training programmes to face challenges of adaptation in this period.

-Distributing simple and brief booklets about physical and psychological changes related to puberty to all female adolescent students in secondary nursing schools

Further researches:

- Replication of this research using a larger sample from various geographic regions to generalize these results.
- Similar studies are required to evaluate the long-term impact of adaptation models on adolescent's self-concept and healthy behaviors.

Acknowledgments

The adolescent students' cooperation and participation in the current research is greatly appreciated by the researchers.

Funding:

No financial support for this research

Conflict of interest

There was no conflict of interest existed, according to the researchers.

References:

- Aghaee-Chaghooshi, S., khodabakhshi-koolae, A., and Falsafinejad, M. R. (2023):* Puberty challenges of female adolescents with visual impairment, *British Journal of Visual Impairment*, 41(1), 96-107.
- Alimohammadi N, Maleki B, Abbasi S, Shakerian B, Hemati Z., (2018):* The Effect of Adaptation Training on Controlling Maladaptation Behaviors in Adolescents with Asthma Based on Roy Adaptation Model. *Tanaffos*. 17(2):103-109. PMID: 30627181; PMCID: PMC6320562.
- Bang, K. S., Kim, S., Lee, G., Jeong, Y., Shin, D. A., & Kim, M. (2022):* Intervention studies on the enhancement of self-concept among adolescent mothers: a systematic review. *Journal of Psychosocial Nursing and Mental Health Services*, 60(3), 31-39.

- Barkhordari-Sharifabad, M., Vaziri-Yazdi, S., and Barkhordari-Sharifabad, M. (2020):** The effect of teaching puberty health concepts on the basis of a health belief model for improving perceived body image of female adolescents: a quasi-experimental study, *BMC public health*, 20, 1-7.
- Belayneh, Z., and Mekuriaw, B., (2019):** Knowledge and menstrual hygiene practice among adolescent school girls in southern Ethiopia: a cross-sectional study, *BMC Public Health*, 19(1), P: 1595. <https://doi.org/10.1186/s12889-019-7973-9>
- Central Agency for Public Mobilization and Statistics, (CAPMAS), (2019):** <https://www.capmas.gov.eg/HomePage.aspx>
- Clevinger, K., Petrie, T., Martin, S., and Greenleaf, C. (2020):** The relationship of sport involvement and gender to physical fitness, self-efficacy, and self-concept in middle school students. *Physical Educator*, 77(1), 154-172.
- Coast, E., Lattof, S. R., & Strong, J. (2019):** *Puberty and menstruation knowledge among young adolescents in low-and middle-income countries: a scoping review. International journal of public health*, 64(2), 293-304.
- Dempsey, C., Devine, R. T., Fink, E., & Hughes, C. (2023):** Developmental Links between Wellbeing, Self-Concept and Prosocial Behaviour in Early Primary School.
- Dorn L.D., Hostinar C.E., Susman E.J., and Pervanidou P., (2019):** Conceptualizing Puberty as a Window of Opportunity for Impacting Health and Well-Being Across the Life Span, *Journal Of Research On Adolescence*, 29(1), P:155–176
- Eghbal S.B., Kenari Z.A., Ashouri A., Rouhani-Tonekaboni N., Kasmaei P., Mehrabian F., Karimy M., Rezaei F and Fattahi E., (2023):** The effectiveness of educational program based on health belief model on promotion of puberty health concepts among teen girls: a cross-sectional study in north of Iran, *BMC Women's Health*, 23(239). <https://doi.org/10.1186/s12905-023-02391-3>
- Gurusamy J., Amudhan S., Veerabhadraiah K.B., and Palaniappan M., (2022):** Health promoting behaviours, their relationships and correlates in nursing students: Implications for nursing education and practice, *Journal of Professional Nursing*, Volume 39, P: 69-75
- Ismail I., Ali H., Anwar K., (2022):** Factors Affecting Critical and Holistic Thinking in Islamic Education in Indonesia: Self-concept, System, Tradition, Culture. (Literature Review of Islamic Education Management), *Dinasti International Journal of Management Science*, 3(#), P: 415-416
- Karimi, N., Saadat-Gharin, S., Tol, A., Sadeghi, R., Yaseri, M., & Mohebbi, B. (2019).** A problem-based learning health literacy intervention program on improving health-promoting behaviors among girl students. *Journal of education and health promotion*, 8.
- Lichner, V., Petriková, F., and Žiaková, E., (2021):** Adolescents self-concept in the context of risk behaviour and self-care, *International Journal of Adolescence and Youth*, 26 (1), 57-70 .
- Iowa State University of Science and Technology (2020):** *Research Methodologies Guide (Quasi-Experimental Design)*. Available at: <https://instr.iastate.libguides.com/researchmethods>. Accessed on October 10, 2023, 9 am.
- Lubis L., Abdurrahman., Fazira E., (2022):** Connection Management Self-Concept and Social Support With Student Confidence, *Jurnal Manajemen Pendidikan Islam*, 7(1), P: 31-38
- Mathiyalagan Martin R., and Maheswari K., (2022):** Significance of Self Concept Among the Adolescent School Students, *Journal of Positive School Psychology* 2022,6(4):3669-3675.
- Mendle J., Beltz A.M., Carter R., and Dorn L.D., (2019):** Understanding Puberty and Its Measurement: Ideas for Research in a New Generation, *Journal Of Research On Adolescence*, 29(1), P:82–95
- Methun, M. I. H., Uddin, M. S. G., Hossain, M. I., Habib, M. J., Saleheen, A. A. S., and Haq, I. (2022):** Biosocial correlates of adolescent's knowledge on pubertal changes

- in rural Bangladesh: A structural equation model, *Plos one*, 17(3), e0264515.
- Moghadam, M. B., Khosravan, S., Sadeghmoghadam, L., Nasirzadeh, A., & Ebrahimi, N. (2019):** The Effect of Roy Adaptation Model-Based Intervention on Self Concept of Teenage Girls. *Hormozgan Medical Journal*, 23(3), e93256-e93256.
- National Academies of Sciences, Engineering, and Medicine (NASEM), (2020):** Promoting Positive Adolescent Health Behaviors and Outcomes: Thriving in the 21st Century. Washington, DC: The National Academies Press. <https://doi.org/10.17226/25552>.
- Ochi, S., & Dwivedi, Y. (2023):** Dissecting early life stress-induced adolescent depression through epigenomic approach, *Molecular Psychiatry*, 28(1), 141-153.
- Palenzuela-Luis, N., Duarte-Clímets, G., Gómez-Salgado, J., Rodríguez-Gómez, J. Á., & Sánchez-Gómez, M. B. (2022):** International Comparison of Self-Concept, Self-Perception and Lifestyle in Adolescents: A Systematic Review. *International Journal of Public Health*, 67, 1604954.
- Peng, J., Yin, L., Wang, K., Zhang, T., Liu, H., Yang, J., & Luo, J. (2022):** A study on the relationship between adolescent health behavior, BMI, and blood physical and chemical properties. *Frontiers in Public Health*, 10.
- Péter, P. (2023):** Examination of Physical fitness, Body weight, Self-esteem, Body image and Eating attitudes among Adolescents.
- Roussia S., Muthu P., and Ekama Ilesanmi R., (2023):** Self-care Management in Heart Failure Using Roy Adaptation Theory-guided Intervention in the United Arab Emirates, *SAGE Open Nursing*, Volume 9, P: 1–14. DOI: 10.1177/23779608231160484
- Roy, c and Andrews, H. a. (2009):** The roy adaptation model (3rd ed.). Upper Saddle River, NJ: Pearson Prentice Hall.
- Saadah, N., Damayanti, A. A., Rahayu, T. P., Santosa, B. J., and Banu, S. B. (2022):** The Relationship of Young Women's Knowledge and Attitudes About the Physical Changes of Puberty with Self-Confidence. *International Journal of Advanced Health Science and Technology*, 2(4), 247-251.
- Sundgot-Borgen, C. (2020):** The Healthy Body Image intervention: A school-based, cluster-randomized controlled trial in high school students. *Body Image*, 29, 122-131.
- Tort-Nasarre, G., Pollina-Pocallet, M., Ferrer Suquet, Y., Ortega Bravo, M., Vilafranca Cartagena, M., and Artigues-Barberà, E. (2023):** Positive body image: a qualitative study on the successful experiences of adolescents, teachers and parents. *International Journal of Qualitative Studies on Health and Well-being*, 18(1), 2170007.
- Turan Miral, M., and Hotun Sahin, N. (2022):** Psychosocial adaptation to precocious puberty: A nursing support program. *Journal of Child and Adolescent Psychiatric Nursing*, 35(3), 285-294.
- UNICEF (2023):** Adolescents, Investing in a safe, healthy and productive transition from childhood to adulthood is critical adulthood, <https://data.unicef.org/topic/adolescents/overview/>.
- Vaske, J. J., Beaman, J., & Sponarski, C. C. (2017):** Rethinking Internal Consistency in Cronbach's Alpha. *Leisure Sciences*, 39(2), 163–173. <https://doi.org/10.1080/01490400.2015.1127189>
- Veiga, F., & Leite, A. (2016):** *Adolescents' Self-concept Short Scale: A version of PHSCS*. *Procedia - Social and Behavioral Sciences*, 217, 631 – 637.
- Yao, J., Ziapour, A., Abbas, J., Toraji, R., and NeJhaddadgar, N. (2022):** Assessing puberty-related health needs among 10–15-year-old boys: a cross-sectional study approach. *Archives de Pédiatrie*, 29(4), 307-311.