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The Effects of an Educational Program based on Roy's Adaptation Model on Psychosocial Adaptation among Patients with Permanent Pacemaker

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ABSTRACT

Implanting an artificial cardiac pacemaker can alter patients' body image and quality of life. Adaptation to a pacemaker is a key component of disease management among patients with implanted pacemakers. This study aimed to investigate the effects of an educational program based on Roy's Adaptation Model on psychosocial adaptation among patients with permanent pacemakers. This quasi-experimental study was conducted in 2020 using a one-group pretest-posttest design. Participants were 30 patients with permanent pacemakers consecutively recruited from Madani Subspecialty Heart Hospital, Khorramabad, Iran. Data collection instruments were a demographic questionnaire, the Psychosocial Adjustment to Illness Scale, and Roy's Assessment Tool. Initially, participants' maladaptive behaviors and educational needs were assessed using Roy's Assessment Tool. Then, a need-based educational program was developed and implemented in four 40–60-minute face-to-face educational sessions held in two weeks. Moreover, weekly contacts were made with participants during the first month after the intervention to answer their questions and encourage them to use the education for self-care. Participants' psychosocial adaptation was assessed at four points: before, immediately after, one month after, and three months after the intervention. The variations of the mean scores of psychosocial adaptations and their healthcare orientation, vocational environment, social environment, and psychological distress across the four measurement time points were statistically significant (P < 0.05). Roy's Adaptation Model-based education effectively improves psychosocial adaptation among patients with permanent pacemakers.

Keywords: Education; Roy's Adaptation Model; Pacemaker; Psychosocial adaptation

Introduction

Dysrhythmias are among the most important complications of cardiovascular disease and the leading cause of around 50% of cardiac deaths. Among 2.4 million deaths in 2003 in the United States, 497000 deaths were due to dysrhythmias [1].

Pacemaker use is the main strategy for dysrhythmia management [2]. Around three million people worldwide use pacemakers, and 550 new ones are implanted annually in Iran [1].

Patients with pacemakers experience many different problems such as dysrhythmias, surgical site infection, problems caused by exposure to magnetic fields, and psychological problems due to dependence on pacemakers. Their problems in doing their daily activities also cause them feelings of weakness and disability and thereby can result in depression, anxiety, reduced self-confidence [1], and low quality of life [1, 3]. Pacemaker implantation can also alter body image and cause problems

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in psychosocial adaptation (PSA) and emotional disorders [3]. Adaptation disorders are, in turn, associated with sleep disorders, restlessness, irritability, fatigue, anxiety, nervousness, concentration impairment, and isolation [4].

Adaptation to dysrhythmias and pacemakers is a key factor in disease management among patients with pacemakers. However, pharmacological therapies cannot effectively manage psychological factors affecting adaptation [3]. Previous studies reported different strategies for adaptation to the problems associated with chronic conditions. For example, a study recommended that cognitive behavioral therapy can promote adaptation to illness and depression symptoms and improve psychological status among patients with diabetes mellitus and depression [5]. Another study reported that cognitive behavioral therapies, such as relaxation and cognitive methods for changing negative thoughts, can effectively manage different problems [3].

There are different cognitive and personality-oriented models and theories on adaptation to the problems associated with chronic conditions. The Roy's Adaptation Model (RAM) is one of these models [6]. RAM specifically addresses PSA among patients with chronic conditions [4] and has been used for more than 30 years to understand and guide nurses' professional activities [7]. However, the results of previous studies regarding the effects of RAM are contradictory [8–10]. For example, a study on adaptation among patients with diabetes mellitus in Iran showed that RAM had significant positive effects on self-concept and independence but had no significant effects on role function [8]. Moreover, a study on patients with chronic obstructive pulmonary disease in Turkey reported that RAM significantly improved adaptation in the physiological, self-concept, and role function modes and had no significant effects on independence [9]. Another study in Turkey also reported that RAM significantly improved prenatal adaptation but had no significant effects on postpartum adaptation among nulliparous women [10].

The contradictory results of previous studies into the effects of RAM highlight the necessity of further studies in this area. Moreover, adaptation widely varies according to the immediate sociocultural context [11], and hence, studies in different contexts are needed to produce firmer evidence regarding the effects of RAM on adaptation. Nonetheless, there is limited information about RAM's effects on pacemaker patients. Thus, the present study was conducted to narrow this gap. This study aimed to investigate the effects of a RAM-based educational program on PSA among patients with permanent pacemakers.

Materials and Methods

This quasi-experimental study was conducted in 2020 using a one-group pretest-posttest design.

Participants and setting

Participants were patients with permanent pacemakers consecutively recruited from Madani Subspecialty Heart Hospital, Khorramabad, Iran. Inclusion criteria were a definite diagnosis of dysrhythmia by a cardiologist, an age of 20–70 years, a permanent pacemaker for at least one month, ability to understand and speak Persian, access to a telephone or mobile phone, no debilitating severe health problem such as asthma, chronic obstructive pulmonary disease, cancer, mental disorders, or speech, hearing, or visual impairments, and informed consent for participation. Exclusion criteria were affliction by an acute disorder, voluntary withdrawal, more than one absence from the intervention sessions, death, pregnancy, use of psychiatric medications, and participation in any other educational programs during the study.

The sample size was determined using Altman's nomogram. Accordingly, with a power of 0.80 and a standardized difference of 0.5, the sample size was thirty, which was increased to 41 to compensate for probable withdrawals.

Data collection

Data collection instruments were a demographic checklist, the Psychosocial Adjustment to Illness Scale, and Roy's Assessment Tool. The items of the demographic checklist were age, gender, educational level, duration of affliction by cardiac problem, comorbid conditions, family history of cardiac problems, and type of treatment.

The Psychosocial Adjustment to Illness Scale was introduced by Leonard Derogatis in 1990 for PSA assessment among patients with chronic conditions. This scale has 46 items in seven main dimensions, namely healthcare orientation (eight items), vocational environment (six items), domestic environment (eight items), sexual relationships (six items), extended family relationships (five items), social environment (six items), and psychological distress (seven items). Items are scored on a four-point scale from zero ("No disturbance") to 3 ("Marked disturbance"). The sum score of each dimension is divided by the number of items to calculate its total score in the 0–3 range. Moreover, the sum score of the scale was divided by 46 to calculate the scale's total score in the 0–3 range. A previous study in Iran cross-culturally adapted this scale for the Iranian context, confirmed its acceptable validity and reliability, and reported that its Cronbach's alpha was 0.94 [10]. As most participants were female and retired, the item on absence from work during the past month was deleted, and the 45-item scale was used for data collection.

The Roy's Assessment Tool was developed by Sister Callista Roy in 1980. It has four main modes: physiological, self-concept, role function, and independence [24]. The physiological mode has seven subscales, namely activity (4 items), rest (five items), nutrition (seven items), elimination (three items), oxygenation (seven items), fluid and electrolytes (seven items), and endocrine function (eight items). The self-concept mode has three subscales, namely objective self (five items), subjective self (six items), and self about others (four items). The role function mode has five items on family relationships, roles, and role expectations, while the independence mode has four items on personal and social relationships and habits. Two previous studies in Iran confirmed this tool's acceptable validity and reliability and reported that its test-retest correlation coefficient was 0.75 [11, 12].

Intervention

Based on RAM, the maladaptive behaviors of participants in the physiological, self-concept, role function, and independence modes, together with their focal, contextual, and residual stimuli, were determined. Then, participants' educational needs were determined, and a need-based educational program was developed. Participants were divided into two 15-person groups based on their educational needs. They were provided with education in four 40–60-minute group sessions in two weeks accompanied by a single one-to-one session. Education was provided through lectures, group discussions, question-and-answer, and PowerPoint presentations. During the first month after the last session, weekly contacts were made with participants, and their questions were answered, and they were encouraged to use the education for self-care.

Moreover, participants could call the first author during this one month to ask their questions. A self-report checklist was also provided to each participant in the last intervention session to document his/her daily activities during the one-month follow-up period. The validity of the educational program was confirmed by one nursing instructor, one subspecialist in dysrhythmia and pacemakers, and a clinical psychologist selected from the study setting. Participants' PSA was assessed at four points: before, immediately after, one month after, and three months after the intervention.

Data analysis

The SPSS software (v. 19.0) was used for data analysis. Normality was tested using the Kolmogorov-Smirnov and the Shapiro-Wilk tests. Moreover, the repeated measures analysis of variance was used for within- and between-

group comparisons respecting the variations of the mean PSA score across the four measurement time points. Bonferroni's test was used for post hoc analysis. A significance level of less than 0.5 was considered for all tests.

Ethical considerations

The Ethics Committee of Lorestan University of Medical Sciences, Khorramabad, Iran, approved this study (code: IR.LUMS.REC.1397.046). Participants were clearly informed about the study's aim, voluntariness of participation, freedom to unilaterally withdraw from the study, confidential management of the data, easy access to the study findings, and imposition of no added costs for participation.

Results

In total, 41 patients were recruited to the study. Six patients died, and five patients irregularly participated in the intervention sessions. All eleven participants were excluded, and a final data analysis was performed on the data obtained from 30 participants (Figure 1).

The mean age of participants was 61.23±9.87 years, in the range of 20–70. Most participants were female (53.3%), married (53.3%), and illiterate (66.7%) (Table 1).

The pretest mean PSA score was 53.9±17.64. relationsh. The most common maladaptive behaviors were weakness and fatigue in the physiological mode (60%), anxiety and depression in the self-concept mode (63.3%), poor social role performance in the role function mode (50%), and dependence on family members in the independence mode (63.3%) (Table 2).

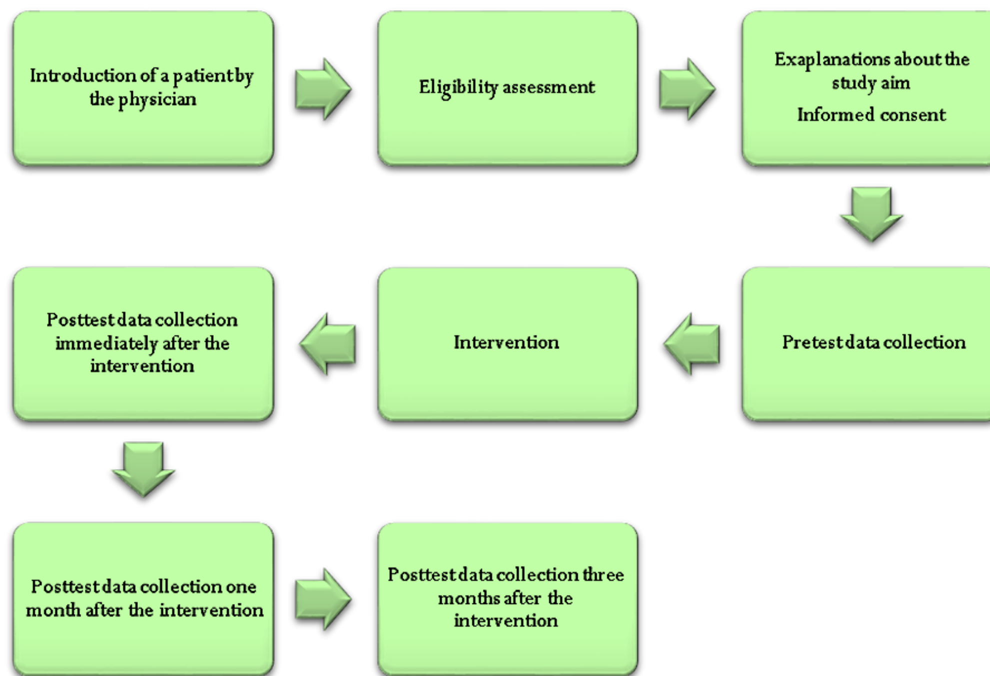

Figure 1. The flow diagram of the study

Table 1. Participants' demographic haracteristics and mean score of psychosocial adaptation (PSA) and their relationships

Variable	Category	N	Percentage	Mean±SD
Age (Years)	< 65	18	60	51.9±16.6
	> 65	12	40	55.8±17.74
Gender	Male	14	46.7	54.20±83.88
	Female	16	53.3	52.1±5.97
Marital status	Single	5	16.7	60.5±8.89
	Married	16	53.3	49.17±37.48
	Single/Widowed	9	30	58.21±11.16
Educational level	Illiterate	20	66.7	54.14±45.24
	Primary	7	23.3	61.22±14.51
	High school	3	10	22.15±33.69

The variations of the mean scores of PSA and its healthcare orientation, vocational environment, social environment, and psychological distress across the four measurement time points were statistically significant (P < 0.05). In contrast, the mean scores of the domestic environment, sexual relationships, and extended family relationships did not significantly change (Table 3)

The results of Bonferroni's test for post hoc analysis revealed that the pretest mean score of PSA was significantly more significant than the mean score of PSA at the first posttest. At the same time, other pairwise differences between time points were not significant. The pretest mean score of healthcare orientation was also significantly more significant than the mean score of healthcare orientation at all posttests (P < 0.05). The mean score of healthcare orientation at the first posttest was significantly less than the third posttest (P < 0.05), while other differences between time points respecting the mean score of healthcare orientation were not significant. The pretest mean score of vocational environments was significantly more than the mean score of vocational environments at the first posttest (P < 0.05), and other differences between time points were not significant. The pretest mean scores of social environment and psychological distress were significantly greater than their corresponding mean values at the first posttest (P < 0.05), while other differences between the time points respecting the mean scores of social environment and psychological distress were not statistically significant

Table 2. The pretest prevalence of maladaptive behaviors in the four modes of RAM

Mode	Maladaptive behaviors	N	%
Physiological	Immobility	144	46
	Sleeplessness	13	43
	Dependence on sleep medications	16	53.3
	Weakness and fatigue	18	60
	Non-adherence to diet	12	40
Self-concept	Altered body image	17	56.6
	Low self-confidence	16	53.3
	Alteration of personal adaptation (anxiety and depression)	19	63.3
Role function	Social role conflict	15	50
	Spousal role conflict	11	36
	Parental role conflict	9	30
Independence	Dependence on family members	19	63.3
	Low personal autonomy	13	43

Table 3. The variations of the mean scores of psychosocial adaptations across the four measurement time points

Dimensions / Time	Mean ± SD				Effects of time*
	Before	Immediately	After 1 month	After 3 months	
Healthcare Orientation	0.11±0.04	0.05±0.025	0.07±0.04	0.08±0.05	F = 14.70, P < 0.001
Vocational environment	0.24±0.15	0.198±0.098	0.198±0.091	0.20±0.11	F=2.880, *P=0.043
Domestic environment	0.13±0.06	0.11±0.04	0.11±0.03	0.11±0.03	F=2.166, P=0.099
Sexual relationships	0.17±0.11	0.14±0.07	0.15±0.04	0.15±0.05	F=0.626, P=0.601
Extended family relationships	0.16±0.13	0.12±0.08	0.14±0.08	0.16±0.08	F=2.00, P=0.120
Social environment	0.24±0.13	0.16±0.08	0.17±0.06	0.16±0.08	F=12.22, *P=0.001
Psychological distress	0.14±0.08	0.09±0.05	0.10±0.06	0.09±0.06	F=4.533, *P=0.005
Total	0.14±0.05	0.10±0.03	0.11±0.04	0.11±0.05	F=3.631, *P=0.003

* The results of the repeated measures analysis of variance

Discussion

This study investigated the effects of a RAM-based educational program on PSA among patients with permanent pacemakers. Findings revealed that the pretest mean score of healthcare orientation significantly differed from the mean score at all posttests. The mean score of healthcare orientation at the first posttest was significantly different from the mean score of healthcare orientation at the third posttest, while other differences between the time points respecting the mean score of healthcare orientation were not significant. These findings denote the effectiveness of the RAM-based educational program in significantly improving healthcare orientation among patients with permanent pacemakers [13]. In line with our findings, several previous studies reported the significant positive effects of educational interventions on knowledge and attitude among patients with permanent pacemakers [14-16]. Another study introduced educational programs as essential resources to improve knowledge and attitudes among patients with diabetes mellitus [17]. Educational interventions based on behavioral theories can help patients acquire greater familiarity with their illness and improve their attitude toward treatments [18]. RAM helps determine the underlying causes of patients' behaviors and, thereby, helps nurses design more effective programs to manage patients' problems [19]. The development of the intervention of the present study based on participants' needs and behavioral stimuli can explain the effectiveness of the intervention in improving participants' knowledge, healthcare orientation, and PSA. Another explanation for the positive effects of educational interventions, like the intervention of the present study, on patient outcomes is the effectiveness of these interventions in strengthening positive beliefs and reducing psychological problems such as stress. In contradiction to our findings, an interventional study on 72 patients with permanent pacemakers reported that patient education one week after hospital discharge had no significant effects on self-care attitude and behavior. However, it significantly improved their self-care knowledge [20]. This contradiction is attributable to the shortness of the educational program, the lack of a follow-up program to improve learning retention, and the small number of educational sessions in that study.

The study findings also showed that the intervention significantly improved PSA in the vocational environment, social environment, and psychological distress dimensions. This finding denotes that patients with permanent pacemakers have limited knowledge about pacemakers and how to adapt to them, and RAM-based education can improve their psychosocial functioning and adaptation. One previous study reported that patients with coronary artery disease had poor affective, emotional, and social functioning and

experienced uselessness, marital problems, loneliness, and social isolation [21]. In agreement with our findings, two former studies reported the positive effects of RAM-based educational interventions on role function [9] and independence modes of RAM [22]. Social and informational support, provided in the present study through the RAM-based educational program, is a significant factor in improving patients' acceptance of pacemakers and their social functioning [23]. Contrary to our findings, a study reported that RAM-based nursing care was ineffective in improving role function [11]. This contradiction may be due to the careful assessment and identification of patient's problems and their contributing factors in the present study and effective management through face-to-face group education, face-to-face and telephone-based interviews, and educational booklets and pamphlets.

Study findings also revealed the significant positive effects of RAM-based education on the vocational environment and the psychological distress dimensions of PSA. These two dimensions of PSA belong to the self-concept mode of RAM. In agreement with our findings, several studies reported that RAM-based education significantly positively affected the vocational environment dimension of PSA, self-concept, and psychological problems [11, 22, 9].

Our findings also showed that RAM-based education did not significantly affect the domestic environment and extended family relationships. In RAM, family relationships are assessed in the independence mode. Two former studies also reported that RAM-based education was ineffective in significantly improving independence [9, 24]. In contrast, several studies reported that educational interventions effectively reduced family conflicts and strengthened family relationships [25, 26].

We also found that RAM-based education had no significant effects on the sexual relationships dimension of PSA. A previous study on patients with type 2 diabetes mellitus also reported the same finding [12]. The insignificant effects of RAM-based education in these two studies are attributable to the fact that their participants were mostly older adults with chronic conditions and fewer sexual needs. Contrarily, two studies on healthy individuals reported that educational interventions significantly alleviated sexual problems and improved sexual relationships [26, 27].

Conclusion

This study suggests the positive effects of RAM-based education on PSA among patients with permanent pacemakers. Therefore, RAM-based education can be used as a simple and non-invasive holistic non-pharmacological nursing intervention to identify and manage the psychosocial problems of patients with permanent pacemakers and fulfill their educational and informational needs. Future studies are recommended to assess the effects of RAM-based educational interventions on PSA among the family members of patients with permanent pacemakers. Moreover, quality education about marital relationships for patients with permanent pacemakers is recommended.

Conflict of Interests

Authors declare that they do not have any conflict interests.

Acknowledgment

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References

1. Ataee E, Haghjoo M, Dalvandi A, Bakhshandeh H. Effect of self-care education on quality of life among patients with permanent pacemaker. Iranian Journal of Cardiovascular Nursing. 2013 Mar 10;1(4):40-7.

2. Asgari MR, Soleimani M. Comprehensive book: critical care nursing in CCU, ICU and dialysis wards. Tehran: Boshra Publication. 2014;50.

3. Figueroa C, Alcocer L, Ramos B. Psychological intervention to modify anxiety, depression and quality of life in patients with an implantable pacemaker. Psychology. 2016 Mar 11;7(3):374-81.

4. Saini N, Sharma V, Arora S, Khan F. Roy's Adaptation Model: Effect of Care on Pediatric Patients. Int J Nurs Midwif Res. 2017;4(1):52-60.

5. Samadzade N, Poursharifi H, Babapour J. The effectiveness of cognitive-behavioral therapy on the psycho-social adjustment to illness and symptoms of depression in individuals with type II diabetes. Clinical Psychology Studies. 2014 Dec 22;5(17):77-96.

6. Kolivand M, Amraei K, Rezaei F. The Effectiveness of Application of Roy's Adaptation Model on Alexithymia and Diet Adherence in People with Hypertension Comorbid with Stress. Journal of Health And Care. 2022 Mar 10;23(4):353-64.

7. Ursavaş FE, Karayurt Ö, İşeri Ö. Nursing approach based on Roy adaptation model in a patient undergoing breast conserving surgery for breast cancer. The journal of breast health. 2014 Jul 1;10(3):134.

8. Sadeghnazhad Forotgeh M, Vanaki Z, Memarian R. The effect of nursing care plan based on “Roy Adaptation model” on psychological adaptation in patients with diabetes type II. Nursing and Midwifery Journal. 2012 Dec 10;10(5):0-.

9. Akyil RÇ, Ergüney S. R oy's adaptation model-guided education for adaptation to chronic obstructive pulmonary disease. Journal of Advanced Nursing. 2013 May;69(5):1063-75.

10. Serçekuş P, Mete S. Effects of antenatal education on maternal prenatal and postpartum adaptation. Journal of advanced Nursing. 2010 May;66(5):999-1010.

11. Sadeghnezhad Forotaghe M, Vanaki Z, Memarian R. The effect of nursing care plan based on “Roy Adaptation model” on psychological adaptation in patients with diabetes type II. Evidence Based Care. 2011;1(1):5-20.

12. Feghhi H, Saadatjoo SA, Dastjerdi R, Kalantari S, Alidousti M. The effect of a training program based on Roy’s adaptation model on psychosocial adaptation in patients with type II diabetes in Birjand, Iran. Journal of Diabetes Nursing. 2016 Apr 10;4(2):8-24.

13. Huang LY, Guo SE, Tsai CC, Huang TY. The effectiveness of a systematic patient education intervention on knowledge, attitudes and behavior about self care in patients with permanent pacemakers. Taiwan Gong Gong Wei Sheng Za Zhi. 2014 Apr 1;33(2):174.

14. Snegalatha D, Anand J, Seetharaman B, John B. Knowledge and attitude regarding permanent pacemaker and the quality of life of patients after permanent pacemaker implantation. Indian Journal of Continuing Nursing Education. 2019 Jan 1;20(1):33-9.

15. Chapagai S, Andrews GR, Naik N. A Study to Assess the Knowledge and Quality of Life of Pacemaker Patients with a view to Develop an Information Booklet. Asian Journal of Nursing Education and Research. 2017;7(1):108-14.

16. Mohamed A, Shreif W, Mohamed H, Maaty A. Effectiveness of educational program on knowledge and practice of patients undergoing permanent pacemaker. IOSR Journal of Nursing and Health Science. 2016;5(6):72-83.

17. Bruce DG, Davis WA, Cull CA, Davis TM. Diabetes education and knowledge in patients with type 2 diabetes from the community: the Fremantle Diabetes Study. Journal of Diabetes and its Complications. 2003;17(2):82-9.

18. Khani Jeihooni A, Kashfi SM, Hazavehei SM. Effects of the BASNEF model-based educational programs on blood Sugar control,(type 2 diabetes). Health Education and Health Promotion. 2013 Mar 10;1(1):33-49.

19. Mahdavipour F. A review on adaptation of heart failure patients based on roy adaptation model: A review study. Iranian Journal of Systematic Review in Medical Sciences. 2020;2(1):11-9.

20. Huang LY, Guo SE, Tsai CC, Huang TY. The effectiveness of a systematic patient education intervention on knowledge, attitudes and behavior about self care in patients with permanent pacemakers. Taiwan Gong Gong Wei Sheng Za Zhi. 2014 Apr 1;33(2):174.

21. Hekari D, Mohammadzadeh R. The assessment of adaptation rate of coronary artery disease female patients according to quadruple aspects of physiologic, self perception, role playing and independence/dependence in Tabriz, 1386-87. Medical Science Journal of Islamic Azad Univesity-Tehran Medical Branch. 2008 Oct 10;18(3):187-93.

22. Aliakbarzadeh-Arani Z, Taghavi T, Sharifi N, Noghani F, Faghihzade S, Khari-Arani M. Impact of training on social adaptation in mothers of educable mentally-retarded children based on Roy adaptation theory. Feyz Journal of Kashan University of Medical Sciences. 2012 Apr 1;16(2).

23. Charyton C, Elliott JO, Lu B, Moore JL. The impact of social support on health related quality of life in persons with epilepsy. Epilepsy & Behavior. 2009 Dec 1;16(4):640-5.

24. Hassani P, Otaghi M. Roy adaptation model in hemodialysis patients: a mixed method research. Nursing and Midwifery Journal. 2012 Dec 10;10(5):0-..

25. Arieta MT. Women's couple relationship satisfaction: The impact of family structure and interparental conflict. ProQuest; 2008.

26. Ahmadi K, Mahdi Nabipoor Ashrafi S, Ali Kimiaee S, Afzali MH. Effect of family problem-solving on marital satisfaction. Journal of applied sciences. 2010;10(8):682-7.

27. Shahsiah M, Bahrami F, Etemadi O, Mohebi S. Effect of sex education on improving couples marital satisfaction in Isfahan. Journal of Health System Research. 2011 Mar 10;6(4):0-.

28. Ghanbari afra L, Adib-Hajbaghery M. Roy's Adaptation Model on patient with covid-19. Nursing and Midwifery Journal 2020; 18 (5) :387-397.