

Development of a Rheumatoid Arthritis Education Program using the PRECEDE_PROCEED Model

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ABSTRACT

Background: In order to help rheumatoid arthritis (RA) patients in carrying out and attaining relevant self-care behaviors and adaptation to the physical limitations of this disease and, consequently, promoting their level of health status, an education program based on the PRECEDE component of the PRECEDE-PROCEED model targeting patients with RA was developed. This paper describes the planning of a RA Patient Education Program (RAPEP) designed to promote their quality of life.

Methods: The development of the program began with a comprehensive review of the literature. This included a review of the signs and symptoms of RA, accompanying functional disabilities, previous educational programs and the effect of the disease on the patient's quality of life. Besides, in order to help inform RAPEP program development, and organize the survey according to the factors identified in the PRECEDE model a cross-sectional survey was applied on a non-probability sample of 181 outpatients in Yazd, center of Iran.

Results: The quality of life (QOL) problem identified was the considerable low role functioning, health perception and physical functioning due to chronic pain. One of the most significant modifiable behavioral factors impacting pain and functional limitations was self-care behaviors in RA patients. Higher level of knowledge, attitude, self-efficacy, enabling factors and social support is associated with better self-care behavior.

Conclusions: The PRECEDE component of the PRECEDE-PROCEED model provided a comprehensive conceptual framework for the development of RAPEP aiming at RA patients in Yazd. Further research to evaluate this educational program is suggested.

Keywords: Rheumatoid Arthritis; Educational Program; PRECEDE Model

INTRODUCTION

Rheumatoid Arthritis (RA) is a chronic, painful and progressive disorder characterized with the inflammation of the joints, which affects 1% of the world population [1-2]. Rheumatoid arthritis can have a remarkable influence on the patients' quality of life (QOL) [3].

Previous studies have shown that health education programs on arthritis management may result in positive changes in patients' behavior and health status. A comprehensive review

of arthritis patient education studies [4] showed that 77% to 87% of the studies reported positive changes in several factors. Several packaged arthritis interventions reviewed help patients with arthritis increase their abilities and reduce pain and functional limitations [4]. In addition, other intervention programs may be helpful in reducing pain and disability and in increasing self-care behaviors.

A significant preference in managing RA is adaptation of the treatment

regimen with daily disease activity. This presumes sufficient treatment and pertinent educational support by health promoters and healthcare providers. In addition, the patient has an influential role in managing the disease. The patients have to learn to adapt rest, exercise and medication to the intermittently changing disease activity [5]. Hence, empowering of RA patients toward self-care in the management of the disease is important. Moreover, physical activity and exercise are priorities in managing arthritic diseases. Considering the obvious efficacy of exercise, physical activity and self-care education programs, clinical practitioners and health promoters have suggested the participation of arthritis patients in these interventions [4].

The PRECEDE phase of the PRECEDE-PROCEED framework was applied to plan RAPEP. PRECEDE is an acronym for Predisposing, Reinforcing and Enabling Causes in Educational Diagnosis and Evaluation which provides a framework for planning in health education and promotion [6-7]. PRECEDE phase constitutes of five stages: 1) social diagnosis, 2) epidemiological diagnosis, 3) behavioral and environmental diagnosis, 4) educational and organizational diagnosis, and 5) administrative and political diagnosis. Applying the actions outlined in stages 1-5 of the PRECEDE phase to perform a cross-sectional survey and also a literature review we tried to develop the educational program of RAPEP.

In order to help RA patients in carrying out and attaining relevant self-care behaviors and adaptation to the limitations of RA and, consequently, promoting their level of health status an education program targeting patients with RA was developed. In the case of being successful, the program should help RA patients in promoting their

level of self-care behaviors and health status and consequently their health-related QOL.

This paper describes the planning of a RA Patient Education Program (RAPEP) designed to promote their health-related quality of life. Although the PRECEDE-PROCEED model has been applied in chronic diseases research [8-10], its application on RA patients, especially in developing countries like Iran, has not well been examined, therefore, another aim of this study was to explore if the PRECEDE component of the PRECEDE-PROCEED model can provide a conceptual framework for the development of a RA education program in developing countries, like Iran.

Materials and Methods

The development of the RA education program began with a comprehensive review of the literature. This included a review of the signs and symptoms of RA, accompanying functional disabilities, treatment, costs of the disease on the patient, educational programs developed for patients with arthritis and the effect of the disease on the patient's health-related QOL and health status. Moreover, the effects of some of psychological variables like self-efficacy and social support on RA patients reviewed. Along with literature review, in order to help inform our program development, and organize the survey according to the factors identified in the PRECEDE model a cross-sectional survey was applied.

A non-probability sample of 181 RA patients in a Rheumatology Clinic in Yazd, center of Iran was recruited to participate in a study which was conducted to find out the problems of RA patients in Iran, as a developing country. Patients who (a) had been positively diagnosed with RA in accor-

dance with American Rheumatism Association rheumatoid diagnosed standards; (b) had suffered from RA for a period exceeding six months; (c) had the minimum age of 18 and (d) had no audio-visual or psychological problems met the inclusion criteria. The purpose of the study, which included their rights as human subjects for a research study, was explained to participants and all signed consent forms. Face-to-face private interviews were conducted in a private room at the rheumatology clinic for the purpose of data collection. Each interview lasted 20 to 25 minutes.

Measures

Medical Outcomes Study (SF-20) which is a self-administered short-form questionnaire was used to measure health-related QOL. The SF-20 measure has six dimensions; physical, social and role functioning as well as mental health, health perception and pain. It gives six numerical scores (0–100) for each dimension such that a higher score indicates better situation in the dimensions. The only exception is pain: a higher score indicates more pain. The SF-20 has been validated in the United States and Finland [11-12]. Physical functioning is measured with 6 items, role functioning with 2, social functioning with 1, mental health with 5, health perception with 5 and physical pain with 1 item.

Patients' health status was assessed by the AIMS2-SF which comprised 26 core items of the full version AIMS2. The AIMS2-SF measures 5 different domains of health status. Respondents were asked to indicate, on a 5-point Likert scale, how much of the time during the past 4 weeks they were limited in physical function (mobility, walking and bending, self-care, etc.), role function (work), and social function (social activities and support); and

how much of the time during the past 4 weeks they were bothered by symptoms (arthritis pain) and affect (level of tension and mood) [13]. When necessary, items were (according to the recommendations of Meenan et al. [14-15] recoded so that results for all items lay between 0 and 10.

The self administered, Patient Knowledge Questionnaire (PKQ) was developed for use in patients with RA [16]. The PKQ comprised topics which had been identified as important by RA patients in a previous study [17]. We chose not to include some of the items because of cultural inappropriateness. Therefore, a modified version of the PKQ was used. Thus a questionnaire with four subscales, eleven questions and a choice of forty possible answers (18 of them correct) was provided which measured the RA patients' knowledge in four domains: general arthritis knowledge(2 items), medication and compliance(2 items), exercise regimens(3 items) and joint protection(4 items). The respondents should select Yes or No for each answer. A "don't know" option was provided to enhance compliance.

Patient Attitude Questionnaire (PAQ) is a 6-item scale developed to measure the attitudes towards self-care behaviors by asking the RA patients to indicate their level of agreement. A 5-point Likert-type scaling was used (0 = totally agree, 1 = agree, 2 = no idea, 3 = disagree and 4= totally disagree). The theoretical range was 0 - 24, in which higher scores indicate more positive attitude.

Arthritis Self-Efficacy Scale (ASES) is a valid and reliable instrument developed to measure self-efficacy in patients with rheumatic diseases [18]. The ASES comprises five coping with pain items, nine function items and six items related to other RA symptoms (e.g., fatigue, depression).

We did not include the nine self-efficacy function items due to logistical limitations. Therefore, self-efficacy was presented by the pain and other symptoms scale scores. In the ASES, each item is represented by a statement with which the patient may agree or disagree. We employed a 4-point Likert-type scale: 0 = not at all, 1 = seldom, 2 = sometimes, and 3 = a lot. The total possible scores ranged from 0 to 33, higher the score, the greater the self-efficacy.

Social Support Scale (SSS) is a four-dimension, 17-item scale developed to measure the level of perceived social support among the participants. The 17-items were categorized under the four dimensions of emotional support (4 items), instrumental support (1 item), informational support (1 item) and family supportive behaviors (11 items). Each item was rated on a 5-point Likert-type scale that ranged from 0 (not at all) to 4 (very helpful). Total possible scores ranged from 0 to 68, with the higher scores suggesting greater social support as reinforcing factors

Enabling Factors questionnaire (EFQ) is a 6-item scale developed to measure the enabling factors of practicing self-care behaviors. A 4-point Likert-type scaling, 0 = never to 3 = completely, was used. The theoretical range for this instrument was 0 – 18, the higher the scores, the more enabling factors to perform self-care behaviors.

Self-care Behavior Scale (SCBS) was developed by the authors after a review of the relevant literature [2, 19-20]. The SCBS consists of 17 items. The respondents were asked to report the frequency of performing various self-care activities for their arthritis on a regular basis (once a month) during the previous 12 months. The Likert-type scaling ranged from 0 (not at all)

to 4 (always), resulting in a theoretical range of 0 to 68 in which higher scores were representative of higher self-care behaviors practiced by the participants.

A panel of experts reviewed and assessed the questions, orally, by evaluating the appropriateness and relevance of the items to RA patients, response format and confirmed them to be representative of the constructs. The feedback from the panel of experts was used to revise and modify the instruments. These instruments were then pilot tested on a sample of 25 RA outpatients to examine their utility. The data were used to estimate the internal consistency of the scales, using Cronbach's Coefficient Alpha. The content validity of the scales was also established. This pilot sample was not included in the final sample. A brief description of the scales, number of items, reliability coefficients in pilot and final sample, and possible ranges of the constructs are listed in Table 1.

The SPSS software was used for the purpose of data analysis in the cross-sectional study. Pearson Product Moment Correlation Coefficient, Mann-Whitney U test, and regression analysis were performed.

RESULTS

The age of the patients ranged from 18 to 82 years old, with 45.5 as the mean and 13.6 as the standard deviation. 33.5% (60) of the participants were younger than 40, 54.1% (98) were from 41 to 60, and 12.7% (23) were older than 60 yr. The majority of the respondents were females (82.4%) and housewives (70.7%). Seventy one percent of the patients were living with their spouses. The majority (55%) had elementary school level of education. The duration of RA For 65% of the respondents, was more than three years,

of which, 58.6% had access to a caregiver at home.

As it is shown in Table 1, the problems identified regarding health-related QOL among RA patients were the significant low role functioning (20.5%, the less score, the more problem), health perception (35.8%, the less score, the more problem), physical functioning (35.8%, the less score, the more problem) and pain (65.3%, the more score, the more pain). But, in terms of mental health, the patients had the least problem (49.3%).

Moreover, Table 1 shows that the respondents acquired low score (less than 50%) in health status (4.54 out of 10), self-efficacy (15.7 out of 33), and self-care behaviors (32.3 out of 68). Further analysis of our data showed that in the self-care behavior domain, the lowest scores were for "regular exercise especially aquatic exercises," "using relaxation methods such as meditation" and "using a heated pool, tub or shower." During face-to-face interviews, the participating patients said

that they did not know what these methods were or how to use them.

Applying Pearson's, correlation analysis, it was found that health status had statistically significant positive correlations with all other PRECEDE variables (Table 2). Moreover, there was found a statistically significant correlation between patients' level of self-efficacy and self-care behaviors. In addition, as can be seen in Table 2, there was a statistically significant positive correlation between social support and self-care behavior ($P < 0.05$).

Multiple regression analysis was performed to explain the variation in health-related QOL score on the basis of the other PRECEDE variables. As it is shown in Table 3, all PRECEDE variables (health status, self-care behaviors, predisposing, reinforcing and enabling factors) accounted for 77.3% of the variation within which health status and enabling factors were the strongest predictors of health-related QOL.

Table 1: Scales, mean (sd), possible ranges, number of items and reliability coefficients of precede variables

Studied constructs(scales)	Number of Items	Scaling	Cronbach α	Mean (SD)	Possible Range
Quality of Life(MOS-SF-20)¹	20	Standard scale	-	-	-
1- Health Perception	5		0.84	35.85(19)	0-100
2- Pain	1		0.78	65.31(29)	0-100
3- Physical Function	6		0.89	35.81(31)	0-100
4- Role Function	2		0.83	20.59(35)	0-100
5- Social Function	1		0.79	45.08(35)	0-100
6- Mental Health	5		0.91	49.34(20.6)	0-100
Health Status(AIMS 2-SF)²	26	Standard scale	0.93	4.54(1.5)**	0-10
Total Physical Status	12		0.94	4(2.4)	0-10
Arthritis Pain (Total Symptom Status)	3		0.88	5.03(2.3)	0-10
Total affection status	5		0.89	4.13(1.7)	0-10
Total Social Interaction	4		0.79	3.81(1.9)	0-10
Work(Total Role Function)	2		0.78	5.73(2.7)	0-10
Predisposing factors					
Knowledge (PKQ) ³	11	Yes/No answers	-	28.7(3.5)	0-40
Attitude (PAQ) ⁴	6	5-point Likert-type scaling	0.67	16.1(2.9)	0-24
Self-Efficacy (ASES) ⁵	11	5-point Likert-type scaling	0.92	15.7(6.4)	0-33
Reinforcing Factors (SSQ)⁶	17	5-point Likert-type scaling	0.91	46.6(13.9)	0-68
Enabling Factors (EFQ)⁷	6	4-point Likert-type scaling	0.67	9.01(2.1)	0-18
Self-care behaviors (SCBS)⁸	17	5-point Likert-type scaling	0.68	32.3(8.6)	0-68

¹Medical Outcome Survey Short Form20; ²Arthritis Impact Measurement Scale 2-Short Form; ³Patient Knowledge Questionnaire; ⁴Patient Attitude Questionnaire; ⁵Arthritis Self-Efficacy Scale; ⁶Social Support Questionnaire; ⁷Enabling Factors Questionnaire; ⁸Self-Care behaviors Scale

*The higher Mean Percent, the worse pain

**The lower Mean Percent, the better health status

Table 2: PRECEDE Variables with health status correlation matrix

Variables	1	2	3	4	5	6	7
1=Health status	1						
2=knowledge	0.150**	1					
3=Attitude	0.246*	0.216*	1				
4=Self-efficacy	0.673*	0.100	0.417*	1			
5=Reinforcing factors	0.455*	0.032	0.260*	0.518*	1		
6=Enabling factors	0.509*	0.092	0.345*	0.480*	0.394*	1	
7=Self-care behaviors	0.558*	0.093	0.498*	0.550*	0.439*	0.452*	1

* $P < .01$ ** $P < .05$

Table 3: PRECEDE variables regression analysis

PRECEDE variables	Standardized-B	P value	R ²	
Health status	0.785	0.000	0.773	Health-re-
Predisposing factors	0.046	0.352		lated
Reinforcing factors	- 0.036	0.399		Quality of
Enabling factors	0.137	0.002		life
Self-care behaviors	0.008	0.873		

Table 4: Program characteristics (target population, methods, personnel, program costs), Key Content Areas and Processes

Target Population	Patients with Rheumatoid Arthritis
Method/Duration	One to three times per week; 1.5 hour sessions; 8 weeks—ongoing
Personnel / Training Program	Three-person team(layperson, health professional and fitness professional); At least 6 hours self-care training and self-help courses +12 hour for exercise training
Costs	Accessible classroom/ meeting room or accessible heated pool; textbook; video projection; training costs and personnel
Key Content Areas	- Cause, meaning, and how to deal with disease and its consequences; generalizable skills (e.g., problem solving, decision making, communicating with providers and doctor, cognitive restructuring/ self-talk techniques etc.); training/ support in adopting and maintaining health-related behaviors: exercise, relaxation, energy-saving techniques -Managing problems with pain, depression, sleep; benefits/barriers to exercise; relaxation techniques - Range-of-motion exercises; some muscle-strengthening exercises; games to promote socialization, endurance, balance, and coordination; relaxation component
Key Processes	-Experiential educational methods (problem-solving discussions, brainstorming, demonstration/practice and feedback); -Self-efficacy-enhancing strategies (goal setting/ contracting, role modeling, peer support and persuasion, reinterpreting symptoms); -Behavioral modification techniques (shaping of behavior, repeated practice and feedback, self-monitoring/diaries, environmental cueing); -Social support strategies (involvement of significant others, buddy system, allotment of time for group sharing and feedback) -Supervised exercise training

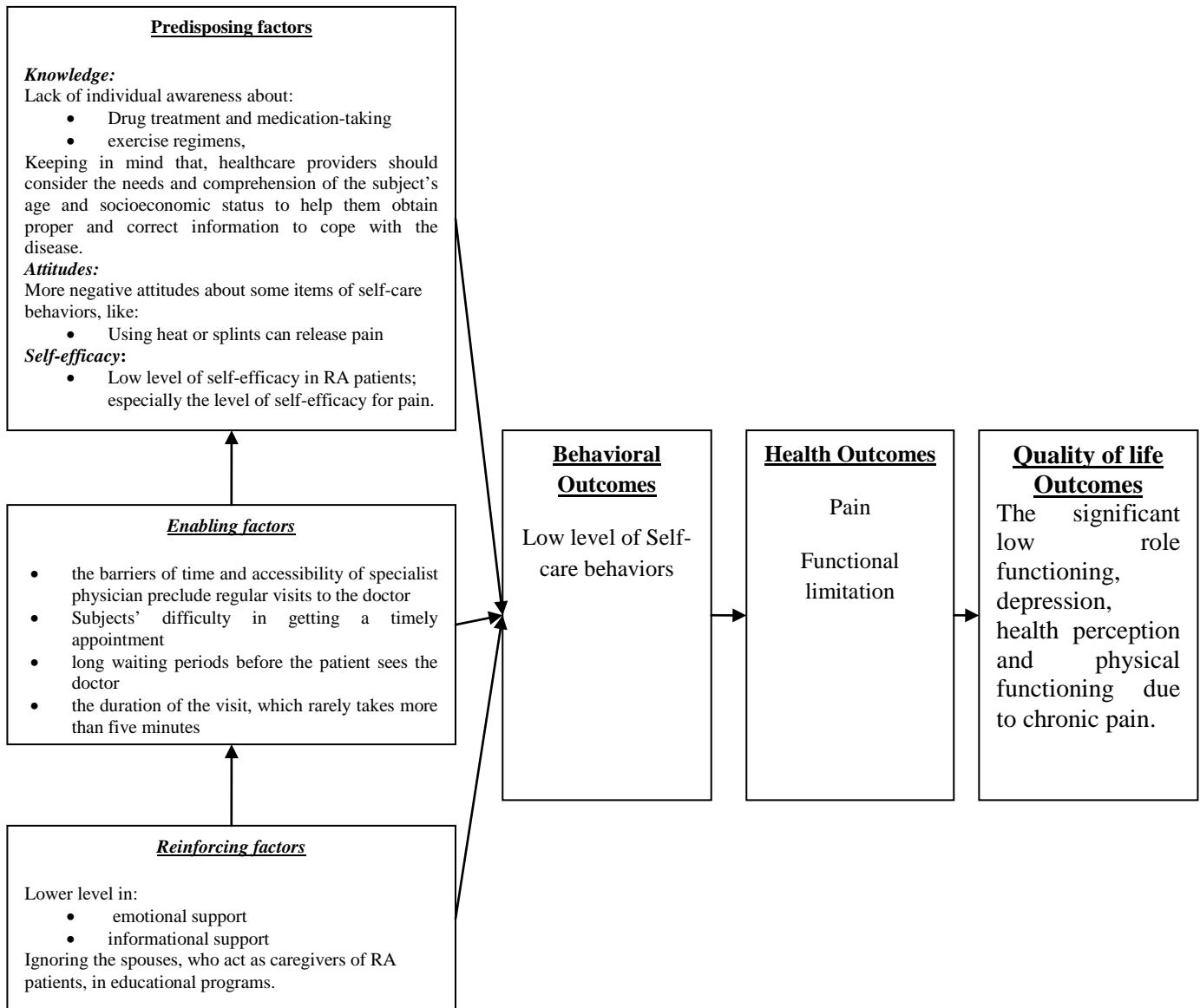


Figure 1: A summary of factors related to self-care behaviors in RA patients.

Discussion

Based on our results regarding health-related QOL and health status and what was found from other studies [21-22], the problems identified in RA patients was the significant low role functioning, health perception and physical functioning due to chronic pain. Health-related QOL and functional disability in RA are key outcomes that determine patients' requirements for care, and may affect their compliance and satisfaction with treatment [23]. Moreover, in several studies pain was usual and one of the most annoying prob-

lems among RA patients, and it inclined to increase with disease duration [22, 23]. In addition, there is sufficient evidence that supports the relationship between pain and functional limitation in RA and more deficient QOL [23]. According to our findings in this study others [22, 23]; it has been proposed that reducing pain and functional limitation can assist with improving health-related QOL in RA.

The significant health benefits of self-care behaviors have been emphasized in previous studies [24], and it is noted that

a crucial factor in successful management of RA is the engaging of patients in proper self-care behavior [2]. Orem defined self-care as: "The practice of activities that individuals initiate and perform on their own behalf in maintaining life, health and well-being"[25]. Self-care which improves the positive perceptions of the own patient and his/her health and functional ability may improve QOL, significantly [24]. Callahan and Pincus suggested that self-management activities are good predictors for well being and health, and these activities which include self-care behaviors may intervene between health status and health outcomes [26]. If this claim is true, the health care providers must have an obvious understanding of the factors related to effective self-care behaviors and also, the outcomes associated with it, so that they can guide RA patients in performing these behaviors.

PRECEDE model has been applied as a successful framework to resolve a wide range of public health problems [10, 27]. Some studies have suggested that applying the PRECEDE model to prevent, diagnosis and decrease health problems is a reliable approach for successful health education [28]. A concentration upon the most changeable behaviors related to a health problem (for example, self-care behaviors of RA patients in this study) and extensive assessment of the factors related to these behaviors may help in decreasing significant human and economic burden of diseases [29]. Based on the results of the present cross-sectional study and literature review it may be concluded that one of the most important changeable behavioral factors influencing pain and functional limitations is self-care behaviors in patients with RA. Figure 1 outlines the factors related to self-care behaviors in RA patients.

The educational phase of PRECEDE model includes the recognition, classifying and systematic arranging of the 'predisposing, reinforcing and enabling factors' which influence the health-related beha-

aviors [7]. Based on the model, an organic hierarchical arrange exists in putting the adjustable factors that influence self-care behaviors in order. Predisposing factors must be modified before enabling factors and enabling factors have to be changed before reinforcing factors. In other words, if RA patients do not have enough knowledge about the disease, and how they should perform relevant and pertinent self-care behaviors they may not spend much effort in performing self-care behaviors.

As Green and Kreuter [7] stated, predisposing factors are the human being knowledge, attitudes, beliefs, values, perceptions and self-efficacy which promote or prevent health behaviors.

Yang et al. found that knowledge of disease to be correlated positively with self-care behaviors, concluding that it might be a significant self-care behavior predictor [30]. But knowledge alone does not necessarily lead to behavioral change in the general population [6-7]. Similar with Chen and Wang [2] study, there was not found any significant relationship between knowledge and self-care behaviors in the present study which shows that in the respondents despite of having good knowledge about RA and its related self-care behaviors, they may not perform these behaviors, it means that maybe there are some other factors like self-efficacy that interact with changing knowledge to the behavior and therefore, hinders doing self-care behaviors.

Green and Kreuter stated that though not totally comprehended, there were relationships between behavior and attitudes [7]. Similar with their idea, in this study, there was a significant relationship between attitude and the level of self-care behaviors in RA patients. As Holman and Lorig [31] concluded, the proper action in managing chronic diseases includes the involvement of patients and their point of views (attitudes) regarding prescribed treatment. Therefore, the attitude of patients toward self-care behaviors which are

recommended as a part of treatment, may prepare RA patients to practice these behaviors or hinder them from practicing it.

Incorporating strategies to increase self-efficacy (confidence in undertaking healthful behaviors) to the program course may cause improved health outcomes [32]. The unforeseeable course and the altering disease activity may cause patients to view their disease as uncontrollable. The feeling of not being able to control the disease may result in anxiety and depression in patients [32]. This, in turn, may lead to increase perceptions of pain and decreased efforts to involve in daily activities. Therefore, health status will become worse. In our study, there was found a statistically significant correlation between patients' level of self-efficacy and self-care behaviors. As Brekke et al. noted self-efficacy is not a fixed trait and can be changed [33]. Therefore, program planning for RA patients in which promoting self-efficacy is one of the most important priorities, is suggested.

Enabling factors are the needed abilities, skills and resources required to carry out a health behavior [6-7], hence it is important to find out that which factors are barriers to self-care behaviors in RA patients. Enabling factors, in the present study, were one of the most powerful predictors of health status and our findings showed that the barriers of time and accessibility of specialist physician prevent regular visits to the doctor by respondents, which is one of the most important self-care behaviors among RA patients. These findings are quite similar to those of Tudiver and Talbot [34], who found that these barriers preclude regular visits to the doctor by men.

Reinforcing factors are the outcomes of action that determine whether the actor receives positive (or negative) feedback and is supported socially afterward [6-7]. RA is a challenge in terms of medical therapy, and often requires social support and social insurance [33]. Similar with Chen

and Wang's findings [2], in the present study, there was a statistically significant positive correlation between social support and self-care behavior, as well as health status. These findings support the idea that higher level of social support is related to better self-care [2].

Administrative diagnosis phase of the PRECEDE model focuses on the administrative and organizational concerns which must be addressed prior to program implementation. Green and Kreuter [7] defined administrative diagnosis as the analysis of policies, resources and circumstances, and predominant organizational situations that could slow down or expedite the development of the health program.

The objectives of this education program will increase RA patients' knowledge, attitude, self-efficacy, and how to deal with disease and its consequences and training and supporting them in adopting and maintaining health-related (self-care) behaviors as well as training them special exercises and increasing their perceived level of social support and enabling factors. In order to increase the patients' level of perceived social support especially emotional and informational support their caregivers should be participated in the program. Changes will be measured in the target population's awareness of (1) the symptoms of RA, (2) its related self-care behaviors like medication-taking and exercise regimens, (3) the patients' level of pain and functional disability and (4) help them obtain proper and correct information to cope with the disease.

The long-term goal of RAPEP is to help RA patients in improving their level of health-related QOL and increasing their significant low role functioning, health perception and physical functioning due to chronic pain. Expected outcomes of the program will be (i) decreasing the current level of pain and functional disability for patients joined in RAPEP by at least 20%,(ii) demonstrating an improved awareness of etiology of RA and, espe-

cially, its related self-care behaviors and exercises compared with baseline (i.e. prior to the educational program) by RA patients and (iii) having fewer pain and functional limitations and therefore, having a higher level of health-related QOL compared with baseline in the patients.

Although lots of studies in this regards have been done before for rheumatic patients including RA in developed countries, the number of these studies in developing countries are few. Thus, it was believed cautious to set up a baseline determination of the health-related QOL and its related factors and behaviors regarding rheumatoid arthritis patients within the Yazd city's population along with developing the educational program. Therefore, the project was begun with a baseline survey to assess these factors about RA.

As Yeo et al., noted, any public health education planning, have to comprise a comprehensive literature review and the acceptance of a conceptual framework that will guide the process in a systematic fashion [29]. The PRECEDE component of the PRECEDE-PROCEED model provided an outstanding conceptual framework to develop RAPEP aiming at RA patients in Yazd. The program characteristics are listed in Table 4. This program can be delivered in group format.

Conclusion

This patient education program can be useful for both clinical and public health practitioners. For clinicians, this educational program may be an integral part of the management of rheumatoid arthritis, patient education and rehabilitation therapies. As is evident, this is a newly developed program in a developing country and its efficacy and effectiveness has not been evaluated, yet. A priority for future research is to determine the efficacy and effectiveness of this intervention program among communities.

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