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Research Article

Relationships among Arthritis Self-efficacy and Background Characteristics in Patients with Rheumatoid Arthritis

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Abstract

Background: A thorough evaluation of variables related to self-efficacy that are unique to each patient population is an important step for developing self-management interventions.

Purpose: To determine factors associated with patient self-efficacy for managing pain and other symptoms of rheumatoid arthritis.

Methods: This cross-sectional study analyzed secondary data collected for a randomized controlled trial on rheumatoid arthritis conducted from October 2016 to January 2018. A sample of 214 patients was recruited from outpatient rheumatology clinics of one medical center in northern Taiwan. Data included demographic and rheumatoid arthritis-related characteristics and self-report scores for disease activity, health status, health-related quality of life, and arthritis self-efficacy.

Results: The mean age of participants was 58.72 years; 86% were female. Hierarchical regression demonstrated predictors of self-efficacy of pain management were a monthly income versus no income, living with other family members, duration (years) of arthritis, and arthritis education/counseling. Health-related quality of life scores for components of physical and mental health were also significant predictors. Predictors of self-efficacy for managing other symptoms were living with other family members in the household, religious beliefs of Buddhism or Taoism vs. none, and physical and mental component scores for health-related quality of life.

Conclusions/Implications for Practice: Nurses should focus interventions targeted at adults newly diagnosed with rheumatoid arthritis, who are living alone, in poor health, and have religious beliefs of Buddhism or Taoism.

Keywords: Arthritis self-efficacy; Physical functioning; Health-related quality of life; Rheumatoid arthritis; Self-management

Introduction

Rheumatoid Arthritis (RA) is a chronic, systemic, debilitating autoimmune disease, which results in limitations of daily activities and loss of employment for 50% or more of patients within 10 years of diagnosis [1]. Unlike osteoarthritis, RA effects the lining of the joints and deterioration of the synovial fluid, which causes painful swelling, stiffness, erosion of the bones, and ultimately deformity of the joints [2,3]. As joint damage increases, patients with RA experience increases limitations of Activities of Daily Living (ADLs) and the ability to maintain employment, which can significantly alter Health-Related Quality of Life (HRQoL) [2,3]. Although RA typically occurs in younger adults 20-40 years of age, diagnosis is difficult because symptoms in the early stages of the disease mimic other joint disorders [1]. A population-based study reported the annual incidence of RA was 15.8 cases per 100,000, with the incidence four-times higher in females than males [4]. As the average life span in Taiwan continues to increase, which was 81 years as of 2019 [5], there will be a concurrent increase in patients living with RA, which

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could be sustained for more than 40 years. Therefore, learning to manage the pain and other symptoms of RA is critical for long-term care, which can be facilitated by providing interventions that offer patients self-management skills [6,7].

A central concept in self-management is self-efficacy, which provides a theoretical basis for successfully managing health [8]. A systematic review conducted by Martinez-Calderon et al. [9], which critically appraised the role of self-efficacy for RA patients, found high levels of self-efficacy was associated with the ability to achieve personal goals, a positive outlook, and interactions with other, a greater acceptance of chronic illness, better coping and problem-solving skills, a greater level of physical function and participation in physical activities, and an improvement in HR-QoL. Therefore, a patient's self-efficacy is critical for the long-term self-management required for coping with symptoms of RA.

A synthesis of evidence-based study on self-efficacy and arthritis disabilities by Marks [10] demonstrated patients with a higher perception of self-efficacy for the ability to perform daily activities were more likely to have a more positive outlook about disease-associated limitations, no matter the patient population or the type of assessment instrument. These findings are applicable to self-efficacy for patients with RA in Western countries, however, the relationships among RA self-efficacy, knowledge of the disease, and demographic and clinical characteristics in Taiwanese adult patients have not been well characterized.

Understanding the variables associated with self-efficacies that are specific to each patient population are useful when developing self-management interventions to reduce symptoms for patients with RA and improve disease conditions. Therefore, most experts emphasize developing interventions that foster confidence in self-efficacy to reduce symptoms and improve outcomes for patients with RA requires evaluating which characteristics and disease variables will have the greatest impact on self-efficacy [10,11]. Therefore, the purpose of this study was to explore whether there are variables associated with greater self-efficacy for persons with RA in Taiwan.

Background

Treatment of RA requires disease self-management, which includes proactive behavior modification strategies to mitigate symptoms and reduce discomfort. These behavior changes assist patients in increasing self-confidence in their ability to address disease-related problems [6,12,13]. The Centers for Disease Control (CDC) recommends self-management for patients with chronic disease, such as RA [14], which not only requires adhering to treatment guidelines, but also incorporating psycho-social variables for coping with a chronic illness.

Bandura's theory of cognitive social learning posits an individual's personal beliefs about their abilities has a positive or negative impact on behaviors, motivation, thinking and emotions when reacting to critical situations [15]. An important mechanism for facilitating learning new behaviors is self-efficacy, which links knowledge and action to one's belief in their ability to successfully complete a task [8]. Hence, self-efficacy is one's confidence in being capable of performing a behavior that will produce a desired outcome. Therefore, having a high level of self-efficacy is critical for self-management of a chronic disease.

It is well-established that self-management programs enhance self-efficacy more effectively than only providing instruction in self-management because they are more effective at sustaining changes in health-related behaviors. A self-management program based on self-efficacy designed for older adults who had experienced heart failure showed heart failure-related symptoms decreased following the intervention compared with patients receiving usual care [16]. Self-efficacy based self-management interventions have also been shown to improve nutritional status for community-dwelling older adults [12]. A study of patients with RA conducted in China (N=88) showed patients who participated in a self-management intervention had significantly better physical functioning then their control counterparts [17].

Identifying variables that are associated with self-efficacy can improve self-management of clinically related symptoms characteristic of chronic disease [10]. Previous studies have identified the following variables to be important for self-management: physical functioning [9,10,18]; disease duration [18]; disease activity [19]; and QoL, measured by subscale scores on the Short-form Health Survey-36 (SF-36) [9,19]. Marks [10] concluded that self-management interventions should be individualized by considering the patient demographics, which could increase self-efficacy and allow patients with RA maintain independent activities as well as remaining fully employed.

Variables important for improving self-efficacy have provided guidance for developing self-management interventions for patients with RA. However, most of the studies on self-efficacy are from Western countries. The medical and cultural environment in Taiwan and other Asian countries differs from Western cultures and therefore, associations between demographic and clinical variables, RA-related disease characteristics and QoL with arthritis self-efficacy for management of pain and other RA-related symptoms have not explored. To enhance self-management for patients with RA, more knowledge and a better understanding of factors related to self-efficacy is needed to enhance arthritis self-care for patients with RA in Taiwan.

Methods

Study Design

This was a secondary analysis of an existing database from a cross-sectional, correlational design of a Randomized Controlled Trial (RCT) on the long-term effects of a self-management program [13]. This study aimed to explore variables that are predictors of arthritis self-efficacy among adults with RA in Taiwan. The study design followed the STROBE guidelines for the reporting of cross-sectional studies.

Setting and Participants

Patients included in the original study were recruited from the rheumatology departments of a medical center in northern Taiwan. Patients were eligible to participate if they met the following inclusion criteria: 1) a diagnosis of RA; 2) ≥20 years of age; and 3) RA symptoms had not increased for a minimum of 3 months, which was established by the patient's rheumatologist. Patients were excluded if 1) they had undergone therapeutic biological treatments within the previous 3 months; 2) were terminally ill, 3) had been diagnosed with severe dementia, or other debilitating psychiatric disorders; or 4) were residing in a long-term residential facility.

The required sample size was calculated with power analysis based on a conventional medium effect size, Cohen's d of .05,

and power level of .80. When a paucity of studies is a concern, 15 participants per predictor are suggested for a consistent regression equation [20]. Therefore, the minimum number of participants for multiple linear regressions conducted for 13 predictors was determined to be 195.

Instruments

Measurements: A survey questionnaire was used to collect data regarding background characteristics of sociodemographic factors (age, gender, educational level, income, living arrangement, marital status, religion (Buddhism/Taoism, Catholicism/Christianity, none), and the presence of other chronic diseases (yes/no). Rheumatoid arthritis related characteristics of disease duration, previous RA education/counseling (yes/no) were also collected with the survey questionnaire. Additional RA related data were collected with the following self-report questionnaires, which have been shown to be reliable and valid instruments for patients with arthritis [6].

Disease activity score: The 28-item Disease Activity Score (DAS-28) is a well-validated instrument for the assessment of a patient's level of RA-related disease activity in 28 joints [21]. The instrument combines clinical measures for the number of swollen and tender joints, and the laboratory value for the Erythrocyte Sedimentation Rate (ESR). A patient's self-assessment of their overall global health is scored using a 10-point visual analogue scale. The total disease activity score ranges from 0 to 9.4; a higher score indicates a greater level of severity for RA-associated disease activity [22]. The Cronbach's alpha for the DAS-28 has been reported as .72 [23]. Cronbach's alpha in this study was .71.

Physical functioning: This study assessed physical functioning with the 8-item Modified Health Assessment Questionnaire (MHAQ) developed by Pincus et al. [24], which has been shown to be a valid assessment instrument when determining if a self-management program improves the ability of a patient with a chronic disease, to perform daily physical functions, such as getting dressed, food preparation, and bathing [25]. The eight items are scored on a Likert-type scale (1=without difficulty to 4=unable to do); total scores range from 20-80, lower scores indicate a higher ability to perform daily activities. The Cronbach's α for the MHAQ is .87 [26]. Koh et al. [27] translated and adapted this scale for Chinese populations; the internal consistency of the scale was .86, and the test-retest reliability was .84. In this study, the Cronbach's α for the Chinese translation of the MHAQ was .95.

Physical and Mental Component scores for Health-Related Quality of Life (HRQoL): The original Short-form Health Survey-36 (SF-36) was developed as a self-report scale by Ware & Sherbourne [28], which has been shown to be a reliable valid measure of self-perceived HRQoL [29]. In this study, we used the Physical Component Score (PCS) and Mental Component Score (MCS) of the SF-36. Four subscales of the SF-36 (physical, role limitations due to physical health problems, bodily pain, and general health) are combined into the PCS, which is comprised of 21 items. Four other subscales of the SF-36 (vitality, social functioning, role limitations due emotional problems, and mental health) are combined into the MCS, which is comprised of 14 items. We did not use the additional item about health change, which is scored independently. Items for each subscale of the PCS and MCS are transformed into total scores, which range from 0 to 100; a higher component scores indicate a higher HRQoL. We used the PCS and MCS for the Taiwanese version of the SF-36 [30], which has a Cronbach's α coefficient >.70. The Cronbach's α for the PCS was .66; the Cronbach's for the MCS was .71 in this study.

Arthritis self-efficacy scale: The 20-item Arthritis Self-Efficacy Scale (ASES) measures the consequences of a patient's involvement in an Arthritis Self-Management Program [31]. The scale is comprised of three subscales for pain, function, and other symptoms (ASES-P, ASES-F, and ASES-OS, respectively). In this study, outcomes only included the subscale scores for the ASES-P and ASES-OS. Each item is scored using a visual analogue scale from 0, 'very uncertain' to 10, 'very certain'; total scores range from 0-50 for the ASES-P and 0-60 for the ASES-OS, with higher scores indicating a higher level of self-efficacy. The Cronbach's α for the ASES-P and ASES-OS is .76 and .87, respectively [32]. This study used a Chinese version of the scale (C-ASES) [33]; the Cronbach's α for the C-ASES-P and C-ASES-OS was reported as .81 and .91, respectively. In this study, Cronbach's α was .79 and .85 for the ASES-P and ASES-OS, respectively.

Data Collection

Data for this secondary analysis were collected from October 2016 to January 2018. After participants signed informed consent, data for demographics and measurement instruments, described above, were completed with individual, face-to-face interviews in a quiet conference room. Data collection was performed by the first author and one research assistant.

Data Analysis

Data were analyzed using the statistical software package SPSS 22 (IBM SPSS, Armonk, NY: IBM Corp). Descriptive statistics established frequency, range, mean and SD for demographic and disease-related variables. Correlations and relationships among independent and dependent variables were analyzed with Pearson's correlations and hierarchical multiple regression analyses.

Normality was confirmed prior to conducting independent t-test, or one-way analysis of variance (ANOVA) to determine if measures for ASES-P and ASES-OS differed among sociodemographic variables. Pearson product–moment correlation coefficient was used to examine the relationships between both ASES scores and all disease related factors (data not shown). Predictors of ASES-P and ASES-OS for patients with RA were identified with multiple linear regression analysis. The hierarchy of the variable entry included in the regression analysis was based on a literature review and demonstrated significant differences or correlations with each ASES. Correlations ranged from .053 to .609 when multicollinearity was examined between the independent variables; variance inflation factors ranged from 1.052 to 2.131 [20].

Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Boards of the hospitals of the primary investigator prior to data collection (No. 103-7345B). The study purpose and process of data collection was explained to all patients, with assurance that participation was voluntary, that anonymity and confidentiality would be maintained, and that they could withdraw from the study at any time and for any reason. Signed informed consent was obtained from all participants prior to beginning the study.

Results

Sample Characteristics

Of the 237 patients who met the inclusion criteria, 23 were excluded due to the following: refused participation because of no interest in the study (n=11), lacked time (n=7), and presence of a language barrier (n=5). Participants were mostly female (86.0 %); the mean age of 58.7 years (range=21-83, SD=11.40); and mean number of years of education was 9.93(range=0–16, SD=3.98). Most participants lived with their family (94.4%), and the average number of other family members in a household was 4.6(SD=1.93, range=1-9, median=5). Mean disease duration was 10.6 years (range=0.2–61, SD=8.39), 83% of participants had no previous instruction or counseling concerning RA, and other chronic diseases were present in 35% of participants. The mean score on the DAS-28 score was 3.81(SD=1.28), indicating a moderate level of disease activity. The mean score on the MHAQ for physical functioning was 24.71(SD=8.74), suggesting most participants had no difficulty performing daily activities. Mean QoL scores were moderately high: 50.45(SD=9.20) for the PCS and 49.97(SD=9.83). Mean scores on the ASES-P were 34.04(SD=9.696) and 49.08(SD=11.410) for ASES-OS, indicating a high level of self-efficacy for management of pain and other symptoms of RA. Details are shown in Table 1.

Table 1: Characteristics of Taiwanese participants with rheumatoid arthritis (N=214).

Variable	n	%	Mean	SD	Range
Background characteristics					
Demographics					
Age, years			58.72	11.40	21-83
Gender					
Female	184	86.0%			
Male	30	14.0%			
Married/partnered	191	89.3%			
Education, years			9.93	3.98	0-16
Religion					
Buddhism or Taoism	146	68.2%			
Catholicism or Christian	16	7.5%			
None	52	24.3%			
Monthly income					
Yes	96	44.9%			
No	118	55.1%			
Living arrangement					
Living alone	12	5.6 %			
Living with family	202	94.4 %			
Number of others in household			4.60	1.93	1-9
Other chronic diseases (yes)	75	35%			
Rheumatoid arthritis related characteristics					
Duration of RA, years			10.58	8.39	0.2-61
Previous RA Education/ counseling					
Yes	36	16.8%			
No	178	83.2%			
Disease activity of the DAS-28 score			3.81	1.28	0.82-8.29
Physical functioning of the MHAQ score			24.71	8.74	20-73
ASES subscale scores					
ASES-P			34.04	9.696	3-50
ASES-OS			49.08	11.41	2-60
Quality of life subscales					
PCS			50.45	9.20	21.91-70.08
MCS			49.97	9.83	16.49-70.81

Note: SD: Standard Deviation; RA: Rheumatoid Arthritis; DAS-28: 28-Item Disease Activity Scale; MHAQ: Modified Health Assessment Questionnaire; ASES-pain: Arthritis Self-Efficacy Scale-Pain; ASES-OS: Arthritis Self-Efficacy Scale-Other Symptoms; PCS: Physical Component Score on the Short-form Health Survey-36; MSC: Mental Component Score on the Short-form Health Survey-36

Table 2: Hierarchical regression: Predictors of ASES-Pain a for Taiwanese adults with rheumatoid arthritis (N=214).

	Predictors							
	Model 1				Model 2			
Variable	B	β	t	p	B	β	t	p
Background characteristics								
Age	-.124	-.145	-1.530	.128	-.142	-.166	-1.958	.052
Gender: female (vs. male)	-2.167	-.077	-1.075	.284	-1.994	-.071	-1.130	.260
Educational level (years)	.251	.103	1.124	.262	.121	.049	.608	.544
Monthly income: yes (vs. no)	-2.187	-.112	-1.310	.192	-3.051	-.156	-2.099	**.037**
Others in household (n)	-.334	-.066	-.948	.344	.796	.158	2.305	**.022**
Religion: Buddhism or Taoism (vs. none)	-.011	-.001	-.006	.995	.138	.007	.096	.923
Religion: Catholicism or Christian (vs. none)	1.417	.037	.499	.618	1.427	.038	.568	.571
	R^2 = .049, R^2_{adj} = .016, F = 1.504, p = .167							
RA disease related characteristics								
Duration of RA (years)					.155	.134	2.090	**.038**
Previous RA Education/ counseling: yes (vs. no)					3.650	.140	2.238	**.026**
Other chronic diseases: yes (vs. no)					.809	.040	.631	.529
DAS-28 Score					-.621	-.082	-1.196	.233
MHAQ score					-.316	-.285	-3.313	**.001**
Quality of life-PCS score					.206	.195	2.479	**.014**
Quality of life-MCS score					.229	.232	3.639	**<.001**
						R^2=.314, R^2_{adj}=266, F=6.483, p<.01;		
						ΔR^2=0.265, ΔF=10.952, p<.01		

Note: ASES-pain: Arthritis Self-Efficacy Scale-Pain: RA: Rheumatoid Arthritis; DAS-28: 28-Item Disease Activity Scale; MHAQ: Modified Health Assessment Questionnaire; PCS: Physical Component Score on the Short-Form Health; Survey-36 MSC: Mental Component Score on the Short-form Health Survey-36; [a]ASES-Pain score: Dependent Variable

Predictors of Arthritis Self-Efficacy

The factors chosen as predictors for the arthritis self-efficacy scale (ASES-P and ASES-OS) for patients with RA in the hierarchical regression analysis were not only based on a literature review, but also on differences and correlational analysis. Therefore, the analysis included background characteristics (age, gender, educational level (years), monthly income, living with others (n), religion), and RA disease related variables (duration of RA (years), previous RA education/counseling, current chron-

Table 3: Hierarchical regression: predictors of ASES-OS a for Taiwanese adults with rheumatoid arthritis (N=214).

	Predictors							
	Model 1				Model 2			
Variable	B	β	t	p	B	β	t	p
Background characteristics								
Age	-.088	-.087	-.917	.360	-.119	-.119	-1.586	.114
Gender: female (vs. male)	-2.013	-.061	-.846	.398	-1.686	-.051	-.920	.358
Educational level (years)	-.143	-.050	-.541	.589	-.243	-.084	-1.178	.240
Monthly income: yes (vs. no)	-1.040	-.045	-.528	.598	-2.641	-.115	-1.751	.082
Others in household (n)	-.213	-.036	-.512	.609	.990	.167	2.763	**.006**
Religion: Buddhism or Taoism (vs. none)	-4.289	-.175	-2.204	**.029**	-3.929	-.160	-2.644	**.009**
Religion: Catholicism or Christian (vs. none)	-.067	-.002	-.020	.984	-.818	-.018	-.313	.754
	R^2 = .040, R^2_{adj}=0.007, F = 1.208, p = .300							
RA disease related characteristics								
Duration of RA (years)					.082	.061	1.068	.287
Previous RA Education/counseling: yes (vs. no)					.671	.022	.396	.692
Other chronic diseases: yes (vs. no)					.295	.012	.222	.825
DAS-28 Score					-1.003	-.113	-1.861	.064
MHAQ score					-.053	-.041	-.534	.594
Quality of life-PCS score					.518	.417	6.016	**< .001**
Quality of life-MCS score					.431	.371	6.599	**< .001**
					R^2=.465, R^2_{adj}=.427, F=12.276, p<.01;			
					ΔR^2=0.425, ΔF=22.459, p<.01			

Note: ASES-OS: Arthritis Self-Efficacy Scale-Other Symptoms; RA: Rheumatoid Arthritis; DAS-28: 28-Item Disease Activity Scale; MHAQ: Modified Health Assessment Questionnaire; PCS: Physical Component Score on the Short-form Health; Survey-36 MSC: Mental Component Score on the Short-form Health Survey-36; [a]ASES-OS: Dependent Variable

ic diseases, and scores on the DAS-28, MHAQ, and PCS and MCS on the SF-36). After testing the assumptions of the regression [34], two hierarchical multiple regressions were obtained, which are described below.

Regression Analysis for Self-Efficacy of Pain Management

In model 1, background characteristics accounted for 1.6% of the variance for scores on ASES-P (R^2=0.049, R^2adj=0.016, F=1.504, p=.167). However, none of the background variables were predictors of arthritis self-efficacy of pain management. In model 2, adding disease related variables explained a significant amount of the variability (ΔR^2=0.265, ΔF=10.952, p<.01). In the final model, the significant predictors included monthly income, living with others, duration of RA, previous RA education/counseling, MHAQ score, QoL-PCS, and QoL-MCS (Table 2).

Regression Analysis for Self-Efficacy of Management of Other Symptoms

All variables for background characteristics accounted for 4.0% of the variance for ASES-OS (R^2=0.040, R^2adj=0.007, F=1.208, p=.300). However, only religion (Buddhism or Taoism vs none) was a predictor of arthritis self-efficacy of other symptoms. In Model 2, inclusion of disease related variables explained a significant amount of the variability over that already explained by religion (Buddhism or Taoism vs. none) (ΔR^2=0.425, ΔF=22.459, p<.01). In the final model, the significant predictors of self-efficacy of managing other symptoms of arthritis included others in household, religion (Buddhism or Taoism), QoL-PCS, and QoL-MCS (Table 3).

Discussion

This study aimed to identify variables associated with arthritis self-efficacy for patients with RA. In total, seven variables were found to be associated with self-efficacy of pain management: monthly income, others in household, duration of RA, previous RA education/counseling, physical functioning, and the physical and mental component scores for QoL. Although thirteen variables were included the analysis, multiple linear regression models explained only 26.6% of the variance in ASES-P, which means that 73.4% remains unexplained. Four explanatory variables were found to be associated with self-efficacy of managing other symptoms of arthritis: others in household, religion (Buddhism or Taoism), and the physical and mental component scores for QoL. The multiple linear regression models explained 42.7% of the variance in ASES-OS.

Our results echo other studies that demonstrated self-efficacy was associated with physical functioning [6,10,17,18,35], confirming a greater level of physical functioning can provide patients with better self-efficacy. Our findings are also consistent with a previous study of patients with RA conducted in China, which demonstrated an association between QoL and self-efficacy [19]. Enhancing self-efficacy for patients with RA has been shown to provide stronger perceptions and attitudes about the benefits of healthy life-style behaviors, which can reduce barriers to sustaining changes in self-management behaviors [35], which are important for improving and maintaining health [10]. Higher self-efficacy increases a patient's ability to establish routines that help them adjust to the chronic nature of RA as their condition progresses [14], which can lead to better physical functioning and QoL [19].

The duration of RA duration was only significantly associated with greater self-efficacy of pain management. However, there are inconsistencies in several previous studies between self-efficacy and disease duration. Many studies have found an increase in disease duration was associated with higher self-efficacy. A study conducted in the Netherlands by Bos-Touwen et al. [11] showed self-efficacy was higher in patients with longer disease duration. However, Primdahl et al. [18] found that longer disease duration significantly had a negative effect on the level of self-efficacy. Landgren et al. [36] provided an explanation that in the early stages of the RA (during the first two years), patients make a concerted effort to optimize their treatment outcomes, by trying to master their new life situation, which may decrease their self-efficacy. Another explanation posited by Bonsaksen et al. [37] is that adults with shorter disease duration are more likely to have young children living at home, which can increase stressors of managing their RA and thus, lower their disease self-efficacy. In contrast, persons with longer disease duration are older and more likely to have support from family members [37]. Patients who have been more recently diagnosed may also be young professionals, who are more likely to be focused on their careers, social activities, and family life on their RA [38]. Patients with longer disease duration are older and have a higher number of chronic diseases and a greater focus on their self-care [38], which is echoed by an old Chinese saying: "A long illness becomes a good doctor".

Education or counseling about RA was only a significant predictor of greater self-efficacy of pain management. However, our findings should be interpreted with caution because most participants in our study (83.2%) had never received RA education/counseling. Helping patients become more engaged and responsible for their self-care has been shown to be an effective coping strategy improving an individual's self-efficacy [37]. Education about RA that includes coping strategies should be the first step for increasing self-efficacy and improving health outcomes [39]. Identification of the most significant self-efficacy predictor is an important finding for healthcare providers, who should direct future interventions towards better self-management among patients with RA. Therefore, understand the patient's knowledge of RA self-care is a crucial step, which can be easily incorporated into a self-management intervention program.

Living with other family members increased participants' self-efficacy for management of pain and other arthritis-related symptoms. This finding might be explained by the tradition of Chinese cultures in which members of a family depend on each other for support and care giving during periods of illness or chronic disease [40,41]. Nearly all participants (94.4%) lived with other family members, hence, support from family members can give participants the freedom to focus on self-management of RA, which may improve their self-efficacy. The relationship between having additional family members in a patient's household and self-efficacy for management of pain and other symptoms of arthritis was also reported by Bos-Touwen et al. [11] for patients with chronic diseases in the Netherlands, who demonstrated that living alone was related to poor activation of disease self-management. However, our findings contrast with a study by Rosland et al. [42], who examined self-care in patients with chronic disease in the United States, who found 25% of patients reported family members were barriers to self-care because they nagged or criticized patients, and therefore, family involvement was associated with lower disease care self-efficacy.

Our findings regarding the positive impact on living with other family members on arthritis self-efficacy may be influenced by the cultural differences of Taiwanese society. Lu et al. [43] found as a patient's disabilities from RA became more severe, patients were more likely to come under the care of their children. When older adults in traditional Chinese cultures become ill they are more likely to be cared for by family members, which include not only physical but also emotional support [40,41]. The responsibility for family members to act as caregivers is deeply ingrained in Chinese societies that are strongly influence by the philosophy of Confucius, which requires filial piety and dictates children have the responsibility of caring for older family members [40]. Taiwanese people tend to depend on their family, and even the needs of individuals who live alone are provided by support from family members [40].

Having a monthly income was negatively associated with self-efficacy, which differs from the finding of several other studies. Bos-Touwen et al. [11] found an association between financial distress and low engagement in self-management; a study of an Asian population reported higher income was associated with better self-care [38]; and Shakya [44] found employed income-earning patients had a greater level of independence in terms of physical ability and managing their treatment compared with unemployed patients. However, whether self-efficacy is truly associated with a patient's income or financial status is highly dependent on the system of healthcare available to the participants being studied, which includes how prescription medicines are distributed and how cost is controlled [38].

The participants in our study who reported having religious beliefs of Buddhism or Taoism had lower self-efficacy compared with participants with no religion. Thus, cultural background should be considered when developing self-management interventions for patients with RA. Therefore, Taiwanese patients who believe their lives are controlled by God or fate often adopt strategies to achieve peace of mind instead of attempting to draw on personal resources that will allow them to be take responsibility for staying healthy [40]. The belief that health is a matter of faith has been shown to inhibit patients from adopting healthy behaviors by shifting responsibility for their chronic disease to God or fate [45,46]. Religious beliefs of Buddhism and Taoism could reduce self-efficacy for patients with RA in Taiwan because they do not believe they are able or have the responsibility to change their health condition.

Limitations of the Study

One limitation to our study findings is that participants were recruited from an outpatient department of one medical center in northern Taiwan, therefore patients with little or no access to the outpatient department, patients who were terminal, or in critical condition were not represented in this study, which may prevent generalization to all patients with RA. In addition, characteristics of patients who elected to participate in the study may differ from those who declined. Our participant population was 86% female (86%), which is a reflection of the distribution in the population, with a higher number of females affected by RA [47]. Therefore, our findings about factors influencing self-efficacy for patients with RA may not generalize to male patients suggest mores studies be conducted with a larger sample size of male participants. Lastly, one note of caution is that the overall amount of the variance accounted for by the predictors was quite small. One explanation may be disease was stable at the time participants completed the questionnaires, thus the lack of more variability in the scores may not correlate well with self-

efficacy. In addition, the small amount of variance explained by the regression model may also indicate the existence of other factors that were not included in the analysis, which should be explored further.

Clinical Implications

Our findings indicate patients newly diagnosed with RA have a lower level of self-efficacy in managing their disease, especially if they have not received adequate arthritis information through educational sessions or counseling. Rheumatology nurses often have a close relationship with patients with RA because they are involved in the long-term care required for this chronic and debilitating disease. Therefore, these nurses can help patients with RA improve their self-efficacy. Nursing intervention programs should focus on patients as soon as a diagnosis of RA is confirmed as well as patients who have never received RA education. Furthermore, our findings suggest that if patients hold religious beliefs oriented towards Buddhism or Taoism, they are likely to display a passive attitude about the impact of their disease. Therefore, we recommend that rheumatology nurses recognize a patient's cultural and religious background characteristics. This would allow nurses and patients to work with a self-management coordinator to design an intervention program that applies an individual's personal characteristic to optimize their self-efficacy.

Conclusions

This study provides evidence that there are significant predictors of arthritis self-efficacy among patients with RA in Taiwan. Identifying significant predictors of self-efficacy could allow healthcare providers to apply these components to future self-management interventions for patients newly diagnosed with RA, who are living alone, and have religious beliefs of Buddhism or Taoism. Our findings identified multiple variables that can have a positive or negative effect on a patient's self-efficacy, which could be incorporated into self-management interventions targeting patients with RA. However, the small amount of variance explained by the regression model suggests there are most likely additional factors related to self-efficacy that were not included in our analysis. Therefore, we suggest future research examine factors related to self-efficacy for managing other chronic diseases to further enhance interventions for patients with RA and increase self-efficacy. The research findings suggest nursing self-management intervention programs should incorporate education and counselling about RA, support for patients' religious beliefs, and encourage adoption of healthy behaviors. Including family members in intervention programs should also be considered as they could provide additional support that fosters patients' arthritis self-efficacy.

Author Statements

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Ethical Approval

This study was approved by the Chang Gung Medical Foundation Institutional Review Board (No. 103-7345B).

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Author Contributions

All authors contributed to all of the following: (1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, and (3) final approval of the version to be submitted.

References

1. World Health Organization (WHO). Chronic Rheumatic Conditions. 2020.
2. Oh H, Park J, Seo W. Identification of symptom clusters and their synergistic effects on quality of life in rheumatoid arthritis patients. Int J Nurs Pract. 2019; 25: e12713.
3. Sok SR, Ryu JS, Park SH, Seong MH. Factors Influencing Self-Care Competence in Korean Women With Rheumatoid Arthritis. J Nurs Res. 2019; 27: e16.
4. Kuo CF, Luo SF, See LC, Chou IJ, Chang HC, Yu KH. Rheumatoid arthritis prevalence, incidence, and mortality rates: a nationwide population study in Taiwan. Rheumatol Int. 2013; 33: 355-60.
5. Ministry of the Interior. Latest statistics. 2022.
6. Barlow J, Wright C, Sheasby J, Turner A, Hainsworth J. Self-management approaches for people with chronic conditions: a review. Patient Educ Couns. 2002; 48: 177-87.
7. Hewlett S, Ambler N, Almeida C, Cliss A, Hammond A, et al. Self-management of fatigue in rheumatoid arthritis: a randomised controlled trial of group cognitive-behavioural therapy. Ann Rheum Dis. 2011; 70: 1060-7.
8. Bandura A. Self-efficacy: the exercise of control. New York: Freeman; 1997.
9. Martinez-Calderon J PT, Meeus M PT, Struyf F PT, Luque-Suarez A PT. The role of self-efficacy in pain intensity, function, psychological factors, health behaviors, and quality of life in people with rheumatoid arthritis: A systematic review. Physiother Theory Pract. 2020; 36: 21-37.
10. Marks R. Self-efficacy and arthritis disability: An updated synthesis of the evidence base and its relevance to optimal patient care. Health Psychol Open. 2014; 1: 2055102914564582.
11. Bos-Touwen I, Schuurmans M, Monninkhof EM, Korpershoek Y, Spruit-Bentvelzen L, et al. Patient and disease characteristics associated with activation for self-management in patients with diabetes, chronic obstructive pulmonary disease, chronic heart failure and chronic renal disease: a cross-sectional survey study. PLoS One. 2015; 10: e0126400.
12. Chen SH, Huang YP, Shao JH. Effects of a dietary self-management programme for community-dwelling older adults: a quasi-experimental design. Scand J Caring Sci. 2017; 31: 619-629.
13. Shao JH, Yu KH, Chen SH. Effectiveness of a self-management program for joint protection and physical activity in patients with rheumatoid arthritis: A randomized controlled trial. Int J Nurs Stud. 2021; 116: 103752.
14. Oshotse C, Zullig LL, Bosworth HB, Tu P, Lin C. Self-Efficacy and Adherence Behaviors in Rheumatoid Arthritis Patients. Prev Chronic Dis. 2018; 15: E127.
15. Bandura A. Social foundations of thought and action. A social cognitive theory, 1st ed. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. 1986.

16. Shao JH, Chen SH. Randomized control trial of a self-management intervention for heart failure older adults in Northern Taiwan. Collegian. 2019; 26: 288-294.

17. Liu ZC, Gao L, Zhang WH, Wang J, Liu RR, et al. Effects of a 4-week Omaha System transitional care programme on rheumatoid arthritis patients' self-efficacy, health status, and readmission in mainland China: A randomized controlled trial. Int J Nurs Pract. 2020; 26: e12817.

18. Primdahl J, Wagner L, Holst R, Hørslev-Petersen K, AMBRA Study Group. The impact on self-efficacy of different types of follow-up care and disease status in patients with rheumatoid arthritis--a randomized trial. Patient Educ Couns. 2012; 88: 121-8.

19. Gong G, Mao J. Health-related quality of life among Chinese patients with rheumatoid arthritis: The predictive roles of fatigue, functional disability, self-efficacy, and social support. Nurs Res. 2016; 65: 55-67.

20. Stevens J. Intermediate statistics: A modern approach, 2nd ed. Mahwah, Lawrence Erlbaum Associates. 1999.

21. van der Heijde DM, van 't Hof MA, van Riel PL, Theunisse LA, Lubberts EW, et al. Judging disease activity in clinical practice in rheumatoid arthritis: first step in the development of a disease activity score. Ann Rheum Dis. 1990; 49: 916-20.

22. van Gestel AM, Haagsma CJ, van Riel PL. Validation of rheumatoid arthritis improvement criteria that include simplified joint counts. Arthritis Rheum. 1998; 41: 1845-50.

23. Salaffi F, Cimmino MA, Leardini G, Gasparini S, Grassi W. Disease activity assessment of rheumatoid arthritis in daily practice: validity, internal consistency, reliability and congruency of the Disease Activity Score including 28 joints (DAS28) compared with the Clinical Disease Activity Index (CDAI). Clin Exp Rheumatol. 2009; 27: 552-9.

24. Pincus T, Summey JA, Soraci SA Jr, Wallston KA, Hummon NP. Assessment of patient satisfaction in activities of daily living using a modified Stanford Health Assessment Questionnaire. Arthritis Rheum. 1983; 26: 1346-53.

25. Lorig KR, Sobel DS, Ritter PL, Laurent D, Hobbs M. Effect of a self-management program on patients with chronic disease. Eff Clin Pract. 2001; 4: 256-62.

26. Köse SK, Öztuna D, Kutlay S, Elhan AH, Tennant A, et al. Psychometric properties of the Health Assessment Questionnaire Disability Index (HAQ-DI) and the Modified Health Assessment Questionnaire (MHAQ) in patients with knee osteoarthritis. Turkish Journal of Rheumatology. 2010; 25: 147-55.

27. Koh ET, Seow A, Pong LY, Koh WH, Chan L, et al. Cross cultural adaptation and validation of the Chinese Health Assessment Questionnaire for use in rheumatoid arthritis. J Rheumatol. 1998; 25: 1705-8.

28. Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care. 1992; 30: 473-83.

29. Ware JE Jr. SF-36 health survey update. Spine (Phila Pa 1976). 2000; 25: 3130-9.

30. Lu JFR, Lan CF, Wu SC, Liu WL, Lee JL, Chi CH. SF-36, 1996.

31. Lorig K, Chastain RL, Ung E, Shoor S, Holman HR. Development and evaluation of a scale to measure perceived self-efficacy in people with arthritis. Arthritis Rheum. 1989; 32: 37-44.

32. Barlow JH, Williams B, Wright CC. The reliability and validity of the arthritis self-efficacy scale in a UK context. Psychology Health and Medicine. 1997; 2: 3-17.

33. Wu SF, Kao MJ, Wu MP, Tsai MW, Chang WW. Effects of an osteoarthritis self-management programme. J Adv Nurs. 2011; 67: 1491-501.

34. Norusis MJ. SPSS 13.0 guide to data analysis. Upper Saddle River, NJ: Prentice Hall. 2005.

35. Suh CH, Jung JY, Oh H, Boo S. Evaluation of factors affecting the levels of physical activity in patients with rheumatoid arthritis: a cross-sectional study. Clin Rheumatol. 2019; 38: 2483-2491.

36. Landgren E, Bremander A, Lindqvist E, Nylander M, Van der Elst K, et al. Mastering a New Life Situation - Patients' preferences of treatment outcomes in early rheumatoid arthritis - A longitudinal qualitative study. Patient Prefer Adherence. 2020; 14: 1421-1433.

37. Bonsaksen T, Lerdal A, Fagermoen MS. Factors associated with self-efficacy in persons with chronic illness. Scand J Psychol. 2012; 53: 333-9.

38. Berner C, Erlacher L, Fenzl KH, Dorner TE. Medication Adherence and Coping Strategies in Patients with Rheumatoid Arthritis: A Cross-Sectional Study. Int J Rheumatol. 2019; 2019: 4709645.

39. Reinseth L, Uhlig T, Kjeken I, Koksvik HS, Skomsvoll JF, et al. Performance in leisure-time physical activities and self-efficacy in females with rheumatoid arthritis. Scand J Occup Ther. 2011; 18: 210-8.

40. Chen SH, Shao JH. Have you had your bowl of rice?: a qualitative study of eating patterns in older Taiwanese adults. J Clin Nurs. 2012; 21: 2-10.

41. Shao JH, Chuang YH, Chen SH. A multi-perspective focus-group approach to revise items in a dietary self-efficacy scale for older Taiwanese adults. Collegian. 2015; 22: 83-90.

42. Rosland AM, Heisler M, Choi HJ, Silveira MJ, Piette JD. Family influences on self-management among functionally independent adults with diabetes or heart failure: do family members hinder as much as they help? Chronic Illn. 2010; 6: 22-33.

43. Lu SR, Lin HY, Lin KC, Lin HR. Quality of life in middle-aged and older Taiwanese patients with rheumatoid arthritis. J Nurs Res. 2008; 16: 121-30.

44. Shakya D. Self-efficacy among patients with chronic diseases and its associated factors. Journal of Kathmandu Medical College. 2018; 7: 82–88.

45. Chen SH, Yu KH, Kao YC, Shao JH. It is like a puppet show-experiences of rheumatoid arthritis among adult Chinese: A qualitative study. Clinical Nursing Research. 2022a; 31: 795–802.

46. Chen SH, Yu KH, Lee YH, Shao JH. Expectations of an online-self-management program for rheumatoid arthritis. Clinical Nursing Research. 2022b; 31: 1023–1032.

47. Centers for Disease Control (CDC). Arthritis: Rheumatoid Arthritis. 2020.