

Original article

Factors associated with depressive symptoms in Japanese women with rheumatoid arthritis

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Abstract

Objectives. It has been suggested that patients with RA are more likely to suffer from depression. Therefore, this study identified the factors associated with depressive states in female RA patients to inform future patient care.

Methods. A self-assessment questionnaire was administered to 150 female RA patients aged ≥ 20 years regarding their satisfaction with disease activity, pain (measured using a visual analogue scale), self-rated depression scale (SDS), stress content (illness, work, family, difficulty in daily life, appearance, treatment and other), confidence in stress management and satisfaction (treatment effect, health status and relationships with health-care professionals). The factors related to depression and the presence of depressive tendencies were investigated.

Results. Data from 145 patients were analysed. Eighteen patients (12.4%) showed depressive tendencies according to their SDS scores. Among these patients, SDS scores were positively correlated with disease activity and with scores on the modified HAQ, visual analogue scale for pain, and stress content. The SDS score was also negatively correlated with patients' confidence in stress management and health status satisfaction.

Conclusion. Female RA patients had family problems and various stressors in their daily lives. Nurses need to conduct regular mental health assessments to monitor their self-management status and support them to improve their confidence and satisfaction in coping. To achieve this, it is important for health-care teams involving various health-care professionals to collaborate and cooperate.

Key words: confidence, depression, RA, stress management, women, coping

Key messages

- Factors associated with depressive states in female patients with RA were identified.
- Of 145 patients, 18 (12.4%) showed depressive tendencies on the self-rating depression scale.
- Female RA patients with depressive tendencies faced several stressors, with decreased confidence and satisfaction.

Introduction

RA is a progressive autoimmune disease characterized by the impairment of physical functions through chronic pain and joint damage. RA affects 0.6–1.0% of the Japanese population, has been reported in 1.24 million people (1% of the total population) and is more prevalent in women [1]. Owing to a recent paradigm shift in

the diagnosis and treatment of RA, functional remission and maintenance of good health-related quality of life (QOL) have been included as treatment goals for patients with RA, in addition to clinical remission [1]. Hewlett *et al.* [2] found that patients wanted to be free of anxiety and worry, make progress in treatment, see improvements in activities of daily living (ADLs), be satisfied with their QOL and experience functional remission

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(no interference with work or finances) and social remission. Furthermore, nurses' psychosocial interventions in the treatment of RA have been reported to be correlated with improved psychosocial outcomes in patients [3–5]. Moreover, Fusama *et al.* [6] demonstrated that biologic treatment, which enables clinical, structural and functional remission, improved patients' QOL. However, Taylor *et al.* [7] reported that patients' psychological and social needs were not being met with their current health status because of the large patient–physician discrepancy regarding RA management [8].

According to previous literature, the prevalence of depressive disorders in RA ranges from 9.5 to 41.5%, with women being more affected than men [9]. This comorbidity has been associated with prolonged disease duration, disease activity (as assessed using the DAS28), functional impairment and psychological issues, such as insufficient social support and social anxiety [10–12]. Furthermore, Rathbun *et al.* [13] proposed that depression might worsen chronic pain and disease activity.

Patients with RA frequently experience more anxiety and irritation owing to uncertainty regarding their future and an inability to understand the symptoms related to their disease, in comparison to other chronic disease patients [14–16]. The EULAR states that part of a nurse's role is to identify, assess and take appropriate measures regarding patients' psychosocial problems to minimize the risk of anxiety and depression, and to educate patients to support self-management of RA [17]. However, given that most nursing care for patients with RA is provided in outpatient centres, the implementation of accurate psychological assessments and the provision of support are still insufficient. The World Health Organization reports that depression is a common disorder affecting 5.0% of adults, and more women suffer from depression than men [18]. In addition, women older than those in their 40s are more susceptible to depression in Japan, and the onset of depression is often related to female hormonal fluctuations, lifestyle, housework, childcare, work and nursing care [19].

Based on these findings, it is necessary to review nursing care and prevention of depression for female RA patients >20 years of age (individuals >20 years of age are defined as adults in Japan).

Therefore, the purpose of this study was initially to identify the characteristics of female RA patients (with and without depression), then to identify the factors associated with depression. We believe that the results of this study will help to guide future nursing care.

Methods

Study design and selection of participants

This cross-sectional study was conducted between March and September 2016. A total of 150 patients were included in the study. The inclusion criteria were as follows: patients diagnosed with RA according to the 2010 ACR/EULAR classification criteria for RA, and

women aged ≥ 20 years. The exclusion criteria were as follows: a history of psychiatric diseases and active use of antidepressants, antipsychotics or gabapentinoid drugs. Patients included in this study were patients of the rheumatology outpatient clinics of the Nagasaki University Hospital and the Japanese Red Cross Nagasaki Genbaku Hospital.

All procedures in this study complied with the Declaration of Helsinki and were approved by the ethical committee of the Nagasaki University Graduate School of Biomedical Sciences (approval number: 15122573) in addition to the participating institutions, namely the Nagasaki University Hospital (approval number: 16052329) and the Japanese Red Cross Nagasaki Genbaku Hospital (approval number: 430).

Data collection

Patients completed a self-assessment questionnaire while waiting to be seen at the hospital. When it was difficult for patients to complete the questionnaire, the survey was conducted verbally, with the permission of the patients or their caregivers. The questionnaire was answered verbally in an unfrequented and undisturbed environment to ensure patient privacy. Patients who were unable to complete the questionnaire during their waiting time were asked to complete it in their own time and mail their questionnaires instead. The questionnaire required 20–30 min to complete. Written informed consent was obtained from all patients.

Clinical parameters

The following medical information was collected from the patients' medical records:

1. Age (in years).
2. Disease duration (in years).
3. The Steinbrocker stage score (I–IV), which was used to assess the progression of RA in the joints. The closer the score was to stage IV, the more severe the progression of RA.
4. The disability class based on Steinbrocker's classes 1–4, where class 4 indicated more severe disability resulting from RA.
5. DAS28-CRP score, which included tender joint count and swollen joint count, and patients' assessment of pain assessed using the visual analogue scale (VAS) for pain calculated using CRP score values (high > 4.1; moderate = 2.7–4.1; low = 2.3–2.6; and remission < 2.3). The DAS28-CRP score was the latest data available on the day of the survey.
6. Use of prednisolone and the quantity thereof.
7. Use of biologics and Janus kinase (JAK) inhibitors, type of inhibitor prescribed and route of administration.

Questionnaire materials

The following information was collected using the self-administered questionnaire:

1. Attribute: housewife (yes/no).
2. Patient VAS score for pain was measured using a VAS with a continuum of values from 0 to 100 mm. Patients were asked to rate how much pain they experienced, with 0 being 'complete dissatisfaction' and 100 being 'complete satisfaction' [20].
3. Physical health was measured using the modified HAQ (mHAQ). Constructed by Pincus *et al.* [21], the mHAQ measures patient QOL regarding physical health. Its reliability and accuracy have been verified in Japan [22]. The questions pertained to the following eight categories: dressing oneself, waking, meals, walking, hygiene, flexibility, grip strength and activity. For each question, participants needed to choose from the following four responses: no difficulty (0 points); some difficulty (1 point); very difficult (2 points); and impossible (3 points). The lowest average score was 0 points, which indicated better retention of mobility and daily functioning.
4. To measure depression, we used the Japanese version of the self-rating depression scale (SDS) developed by Zung *et al.* [23] and licensed by Sankyo. The SDS is an effective tool to measure depressive tendencies among adult men and women in Japan. The scale consisted of 20 questions with the following response options: very rarely (1 point); rarely (2 points); frequently (3 points); and always (4 points). The upper limit of the total score is 80 points, and the higher the score, the stronger the depressive tendency. In this study, based on the criteria provided by Sankyo, scores of 0–49 were defined as not depressed, scores of 50–59 as low degree of depression, scores of 60–69 as moderate to severe depression, and scores of ≥ 70 as extreme depression. In this study, the Cronbach's α value was 0.707.
5. Confidence in stress management was measured using the VAS, which has been reported to be a useful measure for avoiding statistical challenges and problems that can arise from using a non-sequential ordinal scale [24]. Patients' confidence in their ability to manage stress was rated on a continuous scale ranging from 0 to 100 mm, with 0 representing no confidence in stress management and 100 representing absolute confidence in stress management. The higher the value, the higher the individual patient's confidence in stress management.
6. Stress content was measured with respondents selecting all items that applied from the following seven stress categories: illness, work, family, difficulty in daily life (owing to pain or deformity), appearance (deformity), treatment and other (free description). The more items selected, we evaluated that the patient perceives more stress. Stress coping was measured with respondents being asked to select all items, depicting ways of coping with stress, that applied to them from the following: talking to someone, laughing, chatting with a friend, relaxation (such as getting a massage), sleeping and other (free description). The more items selected, the more stress coping strategies they were rated as having. The measurement of

content of stress and stress coping was conducted after referring to/in accordance with a previous survey of patients with chronic diseases and was determined after a preliminary test [25].

7. To assess support in daily life, participants were asked to select which of the following nine items applied to them: no supporters, spouse, children, children's spouses, fathers or mothers, brothers or sisters, grandchildren, grandparents and other (free description). The more options selected, the more support the respondents received.
8. Satisfaction with the treatment effect, health state, and relationships with health-care professionals were measured using the VAS, on a continuum of values between 0 (not satisfied at all) and 100 mm (very satisfied). The higher the value, the greater the patient's satisfaction.

Statistical analysis

Descriptive statistical analysis was performed for basic demographics and SDS scores. The participants were divided into depressed and non-depressed groups according to the presence or absence of depressive tendencies based on the SDS scores. Subsequently, between-group comparisons were made using the Mann–Whitney *U*-test. The SDS category was set as the dependent value, and its relationships with other variables were assessed using the Spearman's rank correlation coefficient and logistic regression analysis. SPSS Statistics v.26 was used as the statistical analysis software, and the significance level was set at 5%.

Results

Patient characteristics

Of the 150 self-assessment questionnaires collected from patients, 145 were analysed, after excluding five incomplete questionnaires. The demographic data and clinical characteristics are shown in Table 1.

The subjects in this study had a median age [interquartile range (IQR)] of 63 years (54–70), and 74 (51%) were housewives. The median duration of disease (IQR) was 10 years (5–19), DAS28-CRP was 2.5 (1.7–3.1), and 61 patients (42.1%) were prescribed biologics and JAK inhibitors. The median SDS score (IQR) was 43 (38–47); 15 (10.3%) participants were mildly depressed, 3 (2.1%) were moderately depressed, and none was extremely depressed. The percentage of participants with depressive tendencies was 12.4%. Based on these results, we divided the participants into two groups: those with depressive tendencies (depression group; $n=18$) and those without depressive tendencies (no depression group; $n=127$) and examined them using the Mann–Whitney *U*-test. The depressed group had significantly higher mHAQ score ($P=0.002$) and VAS score for pain ($P=0.015$) than the non-depressed group. The depression group had significantly higher satisfaction with

TABLE 1 Characteristics of patients with RA with and without depressive tendencies

Variable	Total (n = 145)	No depression (n = 127)	Depression (n = 18)	95% CI	P-value
Age, years	63.0 (54–70)	62.0 (54–70)	64.5 (55–71)	−7.052, 5.552	0.721
Housewife, Y/N	74/71	64/63	10/8	–	–
Disease duration, years	10.0 (5–19)	10.0 (4–19)	7.5 (6–13)	−5.825, 5.867	0.813
Steinbrocker stages, I/II/III/IV	51/27/25/42	41/25/23/37	9/2/2/5	–	–
Steinbrocker's class, 1/2/3/4	44/65/33/3	41/57/25/3	2/8/8/0	–	–
DAS28-CRP	2.5 (1.7–3.1)	2.5 (1.7–3.1)	2.6 (2.1–3.1)	−0.661, 0.293	0.336
DAS28, remission/low/medium/high	63/27/42/13	56/23/37/11	7/4/5/2	–	–
mHAQ	0.1 (0–0.4)	0.0 (0.0–0.4)	0.3 (0.1–1.5)	−0.767, −0.073	0.002
Prednisolone dose, mg/day	0 (0–3.0)	0 (0–15)	0 (0–10)	−1.635, 1.496	0.957
Use of biologics and JAK inhibitors, Y/N	61/84	55/72	6/12	–	–
Biologics and JAK inhibitors ^a	4/16/3/3/4/22/7/2	3/15/3/3/4/19/6/2	1/1/0/0/0/3/1/0	–	–
Biologics and JAK inhibitors ^b	20/29/1/10/1/	16/28/1/9/1	4/1/0/1/0	–	–
VAS of patient pain	17.0 (8.5–38.5)	16.0 (5.0–35.0)	40.0 (12.8–55.0)	−24.069, −1.698	0.015
SDS	43.0 (38.0–47.0)	41 (38–45)	52 (50–57)	−15.845, −10.545	<0.001
SDS, none/low/medium/high	127/15/3/0	127 (87.6%)	18 (12.4%)	–	–
Stress contents ^c	1 (1–2)	1 (1–2)	3 (2–3)	−1.884, −0.650	<0.001
Stress coping ^d	1 (1–2)	1 (1–2)	2 (1–3)	−0.780, 0.198	0.157
Supporters	1 (1–2)	1 (1–2)	1 (0–2)	−0.451, 0.666	0.671
Treatment effect, VAS	74.0 (50.0–86.0)	74.0 (51.0–87.0)	56.5 (35.0–73.8)	3.603, 29.650	0.007
Health status, VAS	62.0 (48.0–80.5)	67.0 (50.0–82.0)	42.5 (23.8–58.0)	13.159, 35.426	<0.001
Relationship, VAS	80.0 (63.5–93.0)	82.0 (68.0–93.0)	78.0 (49.8–85.8)	−1.906, 20.709	0.078

The Mann–Whitney *U*-test was used to test for between-group comparisons, and results are displayed as the median (interquartile range) or classification. ^aBiologics and JAK inhibitors: IFX (infliximab)/ETN (etanercept)/ADA (adalimumab)/GLM (golimumab)/CTZ (certolizumab)/TCZ (tocilizumab)/ABT (abatacept)/JAK inhibitors. ^bThe route of administration of biologics and JAK inhibitors: i.v./s.c. injection (patient)/s.c. injection (family member)/s.c. injection (health-care professional)/oral intake. ^cCategories: illness, work, family, difficulty in daily life (owing to pain or deformity), physical appearance (deformity), medical treatment and others (free description). ^dCategories: talk to someone, laughing, chatting with a friend, relaxation, sleep and others (free description). VAS: visual analogue scale; Y/N: yes/no.

treatment effects ($P=0.007$) and health status ($P<0.001$) than the non-depression group.

Patient characteristics of stress content, coping strategies, confidence in stress management, and support status

Data on the characteristics of the two patient groups, including stress content, coping strategies and support status, are shown in Table 2. The most common stressor in the depression group was illness ($n=13$, 72.2%), followed by difficulties in daily life and medical treatment ($n=10$, 55.6%). The depression group had significantly lower confidence in stress management ($P=0.001$) than the non-depression group. There was no significant between-group difference in terms of stress coping strategies or supporters.

Factors affecting depression

The results of Spearman's rank correlation coefficients with SDS score as the dependent variable and other variables are shown in Table 3. The SDS score was positively correlated with the scores for DAS28-CRP ($r_s=0.184$, $P<0.026$), mHAQ ($r_s=0.307$, $P<0.001$), pain ($r_s=0.251$, $P<0.002$) and stress ($r_s=0.361$, $P<0.002$). Conversely, the SDS score was negatively

correlated with patients' confidence in stress management ($r_s=-0.360$, $P<0.001$) and satisfaction with health status ($r_s=-0.337$, $P<0.001$). Furthermore, these variables were almost intercorrelated.

Logistic regression models were used to calculate adjusted odds ratios (ORs) with 95% CIs for the risk of depressive tendencies associated with mHAQ, patients' VAS score of pain, patients' confidence in stress management, and satisfaction with health status (Table 4). The variables were determined using the results from the Mann–Whitney *U*-test and Spearman's rank correlation coefficient. The results of the multiple logistic regression analysis using the variable increasing method with likelihood ratios showed associations among patients' confidence in stress management (OR 0.963, 95% CI 0.935, 0.989, $P=0.005$), mHAQ (OR 3.313, 95% CI 1.154, 9.509, $P=0.026$), and satisfaction with health status (OR 0.96, 95% CI 0.932, 0.988, $P=0.006$). In particular, patients' confidence in stress management, mHAQ and satisfaction with their health status were significantly associated with depressive tendencies. The result of the Hosmer–Lemeshow test was $P=0.996$, with a discriminant predictive value of 89.7%; the DAS28-CRP score did not significantly affect depressive tendencies ($P=0.451$).

TABLE 2 Stress content, stress coping and support status of RA patients with and without depressive tendencies

Parameter	Variable	Total	No depression	Depression	95% CI	P-value
		(n = 145)	(n = 127)	(n = 18)		
Stress content	Illness	70 (48.3)	57 (44.9)	13 (72.2)	-0.52, -0.027	0.042
	Work	46 (31.7)	32 (25.2)	3 (16.7)	-0.129, 0.299	0.563
	Family	37 (25.5)	28 (22.0)	9 (50.0)	-0.493, -0.066	0.019
	Difficulties in daily life	35 (24.1)	36 (28.3)	10 (55.6)	-0.501, -0.043	0.029
	Physical appearance	35 (24.1)	14 (11.0)	4 (22.2)	-0.276, 0.052	0.242
	Medical treatment	18 (12.4)	25 (19.7)	10 (55.6)	-0.565, -0.153	0.002
	Other	17 (11.7)	14 (11.0)	3 (16.7)	-0.217, 0.105	0.445
Stress coping	Talk to someone	40 (27.6)	34 (26.8)	6 (33.3)	-0.289, 0.158	0.561
	Laughing	40 (27.6)	35 (27.6)	5 (27.8)	-0.226, 0.222	0.985
	Chatting with a friend	60 (41.4)	51 (40.2)	9 (50.0)	-0.345, 0.148	0.429
	Relaxation	15 (10.3)	13 (10.2)	2 (11.1)	-0.161, 0.144	0.909
	Sleep	38 (26.2)	32 (25.2)	6 (33.3)	-0.301, 0.139	0.464
	Other	23 (15.9)	20 (15.7)	3 (16.7)	-0.192, 0.174	0.921
	Confidence in stress management, VAS	57 (35-81)	62 (42-83)	33.5 (18.3-56.3)	11.287, 34.554	0.001
Supporters	Supporters, Y/N	131/14	118/9	13/5	-	-
	Spouse	82 (56.6)	73 (57.5)	9 (50.0)	-0.173, 0.323	0.55
	Child	70 (48.3)	61 (48.0)	9 (50.0)	-0.270, 0.231	0.876
	Child's spouse	7 (4.8)	5 (3.9)	2 (11.1)	-0.179, 0.035	0.185
	Father or mother	17 (11.7)	15 (11.8)	2 (11.1)	-0.154, 0.168	0.931
	Sibling	24 (16.6)	22 (17.3)	2 (11.1)	-0.124, 0.248	0.508
	Grandchild	5 (3.4)	5 (3.9)	0	-0.052, 0.131	0.393
	Grandparent	2 (1.4)	2 (1.6)	0	-0.043, 0.074	0.593
	Other	8 (5.5)	8 (6.3)	0	-0.051, 0.177	0.275

The Mann-Whitney *U*-test was used to test for between-groups comparisons and results are displayed as median (IQR) or classification. VAS: visual analogue scale; Y/N: yes/no.

Discussion

Patients with RA are more susceptible to depression; therefore, this study identified the factors associated with depressive symptoms in females. Of the 145 patients with RA, 61 (42.1%) received biologics or JAK inhibitors, and 63 (43.4%) achieved clinical remission. The treatment was performed with a treat-to-target approach, and the patients' RA was relatively controlled. Tiosano *et al.* [26] reported that tocilizumab (TCZ) treatment was significantly associated with improvements in anxiety and depressive disorders in patients with RA. In the present study, out of the 61 patients treated with biologics or JAK inhibitors, 22 (36%) were treated with TCZ. Six (9.8%) of the 61 patients treated with biologics or JAK inhibitors and three (13.6%) patients treated with TCZ showed signs of depression. The incidence was similar to that previously reported (9.5-41.5%) [9]. However, the usage rate of biologics among RA patients who showed depressive tendencies was low (six patients, 33.3%), suggesting that the incidence of depression might be higher than the previous reports if biologics are not used.

Factors related to or influencing depression

Factors associated with or influencing depression were high mHAQ scores, low self-confidence in stress, many

types of perceived stress contents, and insufficient satisfaction with health status. Baerwald *et al.* [9] reported that impaired function increases the risk of developing depression, as measured by the HAQ. That is, the mHAQ score was associated with the incidence of depression, which is consistent with previous reports [9-13]. To illustrate, Mahlich *et al.* [27] reported that treatment satisfaction affected depression. In the present study, we investigated satisfaction with therapeutic effects, satisfaction with health status and satisfaction with relationships with health-care professionals. There was a significant difference in the therapeutic effect and satisfaction with health status between the depression and non-depression groups. In addition, satisfaction with health status was identified as a factor influencing depression. This suggests that the degree of satisfaction with health conditions influenced depression. Additionally, those with lower self-confidence regarding stress management also showed a tendency towards depression. Stress is a subjective perception that includes physical stress (impairment of daily function), psychological stress (anxiety, fear), social stress (social expectations) and stress related to the ability to manage the above tasks. In the present study, the stress perceptions included those related to illness, family, difficulties in daily life and treatment, all of which overlapped. Hewlett *et al.* [2] explained the importance of stress management

TABLE 3 Factors associated with depression

	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
① SDS	-0.001	0.025	0.184*	0.057	0.305**	0.251**	-0.360**	0.361**	-0.157	-0.337**	-0.121
② Age, years	-	0.097	0.139	-0.036	0.140	0.109	0.090	-0.211*	0.023	0.078	-0.049
③ Disease duration, years		-	0.023	0.114	0.232**	0.145	-0.024	0.058	0.067	-0.084	-0.032
④ DAS28-CRP			-	0.229**	0.421**	0.408**	-0.040	0.114	-0.246**	-0.293**	-0.036
⑤ Prednisolone dose, mg/day				-	0.187*	0.208*	-0.119	0.023	-0.126	-0.082	0.009
⑥ mHAQ					-	0.529**	-0.093	0.313**	-0.301**	-0.444**	-0.258**
⑦ Patient's pain, VAS						-	-0.150	0.287**	-0.382**	-0.500**	-0.357**
⑧ Confidence in stress management							-	-0.213**	0.370**	0.368*	0.235**
⑨ Stress contents								-	-0.343**	-0.500**	-0.272**
⑩ Treatment effect ^a									-	0.602**	0.569**
⑪ Health state ^b										-	0.439**
⑫ Relationships ^c											-

* $P < 0.005$, ** $P < 0.001$. ^aTreatment effectiveness: satisfaction with treatment effect and health status. ^bHealth status: satisfaction with health status. ^cRelationships: satisfaction with relationships with health-care professionals. mHAQ, modified HAQ; SDS, self-rating depression scale; VAS for pain, visual analogue scale for pain.

TABLE 4 Factors affecting depression

Parameter	OR	95% CI	P-value
mHAQ	3.313	1.154, 9.509	0.026
Confidence in stress management	0.963	0.935, 0.989	0.005
Satisfaction with health state	0.960	0.932, 0.988	0.006

OR, odds ratio; mHAQ, modified HAQ.

and reported that stress is a risk factor for developing autoimmune diseases, including RA. Moreover, Parker et al. [28] reported significant improvements in fatigue, self-efficacy, pain and health through effective stress management. It has been reported that women are also more likely to experience stress from major life events and play more vulnerable social roles than men, slowing the development of stress management and increasing the incidence of depression [29, 30]. Therefore, even if there was clinical improvement in the treatment of illness, subjective factors such as the patient's perception of difficulty in daily life, confidence in coping with stress, level of contentedness in stress and expected health condition were considered to be related to depression.

Although several important findings were evident in the present study, several limitations were also present. First, because of the small number of patients in the two hospitals, the statistical power of the results (especially patients with RA with a tendency towards depression) might have been attenuated. Second, all participants in our study were women; thus, these results cannot be generalized to all RA patients. Therefore, further studies are required to validate our findings. Despite these limitations, we believe that the present study demonstrates that subjective factors such as the patient's perception of difficulty in daily

life, confidence in coping with stress, various types of stress and expected health condition were related to depression in female patients with RA. Although we did not find any association with depression, we believe that it is also important to examine whether stress coping methods are effective and whether the presence of a support person is perceived as support. More detailed research is needed not only to examine the presence of a support person but also whether the presence of a support person is perceived as support.

In this study, the factors associated with depression were the mHAQ score, patients' confidence in stress management and patients' satisfaction with their health status. Although not significant, the results suggest that in addition to these items, multiple stress might also have had an impact. Given that functional remission is the ultimate goal of RA treatment, EULAR advocates that the main role of nurses in RA treatment is to address 'psychosocial issues to reduce patients' anxiety and depressive symptoms' [17]. To do this, nurses should first understand how the patient perceives and self-manages their condition, consider patient education and cognitive behavioural therapy to improve adherence depending on the self-management status, support the health-care team and the patient, and provide support to maintain and improve self-efficacy. In addition, it is important to provide patients with the following support services: regular mental health assessment, an understanding of stressors and coping strategies, and support for physical activities that patients might want to engage in, such as work, housework and hobbies. To implement these activities, we believe that it is necessary for nurses to update their knowledge and skills through continuous learning and to create an environment that facilitates support and communication. Furthermore, to support patients as a health-care team, the various health-care professionals should share information obtained from

the patients and collaborate with each other by giving input according to their expertise.

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Data availability statement

The data underlying this article will be shared on reasonable request to the corresponding author.

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