

Fear-avoidance beliefs about physical activity in adults with rheumatoid arthritis

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Objectives: The aim of this study was to describe fear-avoidance beliefs about physical activity and explore how these beliefs correlate with sociodemographic, disease-specific, and psychosocial factors in adults with rheumatoid arthritis (RA).

Method: This cross-sectional study is part of the Physical Activity in Rheumatoid Arthritis (PARA) 2010 study. The study participants (n = 2351) were identified through the Swedish Rheumatology Quality (SRQ) registries from six rheumatology clinics in Sweden. Univariate and backwards stepwise logistic regressions were performed.

Results: Stepwise logistic regressions showed that male gender [odds ratio (OR) 1.55, 95% confidence interval (CI) 1.26–1.91] and having a below average income (OR 1.35, 95% CI 1.12–1.63) were associated with an increased risk of high scores on the modified Fear Avoidance-Belief Questionnaire (mFABQ). The two disease-specific factors most indicative of high mFABQ scores were high level of pain (OR 1.99, 95% CI 1.40–2.84) and poor health (OR 1.59, 95% CI 1.10–2.29). With regard to psychosocial factors, low health-related quality of life (HRQoL; OR 0.44, 95% CI 0.35–0.55) and a low score on the Exercise Self-Efficacy Scale (ESES; OR 0.66, 95% CI 0.52–0.82) were significantly associated with a high mFABQ score. The model fit was 0.27 (Nagelkerke's R²).

Conclusions: High fear-avoidance beliefs about physical activity in patients with RA were found to be associated with being male and having a below average income, a high level of pain, poor health, a low HRQoL, and low ESES score. Additional research is warranted for adults with RA to capture the multiple potential correlates to fear-avoidance beliefs about physical activity.

One of the most common symptoms of rheumatoid arthritis (RA) is pain. Not surprisingly, clinicians and patients report pain as an important outcome measure in RA (1–4). Chronic pain, which consists of many elements, is a highly diverse and complex phenomenon. The International Association for the Study of Pain (IASP) defines pain as ‘an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage’ (5). Fear and anxiety are natural responses to impending pain (6).

Individuals with RA have an increased risk of premature death because of cardiovascular disease, possibly related to inflammation (7) as well as other factors (8). Research supports the benefit of aerobic and strengthening exercise in RA (9), and findings indicate support for health-enhancing physical activity (HEPA) behaviours in people with RA (10). A higher level of self-reported physical activity in persons with RA is associated with a

lower level of arterial dysfunction, independent of other cardiovascular events and rheumatological factors (11). A minority of people with RA perform maintained HEPA, including aerobic physical activity and muscle strength training. Psychosocial factors seem to be the most salient and consistent factors explaining HEPA variation (12). Avoidance of physical activity results not only in negative physical consequences (such as loss of muscle strength and impaired mobility) but also in psychological changes, depression, and anxiety. Furthermore, it may result in decreased social activities and social isolation (13).

The Fear-Avoidance Belief Questionnaire (FABQ), originally described by Waddell et al (14), measures fear-avoidance beliefs about work and physical activity. The FABQ seems to be the best available instrument to measure the concepts of fear and avoidance behaviours towards physical activity (15). The theoretical construct for this scale is pain-related fear, which is associated with catastrophic misinterpretations of pain, hypervigilance, and increased escape and avoidance behaviours, along with intensified pain intensity and functional disability. Pain severity also has an important role in disability. Most studies have focused on patients with non-specific

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medical diagnoses but the pain-related fear process is also applicable to specific pain problems (16). In a study of patients with chronic venous disease, fear-avoidance beliefs were associated with low physical activity (17), and information on the importance of the benefits of physical activity as a treatment strategy was not given as routine (18). Maladaptive negative beliefs can reinforce inactivity while decreased physical activity can lead to increased pain perception, negative expectations, and increased avoidance (19). Proper belief assessment is therefore advocated.

This study aimed to describe fear-avoidance beliefs about physical activity and explore how they correlate with sociodemographic, disease-specific, and psychosocial factors in adults with RA.

Method

Participants

This cross-sectional study is part of the Physical Activity in Rheumatoid Arthritis (PARA) 2010 study. The selection procedure has been described elsewhere (20, 21). Initially, the Swedish Rheumatology Quality (SRQ) registries were searched for potentially eligible participants. Six rheumatology clinics were chosen to represent university and county hospitals, rural and urban areas and different regions of Sweden. To identify a population that would be a target for a physical activity intervention, only those up to age 75 years and with a Health Assessment Questionnaire Disability Index (HAQ-DI) score of up to 2 (measured by the Stanford HAQ-DI) were included. A total of 3152 (out of 5391) potentially eligible patients with RA according to the 1987 American College of Rheumatology criteria (22) responded to the questionnaire. A detailed description of differences between responders ($n = 3152$) and non-responders ($n = 2239$) is available elsewhere (12). Of the 3152 (59%) returned questionnaires (in the PARA 2010 study), 2351 (75%) patients had observations for all the variables. These 2351 patients constitute the present study sample.

Dependent measure

Fear-avoidance beliefs were measured by the modified version of the FABQ (mFABQ). This instrument consists of four items on beliefs about physical activity that causes pain and injury. The items are rated on a seven-point scale from 0 (do not agree at all) to 6 (agree completely). The validity and reliability of the questionnaire have been reported in patients with chronic muscular pain (14) and the mFABQ has been used in a general population in Sweden (23).

Independent measures

Sociodemographic data on sex, age, household members, education, and income were collected, along with

disease-specific data on comorbidity. General health perception was rated on a 100-mm visual analogue scale (VAS) from 0 (totally fine) to 100 (worst imaginable health). The scale is valid and reliable in RA (24). Perceived pain was rated on a 100-mm VAS from 0 (no pain) to 100 (maximal pain). This scale is also considered valid and reliable in RA (25). Fatigue was rated on a 100-mm VAS from 0 (no fatigue) to 100 (maximal fatigue). The scale has good face validity and is sensitive to changes in RA (26, 27).

Psychosocial data were collected using the Exercise Self-Efficacy Scale (ESES). This scale contains six items covering common barriers for exercise. Ratings are made on a six-point scale from 1 (not at all confident) to 6 (very confident). The ESES has been determined as a valid instrument (internal consistency and concurrent validity) for measuring barriers to exercise (28). Preliminary results indicate that the Swedish version of the ESES has moderate test-retest reliability and respectable internal consistency for people with RA; however, its construct validity was only partially supported (unpublished observations). The original version of the ESES uses a 0–100 scale (28) but the Swedish version is from 1 (not certain) to 10 (very certain). Although the number of scale points differ between the Swedish and original version, the Swedish version does retain a scale structure similar to the original.

The EuroQol-5 dimension (EQ-5D) was used to assess health-related quality of life (HRQoL). This questionnaire includes five questions covering five domains: mobility, hygiene, daily activities, pain/discomfort, and anxiety/depression. The EQ-5D score is reported on a 0 to 1 scale, where 0 refers to death and 1 to full health. Each dimension is scored from 1 (no problems) to 3 (extreme problems). To rate health on the actual day, a line is drawn from a box to the appropriate point on a vertical thermometer from 'worst imaginable health state' (= 0) to 'best imaginable health state' (= 100). The EQ-5D has been reported to be a valid measure of HRQoL in patients with RA (29), has previously been used in a general population in Sweden, and has been seen as useful in measuring perceived health in RA together with condition-specific instruments (30).

Statistical analysis

The statistical analysis, performed in two steps, was designed to evaluate factors associated with fear-avoidance beliefs. In the first step, univariate logistic regression was performed for all independent factors. Based on the univariate analysis, all factors with a p -value < 0.2 were selected and entered into the second step. In step 2, backwards stepwise logistic regression was conducted in which model selection was addressed using the Akaike information criterion (AIC), which is a measure of the relative quality of a statistical model for a given set of data. The model fit was estimated using Nagelkerke's R^2 .

The dependent variable (mFABQ) was dichotomized as low (0–6) or high (7–24) according to median values and the results of a previous study (12), where the model estimates the odds ratio (OR) of having a high value. Cronbach's α for the mFABQ was 0.78.

For descriptive purposes, 95% confidence intervals (CIs) are presented. The independent variables (age, sex, children and adults in a household, education, health, pain, fatigue, and ESES score) were grouped into the same categories as those adopted by Demmelmaier et al (12). EQ-5D and EQ-5D VAS were dichotomized based on median values in the present sample. Descriptive statistics are presented as numbers and proportions (%).

Differences between the two groups of participants (responders and non-responders) in the analysis and of those with high and low mFABQ scores were analysed with the χ^2 test. Statistical significance was set at $p < 0.05$. The statistical analysis was performed in R version 2.14.1 (R Foundation for Statistical Computing, Vienna, Austria).

Ethics and consent

Ethical approval was obtained from the Regional Ethical Review Board in Stockholm (Dnr: 2010/1232-31/1). The patients received a letter regarding study information and consented to participate by submitting their questionnaires. The study was carried out in accordance with the ethical principles of the Declaration of Helsinki (31).

Results

Descriptive statistics of the excluded and included groups in the primary analysis are presented in Table 1. A larger proportion of those excluded were older, lived alone, had lower education and income, higher comorbidity, more symptoms, poorer HRQoL, lower ESES and higher mFABQ scores.

Table 2 shows that persons with a higher mFABQ score were more likely to be older, male, have a lower education and income, experience higher comorbidity, suffer more symptoms, have poorer HRQoL, and lower ESES score.

The stepwise logistic regression, presented in Table 3, shows that being male (OR 1.55, 95% CI 1.26–1.91) and earning a below average income (OR 1.35, 95% CI 1.12–1.63) were associated with an increased risk of a high mFABQ score. The two disease-specific factors most indicative of a high score on the mFABQ were a high level of pain (OR 1.99, 95% CI 1.40–2.84) and poor health (OR 1.59, 95% CI 1.10–2.29). For psychosocial factors, low HRQoL (OR 0.44, 95% CI 0.35–0.55) and low ESES score (OR 0.66, 95% CI 0.52–0.82) were significantly associated with higher scores on the mFABQ.

The logistic regression model demonstrated significant overall correlations between all the independent variables

and the mFABQ (Nagelkerke's $R^2 = 0.27$). Overall, the model correctly classified 60.6% of the cases as high or low fear-avoidance.

Discussion

To our knowledge, this study is the first to present data on fear-avoidance beliefs about physical activity as measured by the mFABQ and their correlates with sociodemographic, disease-specific, and psychosocial factors in a large sample of adults with RA.

The present findings, evidencing that moderate to high pain levels increased the risk of high fear-avoidance beliefs, are consistent with studies showing that pain intensity contributes to explaining disability during the acute and chronic stages of pain (16). A previous study (23) reported a relationship between fear-avoidance and activities of daily living (ADL), as well as one between catastrophizing (a person's irrational thought that a situation is worse than it is) and pain intensity in patients with low back pain. The results suggest that fear-avoidance beliefs and catastrophizing may play an active part in the transition from acute to chronic pain (23). Leeuw et al (16) reported that fear of pain, fear of work-related activities, fear of movement, and fear of re-injury are often described in patients who suffer from pain. In the present study 45% of the patients with RA reported moderate to high levels of pain. However, one study found that people with RA who believe their illness is somewhat under control continue to report moderate to severe pain (4) and say that such pain negatively affects their QoL (32).

In our study poor health and a low ESES score were correlated with an increased risk of high fear-avoidance beliefs. In patients with arthritis, self-efficacy has been identified as an explanatory factor for variation in physical activity (33). The psychological well-being of individuals with RA is significantly affected by the various changes in disease and treatment (34). Negative emotions and stress are major psychological factors that have been linked to RA (35, 36). Living with RA has different psychological demands on a person to adapt various strategies to cope with everyday life (37). The reciprocal relationship between fear and avoidance is assumed to be the primary basis for sustained pain behaviour and disability (19). Negative social factors, stressors in the environment, lack of social support, and work history can all influence a person's health (38). Catastrophizing thoughts and fear-avoidance beliefs about physical activity can be addressed as negatively toned emotions and negative bodily attention. Negatively toned self-focused bodily attention has been linked to less effective decision-making strategies and worse adherence (39). Disaster thoughts and behaviours seem to function as a means to maintain factors for chronic pain and its consequences (40). Patients with chronic pain commonly believe they have limited ability to control their pain (13). Catastrophic thoughts involve exaggerated and extremely

Table 1. Descriptive statistics in relation to the excluded vs. included groups in the analysis.

	Excluded (n = 801)	Included (n = 2351)	Total (n = 3152)	p-value
Sex				
Female	582 (72.66)	1727 (73.46)	2309 (73.26)	0.693
Male	219 (27.34)	624 (26.54)	843 (26.74)	
mFABQ (range 0–24)				
High (7–24)	355 (60.48)	1192 (50.70)	1547 (52.65)	< 0.001
Low (0–6)	232 (39.52)	1159 (49.30)	1391 (47.35)	
Age (years)				
< 35	10 (1.25)	111 (4.72)	121 (3.84)	< 0.001
35–54	107 (13.36)	635 (27.01)	742 (23.54)	
≥ 55	684 (85.39)	1605 (68.27)	2289 (72.62)	
Children's age (< 18 years) in household				
0	739 (92.26)	1915 (81.45)	2654 (84.20)	< 0.001
1	25 (3.12)	211 (8.97)	236 (7.49)	
≥ 2	37 (4.62)	225 (9.57)	262 (8.31)	
Adults in household				
1	240 (31.66)	527 (22.42)	767 (24.67)	< 0.001
2	443 (58.44)	1546 (65.76)	1989 (63.98)	
3 or 4	75 (9.89)	278 (11.82)	353 (11.35)	
Education				
Basic	331 (43.16)	595 (25.31)	926 (29.70)	< 0.001
College	146 (19.04)	643 (27.35)	789 (25.30)	
Other	117 (15.25)	261 (11.10)	378 (12.12)	
University	173 (22.56)	852 (36.24)	1025 (32.87)	
Income				
Above average	213 (29.92)	1219 (51.85)	1432 (46.75)	< 0.001
Below average	499 (70.08)	1132 (48.15)	1631 (53.25)	
Other diagnosis				
No	277 (35.74)	1064 (45.26)	1341 (42.90)	< 0.001
Yes	498 (64.26)	1287 (54.74)	1785 (57.10)	
Health, VAS (range 0–100)				
Good (0–15)	169 (23.87)	796 (33.86)	965 (31.55)	< 0.001
Moderate (16–40)	242 (34.18)	831 (35.35)	1073 (35.08)	
Poor (41–100)	297 (41.95)	724 (30.80)	1021 (33.38)	
Pain, VAS (range 0–100)				
Low (0–29)	363 (46.54)	1288 (54.79)	1651 (52.73)	< 0.001
Moderate (30–54)	190 (24.36)	543 (23.10)	733 (23.41)	
High (55–100)	227 (29.10)	520 (22.12)	747 (23.86)	
Fatigue, VAS (range 0–100)				
Low (0–22)	226 (29.05)	789 (33.56)	1015 (32.44)	0.064
Moderate (23–52)	276 (35.48)	772 (32.84)	1048 (33.49)	
High (53–100)	276 (35.48)	790 (33.60)	1066 (34.07)	
EQ-5D (range 0–1)				
High (> 0.8)	444 (59.20)	1529 (65.04)	1973 (63.62)	0.004
Low (< 0.8)	306 (40.80)	822 (34.96)	1128 (36.38)	
EQ-5D, VAS (range 0–100)				
High (> 70)	287 (46.97)	1392 (59.21)	1679 (56.68)	< 0.001
Low (< 70)	324 (53.03)	959 (40.79)	1283 (43.32)	
ESES (range 6–60)				
Low (6–24)	149 (43.44)	770 (32.75)	919 (34.11)	< 0.001
Moderate (25–36)	106 (30.90)	754 (32.07)	860 (31.92)	
High (37–60)	88 (25.66)	827 (35.18)	915 (33.96)	

mFABQ, Modified Fear-Avoidance Beliefs Questionnaire; VAS, visual analogue scale; EQ-5D, EuroQol-5 dimension; ESES, Exercise Self-Efficacy Scale.

Values given as n (%).

negative beliefs about pain (40), and such maladaptive negative beliefs can reinforce inactivity and inhibit health-promoting behaviours (19). Studies have found that anxiety and depression can enhance the perception of pain (41) and that pain intensity is associated with culture and psychological distress in RA (42, 43).

Research on denial and well-being in patients with RA (44) shows that patients with early RA report greater future denial than patients with established RA. Furthermore, younger patients report more hostility than older patients. Higher self-efficacy for pain has been related specifically to greater shock whereas patients

Table 2. Descriptive statistics as a function of the mFABQ.

	mFABQ high (7–24) (n = 1547)	mFABQ low (0–6) (n = 1391)	Total (n = 3152)	p-value
Age (years)				
< 35	59 (3.81)	60 (4.31)	121 (3.84)	0.024
35–54	352 (22.75)	373 (26.82)	742 (23.54)	
≥ 55	1136 (73.43)	958 (68.87)	2289 (72.62)	
Sex				
Female	1101 (71.17)	1053 (75.70)	2309 (73.26)	0.006
Male	446 (28.83)	338 (24.30)	843 (26.74)	
Children age (< 18 years) in household				
0	1311 (84.74)	1141 (82.03)	2654 (84.20)	0.039
1	121 (7.82)	110 (7.91)	236 (7.49)	
≥ 2	115 (7.43)	140 (10.06)	262 (8.31)	
Adults in household				
1	393 (25.74)	310 (22.45)	767 (24.67)	0.081
2	969 (63.46)	901 (65.24)	1989 (63.98)	
3 or 4	165 (10.81)	170 (12.31)	353 (11.35)	
Education				
Basic	488 (31.85)	318 (23.03)	926 (29.70)	< 0.001
College	424 (27.68)	335 (24.26)	789 (25.30)	
Other	195 (12.73)	158 (11.44)	378 (12.12)	
University	425 (27.74)	570 (41.27)	1025 (32.87)	
Income				
Above average	606 (40.32)	789 (57.63)	1432 (46.75)	< 0.001
Below average	897 (59.68)	580 (42.37)	1631 (53.25)	
Other diagnosis				
No	583 (38.01)	681 (49.21)	1341 (42.90)	< 0.001
Yes	951 (61.99)	703 (50.79)	1785 (57.10)	
Health, VAS (range 0–100)				
Good (0–15)	270 (17.98)	656 (48.09)	965 (31.55)	< 0.001
Moderate (16–40)	534 (35.55)	468 (34.31)	1073 (35.08)	
Poor (41–100)	698 (46.47)	240 (17.60)	1021 (33.38)	
Pain, VAS (range 0–100)				
Low (0–29)	560 (36.43)	994 (71.61)	1651 (52.73)	< 0.001
Moderate (30–54)	455 (29.60)	234 (16.86)	733 (23.41)	
High (55–100)	522 (33.96)	160 (11.53)	747 (23.86)	
Fatigue, VAS (range 0–100)				
Low (0–22)	313 (20.36)	645 (46.50)	1015 (32.44)	< 0.001
Moderate (23–52)	515 (33.51)	456 (32.88)	1048 (33.49)	
High (53–100)	709 (46.13)	286 (20.62)	1066 (34.07)	
EQ-5D (range 0–1)				
High (> 0.8)	725 (47.45)	1129 (81.93)	1973 (63.62)	< 0.001
Low (< 0.8)	803 (52.55)	249 (18.07)	1128 (36.38)	
EQ-5D, VAS (range 0–100)				
High (> 70)	584 (40.19)	1014 (75.78)	1679 (56.68)	< 0.001
Low (< 70)	869 (59.81)	324 (24.22)	1283 (43.32)	
ESES (range 6–60)				
Low (6–24)	502 (37.30)	369 (29.38)	919 (34.11)	< 0.001
Moderate (25–36)	482 (35.81)	354 (28.18)	860 (31.92)	
High (37–60)	362 (26.89)	533 (42.44)	915 (33.96)	

mFABQ, Modified Fear-Avoidance Beliefs Questionnaire; VAS, visual analogue scale; EQ-5D, EuroQoL-5 dimension; ESES, Exercise Self-Efficacy Scale.

Values given as n (%).

with poorer self-efficacy for other symptoms report worse anxiety, depression, shock, and anger (44).

To help persons reduce pain-related fear they need to be told that pain is a common symptom in RA that, particularly in the chronic stage, is not indicative of hurt or damage. Behavioural interventions and gradual exposure to activity are also necessary (i.e. to desensitize the patients' fear).

Some limitations of this study should be considered in the interpretation of the results. Fear-avoidance beliefs and the sociodemographic, disease-specific, and psychosocial factors measured in this study are based on self-reported questionnaires and can therefore have certain validity problems. Because a cross-sectional design was used, causal inferences could not be drawn. Notably, the excluded groups in the analysis were older, lived alone,

Table 3. Results from the backwards stepwise logistic regression for each potential correlate for the mFABQ.

	OR (95% CI)	p-value
Sex (male vs. female)	1.55 (1.26–1.91)	< 0.001
Income (below vs. above average)	1.35 (1.12–1.63)	0.002
Health, VAS (moderate vs. good)	1.44 (1.13–1.83)	0.003
Health, VAS (poor vs. good)	1.59 (1.10–2.29)	0.013
Pain, VAS (moderate vs. low)	1.65 (1.26–2.17)	< 0.001
Pain, VAS (high vs. low)	1.99 (1.40–2.84)	< 0.001
EQ-5D (high vs. low)	0.44 (0.35–0.55)	< 0.001
EQ-5D, VAS (high vs. low)	0.56 (0.45–0.71)	< 0.001
ESES (moderate vs. low)	1.15 (0.91–1.44)	0.242
ESES (high vs. low)	0.66 (0.52–0.82)	< 0.001

Nagelkerke's $R^2 = 0.27$.

mFABQ, Modified Fear-Avoidance Beliefs Questionnaire; OR, odds ratio; CI, confidence interval; VAS, visual analogue scale; EQ-5D, EuroQol-5 dimension; ESES, Exercise Self-Efficacy Scale.

had lower education and income, higher comorbidity, more symptoms, poorer HRQoL, lower ESES score, and were more fear-avoidant than the group included in the study. All of these factors combine to limit the generalizability of the results.

A recent study found that persons with RA who want to perform physical activity were mainly female, younger, better educated, had higher income, were more likely to live with children, and had better support for exercise and higher outcome expectations regarding physical activity (21). In our study, being male and having an income below average were associated with an increased risk of fear-avoidance beliefs about physical activity. Although we found several factors significantly associated with an increased risk for a high mFABQ, yet much of the variation remained unexplained in our model. Overall, however, the model correctly classified 60.6% of the cases as having high or low fear avoidance.

In this study we used a set of biopsychosocial factors to determine explanatory factors of fear-avoidance beliefs for physical activity. Health is held to be best understood as a combination of biological, psychological, and social factors (45, 46). The biopsychosocial model seeks to understand disease and health, as well as illness and disability (47). The model incorporates psychosocial factors (e.g. an individual's thoughts, emotions, perceived ability, coping strategies, and behaviours), as well as the social context, and how these factors interact with biological processes (45–47). In general, the model is applicable to chronic diseases (48) and is particularly suitable for persons with RA (49).

Further studies should examine correlations with exploratory factors for fear-avoidance beliefs about physical activity, including catastrophic misinterpretations of pain, hypervigilance, anxiety, depression, psychological distress, culture, functional performance, self-reported disability, and work loss (16). It is also important to identify at an early stage those patients at risk for fear-avoidance beliefs about physical activity and develop prevention strategies when promoting physical activity.

To summarize, in this study, high fear-avoidance beliefs about physical activity in patients with RA were associated with being male and having a below average income, high level of pain, poor health, low HRQoL, and a low ESES score. Additional research is warranted for adults with RA to capture the multiple potential correlates to fear-avoidance beliefs about physical activity.

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