

Fatigue in adulthood and older age

Roos-Anne Pieterse (S1235834)

Supervisors: Dr. C. Bode & Dr. P.M. ten Klooster

Faculty: Behavioral Science

Department: Psychology, Health & Technology

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Abstract

Objectives: Fatigue is reported as one of the most common and bothersome symptoms in patients with rheumatoid arthritis (RA). For most RA patients fatigue is unpredictable and overwhelming. At this point there is no clear cause that triggers fatigue in RA but it is suggested that pain, physical functioning and depression can contribute to the level of fatigue experienced. In general it is assumed that older people have higher levels of fatigue but a recent study showed that these older people report the least level of fatigue. The primary aim of this study was to analyze if the experience of fatigue is different in different life stages. The second aim was to see if the life situation of the patient and characteristics of the disease like depression, pain and physical functioning can explain differences in fatigue at different ages.

Methods: The data of 752 RA patients (67.2% women, mean age 60 years) was selected from a multi-centre longitudinal study (POEET). The BRAF-MDQ was used to measure four dimensions of fatigue. Next the HRQoL was assessed with the Dutch version of the SF-36 to determine the health state of the patient.

Results: It was found that age on its own is not a predictive value in fatigue. But when it is controlled by the factors bodily pain, mental health and physical function it seems that age has some predictive value. Older people reported lower levels of fatigue when corrected for the factors physical functioning, mental health and bodily pain.

Discussion: The findings indicate that age is predictive when controlling for bodily pain, mental health and physical function. It could be that the feeling of fatigue is influenced by maladaptive coping strategies like catastrophizing, this is a point for further investigation.

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Introduction

It seems to me that there is a similarity between Rheumatoid Arthritis, Chronic Fatigue and Fibromyalgia. No one seems to know what causes them. There is no cure for them. They all rob you of energy, fill you with aches and pain; and make life seem like nothing more than an existence. A good day means that you exist well enough to function in a most basic way and can accomplish the most fundamental tasks. A bad day takes you hostage, and simply having air on your skin can hurt. Sometimes, the pain can be so bad that you feel like you have drain cleaner or acid travelling through your veins. Sometimes, the fatigue is so severe that you feel that when you drop, it will be into the black hole, into the abyss, and a dull panic sets in. I used to refer to it, as the living dead - being alive without having a life. (Green, 2003)

Fatigue is a subjective experience that can be described as ‘extreme and persistent tiredness, weakness or exhaustion—mental, physical or both’ (Nikolaus, Bode, Taal & Van De Laar, 2010). It can also be defined as an overwhelming sense of tiredness, lack of energy and feeling of exhaustion. It is a different feeling than normal experiences such as tiredness or sleepiness (Norheim, Jonsson, & Omdal, 2011). Fatigue is a common but poorly understood and disabling phenomenon in many different diseases. Fatigue can be divided in acute fatigue and chronic fatigue. In acute fatigue the source is mostly identifiable and is relieved by rest. Chronic fatigue is often a side effect of a medical illness, lasts longer than 6 months, often has multiple or unknown causes and is poorly relieved by rest (Swain, 2000). Fatigue can also be divided in physical and psychological fatigue. Physical fatigue is when someone wants to do things but is too tired to do anything, this increases during the day and sleep may help. Physiological fatigue can be described as not wanting to do anything, depression is a factor that can influence this type of fatigue (Dupond, 2011). The importance of fatigue, and its impact on a patient's quality of life, has been increasingly recognized and studied for a number of chronic diseases, including rheumatoid arthritis (RA; Huyser et al., 1998). Patients with these chronic diseases consistently identify fatigue as one of the most problematic and challenging aspects of their disease (Swain, 2000). Most patients do not discuss their feelings of fatigue with a healthcare professional because they feel that the fatigue is a part of the disease (Repping-Wuts, Van Riel & Van Achterberg, 2009). Because of this, fatigue can be undertreated and under recognized (Hewlett et al., 2005). Fatigue has major social and economic cost, social activities and household chores are commonly affected in patients with fatigue (Stebbing & Treharne, 2010). Inflammation is associated with fatigue and fatigue is

frequently reported among patients with inflammatory diseases like multiple sclerosis or RA (Norheim et al., 2011). Whether fatigue is related to disease activity is not clear, and may vary across different diseases.

Fatigue and RA

In RA, fatigue is a significant symptom and some form of fatigue is experienced by 88%-98% of the patients (Hewlett et al., 2005), with 42%-69% of the patients reporting severe fatigue (Hewlett, Choy & Kirwan, 2012). RA is an autoimmune disease in which certain cells of the immune system do not work properly and start attacking healthy tissue (Arthritis 2014). With RA, this means that some cells are attacking the healthy joints. Because of these attacks, fluid builds up in the joint which causes pain and inflammation. RA is mostly found in the joints of the hands, wrists, elbows, feet, ankles and knees. Signs and symptoms of RA include pain, stiffness, flares and fatigue. There are some genetic and environmental factors that are linked to the onset and progress of RA, but the trigger to set off RA has not yet been found (Kvien, Scherer & Burmeister, 2009). The impact and importance of fatigue in RA is similar to the impact of pain. RA patients described fatigue as unpredictable, overwhelming and different from normal tiredness. For most RA patients the fatigue causes inability to perform daily activities. The consequences of fatigue for RA patients can be physical, emotional, social and cognitive. Patients try to use self-management strategies, but those do not always work (Repping-Wust et al., 2008). RA has a great impact on the ability to maintain employment and 45% of the patients mentioned fatigue as a persistent threat to employment (Stebbing & Treharne, 2010). These patients had to make a number of adaptations to keep working, like changing jobs, sleeping more and changing work hours.

Although there are no clear causes or mechanism that lead to fatigue in RA but there are some variables that may contribute to the severity of fatigue. Some psychosocial variables are depression, learned helplessness, social supports and anxiety (Riesma et al., 1998).

Depression together with pain and sleep disturbance are the strongest independent predictors of fatigue. Pain is often mentioned as a major symptom and studies have shown that there is a significant association with fatigue. In a systematic review by Nikolaus, Bode, Taal & Van De Laar (2013) it was found that the strongest evidence for a relationship between fatigue and other variables was for pain, physical functioning, and depression. However there were no clear predictors found to draw a profound conclusion about the casual direction of relationships between fatigue and other factors (Nikolaus et al., 2013). Based on this

systematic review study, there are three variables that are likely to be involved in the process of fatigue in RA, these variables are pain, disability/physical functioning and depression or depressive mood.

Fatigue and age

In a group of RA patients it was found that there are four types of fatigue. Surprisingly the people who reported the lowest levels of fatigue were the oldest people. It is likely that this is related to the fact that these people have only a few daily roles and that the expectations from other people are less demanding (Nikolaus et al., 2010). The younger people in this study had the most daily roles and had a hard time to find a balance between fulfilling their roles and resting. The outcome of this study was that older people with fewer daily roles were less fatigued than the younger people with more daily roles.

There are many ways to define young and old people. According to Grootenhuis and Bode (2010) there are nine different age stages with five of them in adulthood. Sugarman (2004) gives eight different stages with four of them in adulthood. Adulthood according to Sugarman contains: early adulthood (18-40), middle adulthood (40-60), early late-adulthood (60-75) and late late-adulthood (75+). Grootenhuis and Bode break the early adulthood in two and call these phases young adulthood (18-30) and the beginning of middle adulthood (30-40).

In early adulthood (18-40), in this stage the main questions are "How do I fit into the adult world?", "Who am I?" and "How can I love?" (McAdams, 2009). The important challenges of this stage are focused on achieving intimacy, making career choices and achieving work successes (Sugarman, 2004). This stage can be the most stressful and difficult because in this period you have to make decisions that have a life-long effect. In this stage most people go to college, get a job, get married and have children. All decisions that have big consequences. When these young people are fatigued they are more likely to be depressed, have anxiety and this can lead to a lower level of emotional intelligence (Brow & Schutte, 2006). The combination of having to perform, one's own wishes and expectations, and the expectations of others makes this the busiest time in someone's life (Grootenhuis & Bode, 2010). Trying to be independent is very important at this stage, when someone experiences fatigue it is likely that this person needs care and is dependent of other people. It takes longer before someone can be independent because energy needs to be carefully used. It can be hard to study, work and live independent all at the same time. When someone gets RA at this age it may inhibit a person's space to grow and build up work experience, which may lead to unemployment. It

can be hard to do multiple tasks at once and therefore sometimes people who get sick have to make choices between having a job or having children. It also can be hard to build up a relationship because of feelings of incompetence and being a burden. Resting is important to cope with RA but can be difficult when you have a full-time job and children. Disappointment, sadness and grief can be (temporarily) consequences of their incapacity to cope (Grootenhuis & Bode, 2010).

In middle adulthood (40-60), physical signs of aging are beginning to appear, there is a decline in hearing, sight and speed of information processing (Grootenhuis & Bode, 2010, Sugarman, 2004). Experience can at this time compensate for the loss of youth. Social life is very important at this stage of life, many careers have reached their peak without having fulfilled earlier hopes and promises. Expectations of the future may need to be changed (Sugarman, 2004). Parents have more time for each other with their children reaching puberty and spending more time and emotional problems with friends. In this period there are some stress triggers like: coping with aging and possibly the need to care for aging parents. It is suggested that there is a gradual decrease in fatigue when they get older, a reason for this could be that people have less responsibilities. But it might be expected that fatigue increases with age due to physical decline (Cook, Molton & Jensen, 2011). If someone gets sick at this age it mostly has a big impact on personal relationships. The partner of a patient is often overloaded because he or she has to take over responsibilities. Sometimes help is unwanted by the patient because it feels negative (Grootenhuis & Bode, 2010).

In the early days someone who reached early late-adulthood (60-75) was considered old, but with the later start of decline and vulnerability this is a new phase with a reasonable level of vitality and new freedom (Grootenhuis & Bode, 2010). People in this phase try to find personal and meaningful roles and use their time enjoyably and actively. This is a lot harder for people with RA than in other phases because of the lack of work- and social roles that are available in this phase. The role of parent is likely to be less demanding and maybe the role of grandparent is added, but these responsibilities are less than they were (Sugarman, 2004). When these roles perish it can be easier for people to deal with fatigue because of a lack of time schedules, it becomes easier to rest when needed. If someone gets RA at this age hopes and dreams may not be realized, but at this age people know that they possibly are more likely to get sick and so it is less of a surprise when they do get sick. Because of this people in this phase might be better at adjusting to this new situation (Grootenhuis & Bode, 2010). This

could also be because this phase can be seen as a time of significant spiritual growth which can increase self-acceptance (Sugarman, 2004).

In late late-adulthood (75 years and older), physical and cognitive decline are getting more visible at this point in life and have increasing consequences in the daily life. Even with this decline about 75% of the 85-year olds still live at home (Grootenhuis & Bode, 2010). Social networks tend to become smaller as peers and friends become sick, die or move to nursing homes (Sugarman, 2004). Many old people undertake a life review, through which they reflect upon their life's and try to accept their life as it is (McAdams, 2009). This acceptance of how life has been can make it easier to say goodbye (Grootenhuis & Bode, 2010).

The challenge in this phase is to deal with unpleasant changes and loss, to know when you can do something and when you have to let someone help you. Fatigue in this stage is hardly recognized mostly because people think that fatigue is normal and it is just a side effect of aging (Yu, Lee & Wai Man, 2010).

So every phase of life has different difficulties and consequences of being sick. If this is correct it is possible that RA patients in different life phases experience different levels of fatigue. Maybe the life situation, being married, having a job or other symptoms like pain can explain the differences in the level of fatigue experienced. To examine this a comparison between the four age groups (early adulthood, middle adulthood, early late-adulthood and late late-adulthood) will be made to find out if these groups show differences in different life aspects and if or how these can explain the level of fatigue that is experienced. The second question that will be looked at is to see if next to age characteristics of the disease like depression, pain and physical functioning can explain for a difference in fatigue.

Research questions:

- Is the experience of fatigue different in different life stages?
- Can the life situation of the patient and characteristics of the disease, like depression, pain and physical functioning, explain the difference in fatigue at different ages?

Methods

Procedure

This study was enclosed in an on-going multicentre longitudinal study named 'Potential optimisation of (Expediency) and Effectiveness of TNF-blockers' (POEET) (ZonMw project number: 152041002, trial register number: 3112). The POEET study is a cooperative initiative of different Dutch rheumatology clinics, which aims to determine if it is possible to discontinue anti-TNF treatment in RA patients with stable low disease activity. Inclusion criteria for the POEET-study were having rheumatoid arthritis according to the 1987 revised American College of Rheumatology classification criteria for RA (Arnett et al., 1988), using anti-TNF treatment ≥ 1 year, low disease activity during the last 6 months (DAS28 score of ≤ 3.2) and the presence of written informed consent. After inclusion, the patient was randomly assigned to the 'discontinuing anti-TNF therapy-group' or to the 'continuing anti-TNF therapy-group'. This selection of data was the first available dataset where the patient had completed both the measure of fatigue and health status. In most cases this was the baseline measurement.

Patients

Between 4 October 2011 and 20 March 2014, 752 patients were included in this study. These patients have completed both the measure of fatigue and health status. The majority of the sample was female (67.2 %) and mean (SD and range) age was 60.03 years (10.76 and 23-85).

Table 1. Demographic data and illness characteristics of the POEET sample (n=752)

	Frequency (%)	(Mean SD)
Demographics		
Sex		
- Male	244 (32.4)	
- Female	505 (67.2)	
- Unknown	3 (0.4)	
Age group		60.03 (10.76)
- <40	29 (3.9)	
- 41-50	105 (14.0)	
- 51-60	229 (30.5)	
- 61-70	276 (36.7)	
- 70>	113 (15.0)	
Disease characteristics	Range min-max	
BRAF physical fatigue	2.00 - 22.67	11.79 (4.67)
BRAF living with fatigue	7.00 - 27.00	10.32 (3.79)
BRAF cognitive fatigue	5.00 - 19.00	7.19 (2.69)
BRAF emotional fatigue	4.00 - 16.00	5.32 (2.00)
BRAF total score	18.00 - 81.00	34.63 (11.32)
SF-36 vitality	23.99 - 70.82	52.43 (8.82)
SF-36 bodily pain	19.86 - 62.12	50.15 (8.42)
SF-36 mental health	7.77 - 64.09	52.09 (9.39)
SF-36 physical functioning	14.94 - 57.03	45.60 (9.30)

Measures

For fatigue the **BRAF-MDQ** is used. The BRAF-MDQ ($\alpha=.86$) covers four distinct dimensions of fatigue: physical fatigue ($\alpha=.57$, 4 items, e.g. How long on average has each episode of fatigue lasted?), living with fatigue ($\alpha=.90$, 7 items, e.g. Has fatigue made it difficult to do your work or other daily activities?), cognitive fatigue ($\alpha=.90$, 5 items, e.g. Have you lacked mental energy because of fatigue?) and emotional fatigue ($\alpha=.88$, 4 items, e.g. Has being fatigued upset you?) (Nicklin et al., 2010). There are four response options from “Not at all,” “A little,” “Quite a bit,” to “Very much,” except for the first 3 items, which are

numerical or categorical. All items had a 1-week recall-period. Fatigue scores per subscale are obtained by summing the scores on these scales. Higher scores indicate a higher level of fatigue. To make a comparison there is looked at the fatigue score of a UK RA population in this population the total score is 0-70 with mean and SD of 38.4 ± 13.7 , Physical fatigue 16.7 ± 4 of 22, living with fatigue 9.6 ± 5.5 of 21, cognitive Fatigue 6.1 ± 3.7 of 15 and emotional fatigue 5.8 ± 3.4 of 16 (Hewlett, Dures & Almeida, 2011).

Health-related quality of life. HRQoL was assessed with the Dutch version of the 36-item short-form health survey (SF-36), which is a validated, self-administrated and internationally used health status questionnaire for assessing HRQoL

The patient is instructed to indicate to what extent the statement applies to him/her.

The 8 subscales include: physical functioning (10 items, e.g. walking one block), role-physical (4 items, e.g. Cut down the amount of time you spent on work or other activities), bodily pain (2 items, e.g. How much bodily pain have you had the last 4 weeks?), general health (5 items, e.g. My health is excellent), vitality (4 items, e.g. Did you have a lot of energy?), social functioning (2 items, e.g. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?), role-emotional (3 items, e.g. Didn't do work or other activities as carefully as usual) and mental health (5 items, e.g. Have you felt downhearted and blue?). All items had a 4-week recall-period. The scores of the SF-36 lie between 0-100 with a higher score indicating a more favorable health state and with a mean of 50 in the general public (ten Klooster et al., 2013). For this study there was looked at the subscales for physical functioning ($\alpha = .91$), bodily pain ($\alpha = .84$), vitality ($\alpha = .77$) and mental health ($\alpha = .88$).

Statistical analyses. The statistical analyses were performed using IBM SPSS Statistics version 20 for Macintosh (IBM, 2011). For the first research question a one-way ANOVA was used to see if there is a difference in fatigue at different life stages. For the second research question there was a multiple regression analysis used to see what percentage of fatigue can be explained by bodily pain, mental health, physical function and age. This was done three times, one time with the total BRAF score, one time with the norm-based SF-36 vitality score and one time with the BRAF cognition score. The BRAF cognition was included because the ANOVA analysis was almost significant. There was looked at the VIF score to make sure that there is no multicollinearity between the factors physical functioning, bodily pain and mental health. The VIF indicates whether a predictor has a strong linear relationship

with the other predictor(s). Although there are no hard and fast rules about what value of the VIF should cause concern, it is suggested that a value of 10 is a value at which to worry for multicollinearity. The tolerance can also be a factor of concern, a score lower than 0.1 indicates a serious problem and scores lower than 0.2 are worthy to look at (Field, 2009). In table 1 the demographic data are displayed. Here is shown that on the measure of fatigue the patients score a bit above the mean this indicates a higher severity of fatigue. On the health status the patients score around the mean which indicates that they have a health state that is comparable with the general public.

Results

To answer the first research question, is the experience of fatigue different in different life stages? The first thing that was done was looking at the illness characteristics of the POEET sample, in table 2 these characteristics are shown by age group. A score of 50 on the SF-36 vitality is average and all groups seem to have a score of 50 or higher this indicates that all groups have a better than average score on their vitality test. For the BRAF scores a score of 16.7 on physical fatigue, 9.6 on living with fatigue, 6.1 on cognitive fatigue, 5.8 on emotional fatigue and 38.4 on total fatigue is average. It seems that the first group (<40 years) has a slightly better score on the different tests. For the first group it seems that the BRAF scores are a bit lower which indicates a lower severity of fatigue, while the SF-36 vitality score is a bit higher which would indicate that the youngest group could be less fatigued than the other groups.

To see if this difference is significant a one-way ANOVA was done, in table 3 is the outcome of this ANOVA represented. When looked at the different age groups there is no sign that one of the age groups scores significant better or worse in any of the areas tested. At this point there seems to be no relationship between age groups and the experience of fatigue. However due to the significance score on the BRAF cognition scale (0.08 where a p-value of 0.05 would be significant) there was looked at for the next research question if on this scale age maybe is a predicting factor.

Table 2. Illness characteristics of the POEET sample by age group

Age group	SF-36 vitality Mean(SD)	BRAF physical fatigue Mean(SD)	BRAF living with fatigue Mean(SD)	BRAF cognitive fatigue Mean(SD)	BRAF emotional fatigue Mean(SD)	BRAF total score Mean(SD)
< 40	54.54 (8.76)	10.61 (4.73)	9.21 (2.76)	6.52 (2.46)	5.00 (1.87)	31.33 (10.58)
41-50	52.54 (8.29)	12.27 (3.91)	10.24 (3.43)	7.55 (2.71)	5.51 (1.91)	35.58 (9.80)
51-60	52.16 (8.39)	12.14 (4.79)	10.31 (3.63)	7.33 (2.70)	5.32 (1.93)	35.10 (11.32)
61-70	52.67 (8.69)	11.61 (4.60)	10.30 (3.64)	6.91 (2.45)	5.14 (1.78)	33.94 (10.59)
70>	51.79 (10.40)	11.38 (5.15)	10.80 (4.86)	7.45 (3.17)	5.68 (2.64)	35.31 (14.17)
Range		0-22	0-21	0-15	0-12	0-70

Table 3. ANOVA analysis fatigue

	dF	F	N	Sig.
BRAF total	4, 740	1.24	741	.29
BRAF physical	4, 740	1.39	741	.24
BRAF cognition	4, 740	2.10	741	.08
BRAF emotional	4, 740	1.89	741	.11
BRAF living	4,740	1.09	741	.35
Norm based vitality	4, 745	0.66	746	.62

To answer the second research question a regression analysis is done to see if bodily pain, mental health and physical function next to age can account for a difference in fatigue. This is done three times on different fatigue dimensions. To make sure that there is no multicollinearity between the predictors the VIF scores and tolerance were checked. In table 4 the tolerance and VIF are displayed. The VIF score is far below 10 and the tolerance is on an acceptable level.

Table 4. Multicollinearity between mental health, bodily pain and physical functioning

	Tolerance	VIF
Mental health	.978	1.022
Bodily pain	.995	1.005
Physical functioning	.951	1.052

When answering the research question, can the life situation of the patient and characteristics of the disease, like depression, pain and physical functioning, explain for the difference in fatigue at different ages? there has been looked at three factors of fatigue. In the regression analysis there was looked at the variance of fatigue explained in two steps. In the first step there was looked at age as independent variable, in the second step to this model were added the independent variables bodily pain, mental health and physical function. When looking at table 5 it seems that age does not have any influences on fatigue, in this model 0 percent of the variance in fatigue can be explained by age. In the second step it shows that 56 percent of the variance can be explained by the factors age, bodily pain, mental health and physical function. These four factors all are significant at a 0.01 significance level. This means that age on its self is not a significant factor but controlled by the factors bodily pain, mental health and physical function age becomes significant. This could indicate that there is a connection between age and fatigue but that this connection is indirect. In table 6 the multiple regression analysis of the SF-36 vitality is shown. In this model 0 percent of the variance can be explained by age while 57 percent can be explained when the factors variables bodily pain, mental health and physical function are added. In this second step the factor age is significant this is also found in table 5 and 7 and could indicate that there is a connection between age and fatigue but that this connection is indirect. The last model shown in table 7 is the multiple regression model of the BRAF cognition. In this model 0 percent of the variance is explained by age alone and 40 percent of the variance is explained by the factors age, bodily pain, mental health and physical function. In this model mental health and physical functioning are significant on a 0.01 level and explain a bit more than bodily pain which is significant on a 0.05 level. Like table 5 and 6 in step 2 age is significant.

These three models all show that age is not a direct factor that can predict the score on fatigue. But when looking at step 2 where the factors bodily pain, mental health and physical function

are added it seems that age has some predicting value, in favor of the older people. This could indicate that age has an indirect effect on fatigue.

Table 5. Multiple regression analysis BRAF total

	B	SE B	β	R2	$\Delta R2$	F change
Step 1				0.00		0.39
Constant	33.16	2.37				
Age	0.02	0.04	.02			
Step 2				0.56	0.56	314.00**
Constant	101.78	2.74				
Age	-0.13	0.03	-.13**			
Mental health	-0.44	0.03	-.37**			
Bodily pain	-0.34	0.04	-.25**			
Physical functioning	-0.42	0.04	-.35**			

Note: *P < .05 **P < .01

Table 6. Multiple regression analysis SF36 vitality

	B	SE B	β	R2	$\Delta R2$	F change
Step 1				0.00		2.08
Constant	55.04	1.83				
Age	-0.04	0.03	-.05			
Step 2				0.58	0.57	332.94**
Constant	1.09	2.09				
Age	0.08	0.02	.10**			
Mental health	0.43	0.03	.45**			
Bodily pain	0.21	0.03	.20**			
Physical functioning	0.31	0.03	.32**			

Note: *P < .05 **P < .01

Table 7. Multiple regression analysis BRAF cognition

	B	SE B	β	R2	$\Delta R2$	F change
Step 1				0.00		0.00
Constant	7.23	0.56				
Age	0.00	-0.01	.00			
Step 2				0.40	0.40	159.66**
Constant	20.60	0.76				
Age	-0.03	0.01	-.13**			
Mental health	-0.13	0.01	-.46**			
Bodily pain	-0.03	0.01	-.10*			
Physical functioning	-0.07	0.01	-.24**			

Note: *P < .05 **P < .01

Discussion

This study investigated two questions, first is the experience of fatigue different in different life stages? and second, can the life situation of the patient and characteristics of the disease, like depression, pain and physical functioning, explain the difference in fatigue at different ages? The main results were that the experience of fatigue does not seem to be different at different life stages, when age is controlled by the factors depression, pain and physical functioning it can explain for some of the difference in fatigue.

Expected was that older people would be more fatigued due to physical decline and because fatigue in the last phase of life (75+) is considered as a normal symptom of aging (Yu et al., 2010). In this study it was found that the oldest group did not have higher levels of fatigue than the other groups. What's more, when correcting for bodily pain, mental health and physical function it seems that the older patients are less fatigued. This could be because older people have more time to rest, have less daily roles or have better coping strategies.

Studies of age, coping and health suggested that older adults tend to use better coping strategies than younger adults (Watkins et al., 1999). It is also suggested that older adults try to maximize their coping efforts in dealing with chronic pain to minimize stress. Older adults are more likely to seek medical care and efficiently conserve available coping resources. Older adults are more likely to try conservation of energy and suggested is that with age, individuals tend to use more mature coping strategies (acting less out of impulse or aggressiveness). Blalock, DeVellis, Holt, & Hahn (1993) found that RA patients who indicated using a variety of coping strategies in dealing with their illness tended to have better psychological outcomes than those patients who used fewer strategies. This could indicate that a expertise in coping with a disease is age related, due to more experience with the disease and coping strategies. Younger adults are more likely to use catastrophizing as a coping strategy (Watkins et al., 1999). When a person catastrophizes, it can contribute to increased intensity of the symptoms experienced and lead to more emotional distress (Lukkahatai & Saligan, 2012). At this point there is no clear connection been found between coping strategies and fatigue but it has been observed that successful treatment focused on one symptom (i.e., fatigue) can have beneficial effects for the other (i.e., pain; Smith, Strachan, & Buchwald, 2009). So it could be that the coping strategies used for pain are also effective for fatigue. In the systematic review by Lukkahatai & Saligan (2012) it is said that on this point the relationship between fatigue and catastrophizing is the least explored but in

pain studies catastrophizing is known to significantly predict greater severity of pain behaviors. In this review patients with low and high levels of catastrophizing were compared, patients with high catastrophizing reported higher fatigue severity, more fatigue related disruption in their daily life and could recall fatigue more accurately than low catastrophizing patients. Next to this catastrophizing seems to be a good predictor of fatigue in healthy volunteers. Catastrophizers were more likely to report higher levels of pain which was associated with a higher increase in levels of fatigue (Lukkahatai & Saligan, 2012).

In the systematic review by Nikolaus et al. (2013) it was found that the strongest evidence for a relationship between fatigue and other variables were pain, physical functioning, and depression. In this study it has been shown that these variables explain a big part of fatigue. On its own age does not seem to be associated with fatigue but when the factors pain, physical functioning, and depression are added age seems to have a predicting value. So age is of importance on the factors pain, physical functioning, and depression but not directly on fatigue.

In this study 752 RA patients were included these patients had to fulfill to the inclusion criteria for using anti-TNF treatment ≥ 1 year, low disease activity during the last 6 months (DAS28 score of ≤ 3.2) (and the presence of written informed consent). This group is a small part of the population of RA patients and because of these inclusion criteria it is not possible to generalize the outcome of this study to the whole RA patient population.

The patients in this study have filled out the BRAF-MDQ and SF-36, on both of these measurements fatigue was measured (BRAF in total and SF-36 vitality) which is positive because in most of other studies only one measurement for fatigue is used. The α of the BRAF-MDQ scale physical fatigue ($\alpha=.57$) is low but this does not seem to have a negative effect.

In conclusion life stages and age on its own does not seem to have any effect on fatigue. When corrected for pain, physical functioning, and depression age seems to have effect in a positive way for the older people. These results are good for the older people because it seems that they can do more than what was expected but keep in mind that this study was done on a very specific group of people and therefore it is better to not generalize for the entire RA patient population. At this point there was not looked at coping strategies but these could have impact on the way that people handle fatigue. When looking at the systematic review by

Lukkahatai & Saligan (2012) it could be that catastrophizing is of importance in predicting higher levels of fatigue. In further studies it could be a good to investigate catastrophizing and other coping strategies to see if maladaptive coping strategies are of importance in predicting higher levels of fatigue. It has shown that reducing catastrophizing of pain can improve the functioning of patients with lower back pain (Smeets, Vlaeyen, Kester & Knottnerus, 2006). So it could be possible that reducing catastrophizing with RA patients can lead to improved functioning and lower levels of fatigue. The results might contribute to the development of more effective interventions.

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Apendix 1

Naam..... Datum.....

Multidimensionale Bristol-vragenlijst m.b.t. vermoeidheid bij reumatoïde artritis

(BRAAF-MDQ)

We willen graag weten hoe de vermoeidheid u heeft beïnvloed tijdens de voorbije 7 dagen. Gelieve alle vragen te beantwoorden. Denk er niet te lang en hard over na, geef uw eerste reactie. Er zijn geen juiste of foute antwoorden!

1. Omcirkel het cijfer dat uw gemiddelde niveau van vermoeidheid weergeeft tijdens de voorbije 7 dagen.

Geen vermoeidheid 0 1 2 3 4 5 6 7 8 9 10 Volledig uitgeput

Vink voor elk van de volgende vragen één antwoord aan dat het meest op u van toepassing is.

2. Hoeveel dagen hebt u vermoeidheid ervaren tijdens de voorbije week (7 dagen)?

0

4

1

5

2

6

3

Elke dag

3. Hoe lang duurde elke episode van vermoeidheid gemiddeld tijdens de voorbije 7 dagen?

Minder dan een uur

Meerdere uren

De ganse dag

Draai de pagina om alstublieft

Tijdens de voorbije 7 dagen.....

Helemaal niet

Een beetje

Vrij veel

Heel veel

4.

Had u te weinig fysieke energie als gevolg van vermoeidheid?

5.

Ondervond u moeilijkheden bij het nemen van een bad of douche als gevolg van de vermoeidheid?

6.

Ondervond u moeilijkheden bij het aankleden als gevolg van de vermoeidheid?

7.

Ondervond u moeilijkheden bij het uitoefenen van uw baan of andere dagelijkse activiteiten als gevolg van de vermoeidheid?

8.

Hebt u het maken van plannen vermeden als gevolg van de vermoeidheid? Bv. plannen om uit te gaan of om taken in het huis of de tuin te doen

9.

Heeft de vermoeidheid uw sociale leven beïnvloed?

10.

Hebt u plannen geannuleerd als gevolg van de vermoeidheid? Bv. plannen om uit te gaan of om taken in het huis of de tuin te doen

11.

Hebt u uitnodigingen geweigerd als gevolg van de vermoeidheid? Bv. afspreken met een vriend(in)

12.

Had u te weinig mentale energie als gevolg van de vermoeidheid?

13.

Bent u zaken vergeten als gevolg van de vermoeidheid?

14.

Vond u het moeilijk om helder na te denken als gevolg van de vermoeidheid?

15.

Vond u het moeilijk zich te concentreren als gevolg van de vermoeidheid?

16.

Hebt u fouten gemaakt als gevolg van de vermoeidheid?

17.

Hebt u het gevoel gehad dat u bepaalde zaken van uw leven minder onder controle had als gevolg van de vermoeidheid?

18.

Hebt u zich verlegen gevoeld als gevolg van de vermoeidheid?

19.

Bent u van de kaart geweest als gevolg van de vermoeidheid?

20.

Hebt u zich verdrietig of depressief gevoeld als gevolg van de vermoeidheid?

BRAF-MDQ

V1 27.08.10