

Dealing with fatigue: the importance of health-related action patterns

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Abstract

Fatigue complaints are frequent and important problems affecting people's quality of life and creating puzzles for the General Practitioners they consult. Little is known about what actions people undertake to deal with fatigue, and even less about their success. As revealed by multivariate analyses health-related action patterns can classify people as being particularly successful or unsuccessful in dealing with their complaints of chronic fatigue. This study suggests that a few actions applied in combination and in a concentrated manner constitute the basis for a successful action pattern. The number, type and predictive power of the relevant actions vary depending on the persons in question: having chronic diseases or not and being under 44 or over 44 years old. © 1999 Elsevier Science Ireland Ltd.

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1. Introduction

Fatigue is a complaint that contributes highly to medical consumption as registered by General Practitioners. Following headache and fever, it is the third most common reason for encounter in Dutch general practice [1]. In GP consultations, fatigue complaints are presented by 3.1 and 1.8 out of every 100 women and men, respectively [2]. At the population level 37.8% of Dutch women and 24.3% of the Dutch men between 15 and 65 years of age report fatigue complaints when given a symptom

checklist [3]. In a diary study, fatigue was reported for 61% of the days for women and 37% for men [4]. Depending on the definition and measurement of fatigue, the prevalence of fatigue may vary from 7 to 45% [5]. Studies that correlate fatigue complaints with other factors, however, frequently fail to distinguish duration and severity of the complaints [6].

Fatigue can be either a presenting symptom or the primary complaint. As a symptom, it may accompany such ailments as anaemia, emphysema, asthma, arthritis or low blood pressure. It may also be a symptom of chronic diseases such as thyroid disease, diabetes, occult cancer, infectious mononucleosis, hepatitis or chronic renal failure [7–9]. However,

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laboratory tests seldom reveal a satisfactory biological aetiology [10–14]. Moreover, a year after the first consultation in 55% of cases no medical explanation can be given [15].

Studies show that fatigue symptoms correlate positively with depression, anxiety and emotional stress [6,8,9,14,16]. Negative correlations have been established with employment and marital status [8,17]. Findings relating fatigue to sex [3,5,6,8,14,18,19], age [6,8,12,14,17,20–22,26] and education [7,8,17,18,21,23] are inconsistent. More consistency would be achieved by stratifying for gender, age and chronicity of fatigue [23].

Little is known about the actions people undertake to deal with the fatigue. A few indications are nevertheless provided by a diary study at the community level [23]. When it comes to adapting their life-styles and self-care people with chronic fatigue (i.e. lasting for more than a year) show significantly more health-related behaviour than those with non-chronic fatigue. The frequency of resting, doing exercises or relaxing, taking prescribed medicines, and stopping normal activities has been found to be significantly higher among the chronically fatigued. Chronically fatigued men have been found to stop consuming alcohol more often. It should be noted, however, that actions examined in this study were not exclusively related to fatigue complaints because the fatigue complaints could not be clearly dissociated from other complaints.

Surprisingly, no knowledge is available about the success of health-related actions undertaken. The purpose of the present, population-based study was therefore to examine the health-related actions that people with fatigue complaints undertake and to determine which actions are characteristic of those who are most and least successful in dealing with these complaints. For this purpose the population was stratified according to the significant medical and socio-demographic characteristics. The answers may provide empirical information for health promotion and may help GPs to counsel their patients on a more suitable, individual basis.

2. Methods

In 1987–1988 a nation-wide survey was conducted by the Netherlands Institute for Primary Care

(NIVEL). Patients of 161 general practitioners were sampled from 101 practices. The stratification variables were region, level of urbanisation and distance from a hospital. As almost every Dutch woman or man is listed with a GP the sample was representative for the Dutch population. Non-response due to lack of motivation or inaccessibility was 24%, producing a slight over-representation of citizens between 25 and 44 years of age and a slight under-representation of citizens over the age of 65. A total of 13 066 people participated in the survey. The respondents were asked to complete an extensive health questionnaire at home. The 189 questions included checklists for chronic diseases and the General Health Questionnaire [24]. A total of 11 038 participants (85%) subsequently agreed to keep a health diary for 21 days [23].

The diary was intended to record the day-to-day health status and health-related behaviours of the participants. The first section consisted of questions pertaining to personal well-being and any possible health complaints. If respondents recorded complaints, they were invited to describe the sensations and any related complaints in their own words. These complaints were then coded in 97 categories based on the International Classification for Primary Care [25]. In the second section the respondents could assess their complaints using such categories as 'lasts longer than a year', 'irritates me', 'worries me'. In the third section of the diary any of a list of 16 health-related actions could be entered. For reasons of relevance 14 items were selected for further analysis (see Table 2).

The answers in the second and third section were 'yes' or 'no'. The diary totalled 21 pages with one page per day and 51 items per page to fill in. As only fully completed pages were processed the resulting database included 8524 cases (77%).

For the purpose of the present study, respondents were selected with primary complaints coded in the category including fatigue, lack of energy, sleeplessness, nervousness, tension, stress, lack of concentration and amnesia (which parallels the fatigue list of David et al. [26]). These comprised 1135 people of 25 years or older, and may be considered a reflection of socio-demographic composition and behaviour of a fatigued population. Subsequently, the sample was limited to respondents with four or more and 17 or less days with complaints. The resulting database

numbered 254 cases of which 214 were valid for our analyses.

In order to analyse the success of various health-related actions, a measure of success was constructed as follows. We examined the actions following fatigue complaints and mapped the time sequence of complaints and actions for a number of episodes as can be seen in Fig. 1. An episode began with the first day of complaint and ended on the last day without the complaint. For each episode or window, we recorded the actions undertaken only on the days with fatigue complaint because health-related actions on days without a complaint were not recorded.

We next constructed an index of success. For each episode, we counted the number of days with a complaint and the number of days without a complaint. In the sequence of days with a complaint, we looked at the use of 14 possible actions. Each action

day was counted and summed to obtain the total number of days with actions. As a measure of success the following calculation was made:

$$\frac{\text{number of days without a complaint}}{\text{number of days with a complaint} \times \text{total number of actions}}$$

Our calculation of success thus depends on three variables. Which variable is most important for success has not been determined in advance and must be empirically found. We therefore calculated for our respondents the (non-parametric) Spearman correlations between the measure of success and the variables. The results are presented in Table 1.

It is clear that the number of days with actions is important. The more days with a complaint, the more actions undertaken (0.75). But the number of actions is not so strongly related to the number of days without a complaint (0.40). On the contrary, the

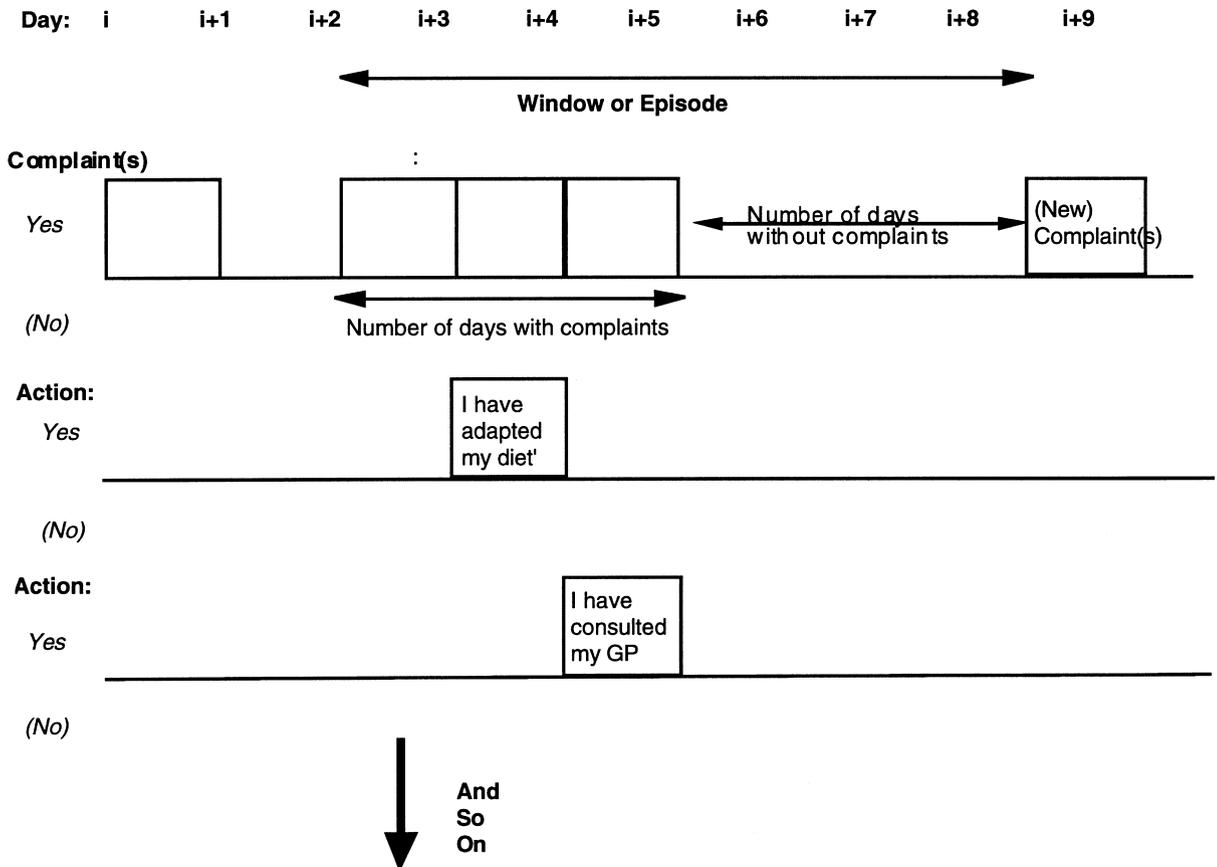


Fig. 1. A time sequence of complaints and actions.

Table 1

The empirical determination of success with the aid of Spearman correlation ($n=214$)

	Success	Dayswith	Dayswithout
Number of days with a complaint (dayswith)	-0.50*		
Number of days without a complaint (dayswithout)	0.50*	0.49*	
Number of days with actions (daysaction)	-0.72*	0.75*	0.40*

* $P<0.001$.

fewer actions, the more success (-0.72). Our measure reflects the efficiency of actions of a respondent or, in other words, how little effort it costs for a respondent's action to issue into days without a complaint.

To conclude, our measure of success was supplemented by another variable. For each patient, the original measure was multiplied by the number of episodes, in order to follow the idea that the more episodes of complaints are dealt with successfully, the more efficient are a patient's actions. The measure was constructed as follows:

$$\frac{\text{number of episodes} \times \text{number of days without a complaint}}{\text{number of days with a complaint} \times \text{total number of actions}}$$

Special software was next developed to categorise the subjects as most successful at getting rid of their complaints, and subjects least successful at getting rid of their complaints. We selected approximately 30% of the respondents with the highest score and approximately the 30% of the respondents with the lowest scores; approximately 40% of our respondents were thus omitted from these analyses. This left a group of 136 respondents: 71 people with the highest success scores (HS) and a group of 65 people with the lowest success scores (LS).

Next, we determined which medical, psychological and socio-demographic variables correlated significantly with our measure of success and stratified the group according to relevant criteria. For these groups separate discriminant analyses were then used to determine the variables responsible for the HS–LS difference [27].

3. Results

3.1. Sample characteristics

Our sample for analysis included 43 men (31.6%) and 93 women (68.4%), with an age distribution of

75 (55.1%) between 25 and 44 years, 47 people (34.6%) between 45 and 64 years, and 14 people (10.3%) 65 years or older. The distribution of the educational level was 40.7% primary and lower vocational school, 35.6% secondary plus college education, and 23.7% higher education. Of our sample, 70.8% were married, 13.1% were divorced or widowed and 16.1% were never married. A total of 33.0% of our sample or 45 people were hindered by a chronic disease (24 moderate and severe; 11 only severe; 10 only moderate) and 40% were psychologically distressed (score above on the GHQ30-questionnaire, $M=5.64$; $S.E.=3.00$). According to χ^2 -tests these characteristics of the sample did not significantly ($P<0.05$) differ from the original group of 1135 people who reported fatigue complaints in their diary. In the following analyses the number of cases may vary because different variables with different missing values are used.

3.2. Health-related actions

As can be seen in the summary of the action frequency, presented in Table 2, 'Got some rest (went to bed early)' is frequently reported. On average, rest lasted 1.5 days, although the variation in the frequency of this action is quite high. The same is true for the other actions, which means that the use of the health-related actions investigated here is highly variable. Such actions as 'went to see a non-medical professional', 'went to see the GP today', 'received help from family, friend or neighbours', 'stayed in bed sick', or 'read about it in a book or magazine' were hardly used.

3.3. Stratification

In Table 3 the statistical associations between our measure of success and the medical, psychological

Table 2
Frequency of actions ($n=214$)

Description	Frequency of action in 21 days (Mean \pm S.D.)	Abbreviation in tables
Talked to others about it	0.63 \pm 1.24	Talking
Read about it in a book or magazine	0.01 \pm 0.10	Reading
Got some rest (went to bed early)	1.52 \pm 1.65	Rest
Had more physical exercises or relaxation	0.33 \pm 0.79	Exercises
Stopped my daily activities	0.33 \pm 1.17	Lowactivity
Stayed in bed sick	0.03 \pm 0.17	Bedstay
Paid more attention to my diet and/or smoked less or not at all	0.33 \pm 1.20	Diet & smoke
Reduced alcohol consumption or quit consumption all together	0.32 \pm 1.18	Stop alcohol
Applied a home remedy	0.14 \pm 0.49	Home remedies
Used prescribed medicine	0.81 \pm 1.88	PresMed
Used OTC medicine or medicine I already had at home	0.22 \pm 0.89	OTCMed
Received help from family, friend or neighbours	0.06 \pm 0.27	Friends
Went to see the GP today	0.03 \pm 0.18	GP
Went to see a non-medical professional	0.03 \pm 0.18	NonMed

and socio-demographical variables are presented. Significant associations were found for success with moderate chronic diseases (MCD) and age in particular. Consequently, analyses were performed for those categories separately.

As sex did not significantly correlate with the success variable, despite findings in earlier studies [19,23], there was no reason to stratify in samples of men and women. However, additional analyses applied to women within the more homogeneous samples of (N)MCD and age showed significant correlations between success on the one hand and moderate chronic diseases and age on the other hand (Spearman 0.23, $P<0.05$ and, respectively, 0.3, $P<0.000$). These analyses could not be conducted for men because of their small numbers.

Additional analysis for chronic diseases showed that of the 23 less successful in the MCD group 19 had to deal with a combination of moderate and severe chronic diseases. On the other hand success could not so easily be related to severe chronic diseases. Five out of 11 people had to deal with a combination of moderate and severe chronic diseases, but were still successful. That is possibly the

reason why there was no significant correlation of severe chronic diseases with success (Table 3).

3.4. Distinctive action patterns

The question posed in the following is what action variables discriminate between the HS and LS groups. We identified the sets of variables for which: (1) the mean in the groups differed significantly (<0.05) according to the t -test or the Mann–Whitney test; (2) an underlying dimension could be extracted which was (according to criteria for discriminant analysis) significant (sign Wilk's $\lambda<0.05$); and (3) the ratio between the number of cases and the number of variables was not lower than 20 [27].

3.4.1. Chronic disease

The results for the patients having moderate and not having moderate chronic diseases are presented in Table 4.

A total of 102 respondents were found to have no moderate chronic diseases (NMCDs) and 34 were found to have moderate chronic diseases (MCDs), i.e. hypertension, chronic back pain, rheumatism and

Table 3
Spearman correlation of success with medical, psychological and socio-demographical variables ($n=214$)

Variables	Sex	Age	Education	Occupational status	Moderate chronic diseases	Severe chronic diseases	General Health Questionnaire
Correlation	0.08	-0.17*	0.15	0.12	-0.18*	-0.14	0.03

*Significant $P<0.05$.

Table 4

Discriminant analysis between LS and HS people stratified for moderate chronic disease ($n=136$)

Action	LS		HS
	StandFunctCoef	Mean \pm S.D.	Mean \pm S.D.
NMCD^a			
Talking	0.78	1.59 \pm 2.12	0.15 80.40
Rest	0.70	2.67 \pm 2.01	0.63 \pm 0.76
Exercises	0.41	0.69 \pm 1.20	0.12 \pm 0.45
Lowactivity	0.32	1.23 \pm 2.30	0.02 \pm 0.13
Diet & smoke	-0.27	0.81 \pm 2.12	0.07 \pm 0.25
NonMed	-0.66	0.07 \pm 0.26	0 \pm 0
Correct prediction (%):	89 (total)	76	98
MCD^b			
Rest	0.70	2.48 \pm 2.40	0.82 \pm 0.87
PresMed	0.85	3.04 \pm 3.24	0.18 \pm 0.40
Correct prediction (%):	85 (total)	78	100

^aLS, $n=42$; HS, $n=60$.^bLS, $n=23$; HS, $n=11$.

ulcus cruris, stomach and bowel problems, bile and liver diseases, diseases of thyroid gland, prostrate and menstrual problems, disorders of eye, ear or the joints. A majority of this group (24 people) had also to deal with more severe chronic diseases, i.e. bronchitis, heart problems, arteriosclerosis, cancer, diseases of the nervous system, diabetes, diseases of the kidney, lasting consequence of an accident or a hereditary handicap. As can be seen in Table 4, HS and LS are predicted by a different set of actions for the NMCD group and MCD group.

For the NMCD sample, the chance of belonging to the HS or LS group can be predicted on the basis of either low or high engagement with 'talking', 'resting' and 'having relaxation or doing exercises'. The negative weight of 'consulting a non-medical professional' indicates an action that is not utilised in the HS group, but is quite predictive for success in the LS group. Contrary to other actions, the higher the frequency of this action, the greater the chance of success.

The results of the discriminant analysis for the 34 respondents with moderate chronic diseases (MCDs) showed a classification result of 85% using only two action variables: 'taking prescribed medicines' and 'resting'.

3.4.2. Age

In Table 5, success in getting rid of complaints is shown to be predicted correctly for 87% of subjects

above the age of 44 years by three actions. Under the age of 44 years, correct prediction of success and failure occurred 91% of the time using four actions. 'Talked to others about it' appears to be the same for the two age groups. However, 'using medicines I had already in home (OTC medicine)' plays an important role for older people, while 'doing exercises or having relaxation' and 'taking rest' were found to be particularly important for younger people.

Additional analyses showed a significant relation between age and moderate chronic disease (Spearman 0.33, $P<0.000$).

4. Discussion

In the present study the success of health-related actions in relation to fatigue complaints was examined, with the population differentiated according to a number of medical and socio-demographic variables. Success appears to relate to the efficiency or the smallest number of actions during the fatigue episodes (ranging from the first day with a complaint to the last day without a complaint).

4.1. Methodological considerations

The conclusions of our study are based on a number of methodological decisions which therefore need to be considered.

Table 5
Discriminant analysis between LS and HS people stratified by age ($n=136$)

	LS		HS
	StandFunctCoef	Mean \pm S.D.	Mean \pm S.D.
25–44 years ^a			
Talking	0.47	1.47 \pm 2.25	0.16 \pm 0.42
Rest	0.66	2.73 \pm 2.28	0.69 \pm 0.73
Exercises	0.23	0.66 \pm 1.09	0.16 \pm 0.52
PresMed	1.66	1.13 \pm 2.01	0.04 \pm 0.30
Correct prediction (%):	91 (total)	77	100
Over 44 years ^b			
PresMed	0.87	2.63 \pm 3.22	0.08 \pm 0.27
Talking	0.62	1.03 \pm 1.44	0.12 \pm 0.30
OTCMed	0.57	0.43 \pm 0.88	0.04 \pm 0.20
Correct prediction (%):	87 (total)	77	100

^aLS, $n=30$; HS, $n=45$.

^bLS, $n=35$; HS, $n=26$.

To start with, we defined a result attained with only one health-related action as more successful than a result attained with two or more actions. We also took more days without a complaint following an action to indicate greater success. In doing this, we distinguished between complaints and other prevailing circumstances, and we therefore did not allow the circumstances surrounding the complaint of fatigue to be a part of our measure of success. If the complaint is particularly bad or the circumstances are particularly heavy, success is not easy to achieve. Finally, our assumption that the more episodes of fatigue dealt with, the greater efficiency is may seem to be rather arbitrary. However, this variable had little influence (Spearman 0.11) on our measure of success, and omitting this variable would change our results very little.

Alternative measures of success are theoretically and logically possible. Different relations between components of our measure would produce different kind of measure and perhaps different results [28]. Nevertheless, our data provide an empirical definition of success: for our respondents, success was related to the efficient use of actions. We found this empirical definition in the most simple way, namely by inspecting the (non-parametric) correlation between the components of our measure.

Our data did not always meet the assumption of normality. Non-parametric statistics were employed, however, and the power of categorisation in the right group was found to be particularly robust. Further-

more, two additional multivariate analyses performed on the group corroborated our result. Both multiple regression analysis, with success as the dependent variable and the actions as independent variables, and log likelihood regression with the dependent variable dichotomous and the independent variables continuous, showed that 'talking', 'rest' and 'prescribing medicines' could explain a significant degree of the variability in success, as was the case in our discriminant analyses.

One methodological problem we had to solve was how to count the logical sequence of complaint(s), action(s), and the disappearance of complaints. Such a sequence is clearly temporal, probably causal and should thus be modelled in a dynamic manner. We divided the time period in the diary into episodes and then counted the components of our measure of success for each episode. The advantage of this approach is that it enabled the use of standard multivariate methods of analysis. The disadvantage is that the interactions between various causes and effects have been greatly simplified. In a subsequent stage of our study, we plan to use the results of our multivariate analysis for simulation.

4.2. Dealing with fatigue

Only 3% of our respondents (with four to 17 fatigue complaints in 21 days) consulted their GP. This finding is similar to that found by others [29,30] and confirms the supposition that the fatigue com-

plaints reported during the provision of primary health care are only a fraction of what occurs in daily life. According to Beukema [31], there are five possible reasons for not consulting one's GP: (1) the complaints are simply not severe enough; (2) visiting the GP does not have priority; (c) expectations of the GP's ability to help are low; (4) former experiences with GPs have been bad; or (5) reluctance to visit a GP. All of these reasons were presumably present in our population, in various combinations.

The range of discriminating health-related actions found in our study roughly parallels the range offered by GPs during initial consultations for fatigue [32]. Those GPs opted for the following: 58.2% provided health education (i.e. explained what constitutes a healthy life style), 39.6% made a medical prescription, 32.5% talked along therapeutic lines, 10.5% adopted a wait-and-see attitude, 5.1% applied medical-technical treatment and 4.8% advised resting. The different prominence of the various strategies across the two studies can easily be explained by the fact that the strategies recommended by the GPs were given during an initial consultation and were based on a complex mixture of complaints and not just an isolated complaint of fatigue.

The patterns of actions found to be successful in our study are almost counter-intuitive. Not a frequent but a moderate application of health-related actions is related to more success (up to 100% predictability), and according to the standard deviations the success of the actions is higher if they are applied in a concentrated way.

Only two to eight actions out of 14 appeared to be decisive in predicting the difference between higher and lower success in relieving fatigue. The predictive action patterns varied with medical condition and age. Consequently, explanations may differ for these distinct categories.

For the NMCD people fatigue seems to be a primary complaint. For those less successful in getting rid of the complaint a spiral of too much anxious attention focused on the complaint may be responsible. The frequent use of talking, resting and low activity might be understood in this way. The variable 'exercises' is ambiguous because it refers both to exercise and relaxation. Here it occurs together with low activity, resting and talking.

Therefore, it should be interpreted as relaxation mainly, and as a part of the spiral. The beneficial effect of seeing a non-medical professional may result from the need for attention being satisfied and to the distraction offered from the immediate complaint. According to our analysis, however, the effect is insufficient to escape from the LS condition. On the contrary, it is strictly limited to that condition. According to Pennebakers theory [33] the NMCD people with lower success scores may belong to a category of people relatively deprived of environmental stimuli and therefore paying (too) much attention to internal sensations, perhaps also believing that maintaining activity could be harmful.

The action pattern of more successful NMCD suggests that resting can be beneficial but only if engaged moderately—1 or 2 days a month. At best it could be combined with a very limited investment in talking and relaxation (or exercise), viz. once to at most three times in the 4 months. This category of people can be assumed to live in an environment with much external information and to believe in a health strategy of ignoring symptoms and carrying on with activities even though feeling unwell.

The success rate of the MCD people does not seem to be influenced by behaviour focused on complaints. For them, resting and taking prescribed medicines appears to be decisive. This pattern can easily be understood as a response to fatigue related to a moderate and or severe chronic disease which cannot be dealt with separately from the illness. One may wonder whether MCD people with less success in relieving their fatigue accommodate too readily to their fatigue or whether they suffer from a more severe and perhaps autonomous type of fatigue.

Overall, our study would seem to reveal three of the four strategies for dealing with chronic fatigue identified on the basis of the Illness Management Questionnaire: focusing on symptoms, maintaining activity and accommodating to the illness [34]. The information-seeking strategy is not evident here unless we interpret 'talking' in that sense.

Younger people (25–44 years) show a mixed pattern of relevant actions. Those with less success combine complaint-focused behaviour (except reducing activities) with a considerable use of prescribed medicines. This may be due to the heterogeneous composition of that sample.

The older people (45–64 years) are the only category in which taking rest does not make a difference between the LS and HS group. In both groups, scores (1.51 and 1.69) differ little from the mean (1.52) of the 214 originally selected respondents. Taking medicines—prescribed as well as OTC—and talking are distinctively characteristic.

One could suppose that the difference in action patterns between younger and older people has to do with different origins of the fatigue complaints, especially because age turns out to correlate significantly with the presence of moderate chronic diseases. Nonetheless, there remains much unexplained variety. Further exploration of this phenomenon is needed.

5. Practical implications

Our results do not seem to confirm the health actions commonly recommended for fatigued people by official organisations in The Netherlands which reflect current clinical insight [35]. They recommend in the first place healthy and variable meals, exercise, refraining from smoking and a reduction in alcohol consumption. With the exception of exercise—which is perhaps to be read as relaxation—we did not find these actions to discriminate between people who manage their fatigue complaints more or less successfully. In addition, as the relevance of the health-related actions in this study appeared to vary with the medical condition and the age of the subject, the recommendations for dealing with fatigue cannot be the same for all people.

However, it would be a mistake to read our findings as clear-cut cues for achieving success in dealing with fatigue complaints. On the one hand, belonging to the HS group does not indicate an absolute condition but only a relative advantage compared to the LS group. On the other hand, the difference between the HS and LS condition may be caused by or interact with other factors of which we had no information and could therefore not included in our analysis, such as we did for medical condition, age, sex, education and distress (GHQ). Differences in severity and in dimensions of fatigue should be especially kept in mind as explanatory factors. For example, the fatigue of HS people may be less

intensive and less physical than the LS people's. Further, other fatigue-managing actions which were not asked for in the diary set-up may have produced the difference. One could think of less problem-focused and more emotion-focused strategies such as positive reappraisal, acceptance of limitations, distancing or seeking support.

In general, our findings raise some doubts about current recommendations, but we cannot conclude that the actions frequently promoted by professionals are ineffectual. GPs, however, could consider paying particular attention to the specific pattern of health behaviour: a small number of actions, applied in combination and in a concentrated manner may work best. Their advice should be tailored to the specific type of fatigue (disease-related or not) and category of patients (younger or older, with many or few external environmental stimuli) since our study suggests that the success of health-related actions depends on the medical, socio-demographic and socio-psychological context.

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References

- [1] Lamberts H. In het huis van de huisarts. Lelystad: Meditekst, 1991.
- [2] Foets M, Sixma H. Een Nationale Studie van ziekte en verrichtingen in de huisartspraktijk. Basisrapport: Gezondheid en gezondheidsgedrag in de praktijkpopulatie. Utrecht: NIVEL, 1991.
- [3] Bakker D de, Claessens A, Velden K van der. Man-vrouw verschillen in gezondheid en medische consumptie. Nationale studie van ziekten en verrichtingen in de huisartspraktijk. 1992. Utrecht: NIVEL, 1991.
- [4] Gijsbers van Wijk CMT. Sex difference in symptom perception. Thesis. Amsterdam: University of Amsterdam, 1995.
- [5] Lewis G, Wessely S. The epidemiology of fatigue: more questions than answers. *J Epidemiol Community Health* 1992;46:92–7.
- [6] Pawlikowska T, Chalder T, Hirsch SR, Wallace P, Wright DJM, Wessely SC. Population based study of fatigue and psychological distress. *Br Med J* 1994;763-66.
- [7] Bensing JM, Hulsman R, Schreurs K. Vermoeidheid; een chronisch probleem. *Med Contact* 1996;51(4):123–4.

- [8] Chen MK. The epidemiology of self-perceived fatigue among adults. *Prev Med* 1986;15:74–81.
- [9] Saultz JW. Commentary (on Valdini et al., 1988). *Fam Pract* 1988;1:37.
- [10] Knottnerus JA, Knipschild PG, van Wersch JWJ, Sijstermanns AHJ. Unexplained fatigue and hemoglobin. A primary care study. *Can Fam Phys* 1986;32:1601–4.
- [11] Morrison J. Fatigue as a presenting complaint in family practice. *Fam Pract* 1980;0:795–801.
- [12] Sugarman JR, Berg AO. Evaluation of fatigue in a family practice. *Fam Pract* 1984;19(5):643–7.
- [13] Kroenke K, Wood DR, Mangelsdorff AD, et al. Chronic fatigue in primary care. Prevalence, patient characteristics and outcome. *J Am Med Assoc* 1988;2609:929–34.
- [14] Ridsdale L, Evans A, Jerrett W, Mandalia S, Osler K, Vora H. Patients with fatigue in general practice: A prospective study. *Br Med J* 1993;307:102–6.
- [15] Pennincks HKM. Epidemiologische gegevens en filosofische overwegingen over de klacht moeheid. *Bijblijven* 1991;7(7):4–8.
- [16] Bensing JM, Schreurs K. Sekseverschillen in moeheid. *Huisart Wet* 1995;38(9):412–21.
- [17] Valdini A, Steinhardt S, Jaffe A. Demographic correlates of fatigue in a university family health centre. *Fam Pract* 1987;4:103–7.
- [18] Lawrie SM, Pelosi AJ. Chronic fatigue syndrom in the community. Prevalence and associations. *Br J Psychiatry* 1995;166:793–7.
- [19] Mens-Verhulst J, Bensing JM. Sex differences in persistent fatigue. *Women Health* 1997;27(3):51–70.
- [20] Tibblin G, Bengtsson C, Furunes B, Lapidus L. Symptoms by age and sex. The population studies of men and women in Gothenburg, Sweden. *Scand J Prim Health Care* 1990;8:9–17.
- [21] Cox B, Blaxter M, Buckle A et al. The health and lifestyle survey. London: Health Promotion Trust, 1987.
- [22] Kirk J, Douglass R, Nelson E, Jaffe J, Lopez A, Ohier J, Blanchard C, Chapman R, McHugo G, Stone K. Chief complaint of fatigue: A prospective study. *J Fam Pract* 1990;30:33–9.
- [23] Mens-Verhulst J, Bensing JM. Distinguishing between chronic and non-chronic fatigue, the role of gender and age. *Soc Sci Med* 1998;in press.
- [24] Goldberg DP. The Detection of Psychiatric Illness by Questionnaire. London: Oxford University Press, 1972.
- [25] Lamberts H, Wood M, editors. International Classification of Primary Care. Oxford: University Press, 1987.
- [26] David A, Pelosi A, Mc Donald E, Stephens D, Ledger D, Rathbone R, Mann A. Tired, weak, or in need of rest: fatigue among general practice-attenders. *Br Med J* 1990;301:1191–202.
- [27] Stevens J. Applied Multivariate Analysis for the Social Sciences. London: Lawrence Erlbaum, 1986.
- [28] Kuijk EAWJ van, Mens-Verhulst J, Dijkum C, Lam N. A model of chronic fatigue. In: Geurts J, Joldersma C, editors. Paper Presented on the 28th Annual International Conference International Simulation and Gaming Association (ISAGA), 1998, Tilburg.
- [29] Bishop GD. Lay conceptions of physical symptoms. *J Appl Soc Psychol* 1987;17(2):127–46.
- [30] Kooiker SE. *Illness in Everyday Life. A Health Diary Study of Common Symptoms and their Consequences*. Groningen: Rijks Universiteit Groningen, 1996. Thesis.
- [31] Beukema H. *Geen dokterlopers. Een onderzoek onder mensen die zelden een huisarts consulteren*. In: Goethals ALJ, Groothoff JW, editors. *Gezondheid en hulpverlening in sociaal-cultureel perspectief*. Amsterdam: Siswo, 1993.
- [32] de Rijk AE, Schreurs K, Bensing J. *De invloed van patiëntkenmerken op de beoordeling van moeheid door huisartsen*. *Gedrag & Gezondheid* 1996;24:173–80.
- [33] Pennebaker JW. *The Psychology of Physical Symptoms*. New York: Springer-Verlag, 1982.
- [34] Ray C, Weir W, Stewart D, Miller P, Hude G. Ways of coping with chronic fatigue syndromes: Development of an illness management questionnaire. *Soc Sci Med* 1993;37(3):385–91.
- [35] Dersjant PJ, Does E van der, Eielts N, Metz RG, Wijmer S. *Wat doe ik. Ga ik naar de huisarts*. Rotterdam: Ketting Partners, 1993.