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Chronic disease and mental disorder

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ABSTRACT

The aim of this study was to achieve a better understanding of the relationship between chronic medical illness and mental distress. Therefore, the association between chronic medical illness and mental distress was analysed, taking into account the modifying effects of generic disease characteristics (concerning course, control and possible stressful consequences), physical quality of life indicators and social and relationship problems. Panel data from the Dutch national Panel of Patients with a Chronic Disease (PPCZ) were used. Data from 1788 chronically medical ill patients (nine disease categories) concerning their mental and physical health have been used in a cross-sectional, multivariate analysis. Somatic disease, generic disease characteristics and physical quality of life were assessed by medical doctors. Mental distress and social/ relationship problems were assessed by questionnaire (respectively, GHQ-12 and Biopro). Members of the panel had more mental distress than a random community sample. However, there were no differences between specific somatic diseases. Relationship, job-related and financial problems increased the probability of mental disorder considerably. Relationship problems may be considered a generic characteristic of chronically ill patients, causing an increased riskof mental disorder. Poor physical health condition contributed to a higher probability of mental disorder as well. General practitioners, home care providers and medical specialists should be aware that people with chronic diseases are in general more at riskof mental disorder. For many chronically ill people, this risk is further exacerbated by social/ relationship problems, and a poor level of perceived health.

INTRODUCTION

People with a chronic somatic disease are relatively more at riskof psychological distress than physically healthy people. Psychological distress may manifest itself in many different ways, from having to make an extra effort to cope with necessary adaptations, through emotional symptoms such as grief or anxiety that naturally accompany a fearful situation, to a clear-cut psychiatric disorder. A number of studies suggest that people with a chronic disease are at riskof psychological distress. The odds for a specific mental disorder (mostly depression) are increased for patients with cancer (Bodurka-Bevers et al., 2000; Carroll, Kathol, Noyes, Wald, & Clamon, 1993; Katon & Sullivan, 1990; Kugaya et al., 2000; McDaniel, Musselman, Porter, Reed, & Nemeroff, 1995; Wells, Golding, & Burnam, 1988), heart disease (Fielding, 1991; Friedman, 2000; Katon & Sullivan, 1990), arthritis (Creed, 1990; Katon & Sullivan, 1990; Murphy, Creed, & Jayson, 1988; Murphy, Dickens, Creed & Bernstein, 1999; Wells et al., 1989), high blood pressure (Wells et al., 1989), chronic lung disease (Ede, Ijzermans & Brouwer, 1999; Wells et al., 1988), neurological disease (Katon & Sullivan, 1990; Wells et al., 1988), diabetes (Anderson, Freedland, Clouse, & Lustman, 2001; Popkin, Callies, Lentz, Colon, & Sutherland, 1988; Garvard, Lustman, & Clouse, 1993; Lustman, Clouse, Griffith, Carney, & Freedland, 1997) and migraine (Lipton, Hamelsky, Kolodner, Steiner, & Stewart, 2000; Swartz, Pratt, Armenian, Lee, & Eaton 2000). Similarly, depressed patients report worse physical health, comparable

with patients with a chronic disease (Wells et al., 1989).

Severity of disease and loss of psychological resources appear to heighten psychological distress among chronically ill. This is supported by Hansen and colleagues who failed to find an association between presence of chronic disease and elevated prevalence of mental illness, but did find, however, three times greater odds for mental disorder for patients with a life-threatening disease (Hansen et al., 2001). Also Ormel et al. report differences in psychological distress among patients with 16 chronic diseases but these differences disappeared after controlling for disability, and personality characteristics reflecting psychosocial resources such as mastery (perceived self-control) and self-efficacy (Ormel et al., 1997).

On the other hand, Hayward's (1995) review reports only weakevidence supporting an association between psychiatric illness and cardiovascular disease. Similarly, Cassileth et al. (1984) found no differences in mental health between those with chronic medical illnesses (arthritis, diabetes, cancer, kidney disease, and dermatological diseases) and people with no chronic illness, while both groups differed markedly from depressed patients (Cassileth et al., 1984). Neither Spitzer et al. (1995) nor Kempen Ormel, Brilman and Relyveld (1997) found impairments in mental health among patients with medical disorders even though they reported lower health-related quality of life in other domains (Spitzer et al., 1995; Kempen et al., 1997).

This contradictory evidence might be attributed to a lackof specification both on the side of chronic medical disease as on the side of psychological distress. Health and disease should be considered on a number of different levels: Wilson and Cleary (1995) distinguish the biological/physical level, symptoms, functional status, and health perceptions, altogether defining an overall quality of life. Greenfield and Nelson (1992) ask attention for the interrelationships between biological, physical, mental, social and quality of life aspects. In Verbrugge and Patrick's (1995) disability model the major components of this health-related quality of life model can be traced back. The model describes the pathway from pathology (biological level) to disability (quality of life) via the intermediary of impairments (symptom level) as a consequence of pathology and the functional limitations in which impairments may result. On all levels, chronic medical disease can have consequences for mental health. These consequences may vary in quality and strength. Psychological distress among chronically ill might exist as a psychiatric disease in itself or it may be a psychological reaction to primary or secondary consequences of the medical disease, which act as stressors (cf. Heijmans et al., 2001). We suggest the following adaptation of Verbrugge's disability model to study the relationship between chronic medical disease and mental disorder.

At the biological level of pathology: In some cases (e.g. Parkinson's disease, Multiple Sclerosis, certain forms of cancer) a common biological substratum for both the disease and depression is postulated (Miranda, Arean, & Rickman, 1994). In such a case high correlations between certain specific diseases and depression are expected.

At the level of impairments and functional limitations: To a lesser or larger degree, chronic medical diseases have generic characteristics such as life threat or an unpredictable course that may be considered stressful in itself or protective against stress (eg. if medical or selfcontrol is possible). Moreover, disability and impairment have generic stressful consequences (disability, pain, changes in appearance), producing stress. These generic characteristics may differ between diseases (cf. Heijmans & de Ridder, 1998) and the more stressful these consequences are, the higher the probability of mental disorder will be. These characteristics are labelled ''generic'' because differences in these characteristics among chronically ill patients could not solely be attributed to different diseases but were dependent on personal characteristics such as age, sex, and illness duration as well (Heijmans et al., 2004).

Furthermore, at the level of functional limitations, chronic medical disease may have a social, relational or material impact, which, stressful as they are may lead to mental distress as well.

In this paper, these relationships will be tested, guided by the following general research question:

To what extent are different chronic medical diseases associated with an increased probability of mental disorder and to what extent are these associations modified by generic disease characteristics and accompanying social or relationship problems?

More specifically, we ask

(1) To what extent are people who suffer from different chronic medical diseases at riskof mental distress?

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(2) To what extent are different chronic medical diseases differentially related to generic disease characteristics and stressful consequences?

(3) To what extent are different chronic medical diseases differentially related to social, relational and material problems?

(4) To what extent is mental distress related to different diagnostic groups of chronic medical disease, generic disease characteristics and stressful consequences and accompanying social/relational/material problems?

METHOD

Study sample

Data were collected by questionnaire from the Dutch national Panel of Patients with a Chronic Disease (PPCZ). This panel was recruited via 56 general practices drawn at random from the population of Dutch general practices, as contained in the Register of General Practitioners and selected for this study according to the following criteria: a diagnosis by a certified medical doctor of a somatic chronic disease, age over 15 years, non-institutionalised, an awareness of the diagnosis, not terminally ill, the mental and physical ability to participate, and sufficient mastery of the Dutch language. Selection was performed by the GP who ran through a randomly drawn 36% sample of the patient files, applying the above-cited criteria. Patients were informed by the GP about the panel and returned a signed informed consent form to the research centre. After obtaining informed consent patients were approached with a questionnaire.

In the study, reported here, only patients with the nine most frequent diagnoses from this national panel are included (N ¼ 1788) with the following diagnoses: Ischemic heart disease, rheumatoid arthritis, cancer, diabetes, neurological diseases (epilepsy, Parkinson's Disease, multiple sclerosis), migraine, digestive disorders, osteoarthritis and asthma.

Data collection

The panel was recruited between November 1997 and February 1998. Diagnoses were reported on registration forms by the GPs at the time of recruitment. On this form generic disease characteristics were assessed by the GP as well.

Questionnaires are sent each year to all members of the panel. The current data were derived from the 1998 (October) questionnaire. Response rate: 91.8%.

Measurements

The following characteristics were assessed.

Mental distress

The questionnaire included the 12-item version of the General Health Questionnaire (GHQ). The GHQ has been developed as a screening test for mental disorder and is commonly used as a measure of mental distress. The GHQ has a range from 0 to 12. A higher score indicates more mental distress and a higher probability for mental disorder. A sensitivity score of 83%, a specificity score 79% and a positive predictive value of 64% have been reported of the GHQ-12 in relation to standardised psychiatric interviews (Goldberg, 1985). In four Dutch studies, sensitivity and specificity of GHQ-12 compared with PSE-ID varied from 0.61 and 0.94, respectively, 0.60 and 0.78 (Koeter & Ormel, 1991)

Sociodemographic characteristics:

These include age (in years) at the time of completion of the questionnaire and gender.

Chronic disease characteristics

These include: (1) diagnosis as given by the patient's GP (for patients with more than one diagnosis, the oldest diagnosis served as the index diagnosis); (2) comorbidity, expressed as the number of diagnoses of chronic diseases registered by the GP; (3) duration of each chronic disease, according to the date of onset as recorded by the GP. In order to assess the generic diseases characteristics and stressful consequences, the health situation of each patient was rated by the GP on a 3-point scale (1=lesser than average, 2=average, 3=higher than average; where 'average' refers to the situation of all chronically ill patients) according to disease characteristics (life-threatening character, deteriorating/ progressive course, episodic character, controllability) and stressful consequences (pain, changes in

physical appearance, limited physical functioning) The same items were rated by the patient as well. These characteristics have been identified as general themes which chronically ill patients refer to when asked for the consequences of their diseases (de Ridder, Schreurs, & Bensing, 1998).

Social/relationship problems

In the questionnaire, the following social/relationship problems were described: the respondents were asked to indicate whether they had encountered any of the following problems during the last year: financial, housing, employment, with partner, with children, with other people, sexual, with leisure time.
Questions were derived from the biographical list of problems, (BIOPRO), developed by Hosman (1983).

Reference groups

The characteristics of the study sample were compared with certain reference groups as follows: The GHQ-score was compared with the GHQ-score, measured in a nation-wide, population based survey, (N ¼ 9541; response rate 64%). Data were collected in 2001 in the context of the second Dutch National Survey of General Practice (Schellevis, Westert, Bakker, & Groenewegen, 2000). The community sample was representative of the Dutch population regarding distribution over the country, degree of urbanisation, and demographic characteristics.
The prevalence of social/relationship problems was measured with the BIOPRO. The same questions were administered during the survey mentioned above to a representative nation-wide sample.

Statistical analysis

Differences in GHQ-score, social/relationship problems and disease characteristics of the nine diagnostic groups were assessed by a one-way analysis of variance. The level of significance of the differences was computed by means of Scheffe's analysis. GHQ means of the chronically ill sample were compared with means of the population sample with analysis of variance, controlling for age and sex.
The relation between GHQ score, type of chronic disease, possible confounders, generic disease characteristics and social/relationship problems, was analysed by linear regression with GHQ score as the dependent variable. The analysis was hierarchical: first, the specific somatic disease was entered, followed by age, sex and illness duration, and then by the generic characteristics as assessed by the GP. Finally social/relationship problems were entered.

RESULTS

Table 1 presents the distribution of age and gender. Patients with asthma and migraine were on average younger than most other categories; patients with heart disease, cancer or osteoarthritis were older than patients from other categories. Patients with heart disease were more often male; patients with migraine, rheumatoid arthritis, digestive diseases or osteoarthritis were more often female.
Regarding the generic characteristics of the patients' health situation as assessed by the GPs the following differences between the nine chronic diseases could be observed (table available on request). Regarding the average number of diseases (comorbidity) and the duration of the illness, differences between different chronic diseases were small. Patients with heart disease had more co-morbidity than the others; the average duration of cancer and digestive disease was shorter than that of rheumatoid arthritis and asthma.
Heart disease was considered life threatening in more cases than other diseases. The condition of cancer patients was considered life threatening as well; rheumatoid arthritis and osteoarthritis were characterised frequently as progressively deteriorating, painful, episodic and causing physical disability, whereas these diseases were seldom considered life threatening. The same held true for migraine patients, except that the illness was considered far less progressive and disabling.
Diabetes and asthma were most frequently assessed as controllable, not painful and without physical limitations. Neurological diseases were relatively often accompanied by physical disability.

[TABLE 1]

[TABLE 2]

  Limited physical functioning, pain, changes in physical appearance and a course of illness that is episodic or progressive were significantly related to more mental distress, as indicated by the GHQ. In Table 2 the mean GHQ score is shown for patients with different chronic conditions.
The total mean was 2.01 (95% confidence interval 1.86–2.14). This varied from 1.30 for people with digestive diseases to 2.67 for people with migraine. Although the variance within groups was significantly less than between groups (F ¼ 2:66; p ¼ 0:007) there were no significant differences between any of the diseases.
The analysis of variance comparing chronically ill and community people revealed significantly higher scores for the chronic somatic disease group (M ¼ 2:01) compared to the community sample (M ¼ 1:11; 95% confidence interval 1.05–1.17). Women in both groups had higher scores than men. The significant age effect showed highest scores for 15–44 years, lowest score for 65–74 and an in-between position for 45–65 year olds and 75+. This shape is visible for both men and women in the chronically ill group and in the community sample. These relations are depicted in Fig. 1.

[FIGURE 1]

Patients with a chronic somatic disease had more financial problems, housing problems, relational problems and sexual problems than a reference group from a national survey in the Netherlands in 2001. Chronically ill patients had less employment problems than the reference group.
The differences in social/relationship problems between the patients with different diseases were almost negligible. Patients with neurological diseases reported more sexual problems than patients with rheumatoid arthritis. Details on the specific social/relational problems for each chronic disease are available from the authors on request.
Table 3 gives the results of the multiple linear regression analysis, conducted in four steps.
The first step explained 1.6% of the variance; patients with digestive diseases and diabetes had relatively low GHQ scores. The second group of variables, age, sex, illness duration, explained an additional 2.3% of the variance. The addition of age and sex eliminated the effect of diabetes (step 2), diabetic patients being relatively old and GHQ decreasing with age. Generic disease characteristics in step 3 added little to the explained variance. Only disabilities in physical functioning made a significant contribution, increasing the total amount of explained variance to 6.3%. Following the introduction of social/relationship problems to the model (step 4), the proportion of the variance accounted for increased from 6% to 27%. The group of social/ relationship problems in itself explained 25% of variance. Problems with partners, jobs, finance, children, and other people as well as problems with leisure time all added to the explanation of a higher GHQ score. All the changes in the variance accounted for between the various steps were significant at po0:0001:

DISCUSSION AND CONCLUSIONS
  Patients with a chronic somatic disease have a higher probability of mental disorder, as indicated by the GHQ, than patients from a community sample. However, we did not find a specific relation between a particular disease and an increased risk. Females were more at riskthan males, and younger people more than those aged 45–74. Negative characteristics of the course of the disease (progressive or episodic) and stressful consequences (limited physical functioning, pain, changes in physical appearance) contributed to the risk for mental distress. Disease characteristics, considered protective, like medical or self-control, did not bear a relationship with distress. The results further suggest that social, material and relationship problems increase the probability of mental disorder considerably. Some of these problems are not particularly more prevalent among chronically ill patients; others (financial problems, housing problems, partner-relationship problems, sexual problems) on the other hand are. Concerning social, material and relationship problems, there are no significant differences between patients with different chronic conditions. These social/relational problems might be considered a generic consequence of chronic somatic disease, related to an increased risk of mental

disorder.

When all variables were considered together in one analysis, the generic disease characteristics and stressful consequences lost their significant contribution, once social relationship problems were added.

Returning to our disability model discussed in the introduction section, the common biological substratum hypothesis could not be confirmed. Patients with cancer or neurological disease had no greater probability for mental disorder. The hypothesis that different chronic diseases have different stressful consequences as a result of the generic disease characteristics was confirmed, but each disease appears to have its own burden. Some diseases were accompanied by a lot of pain and disabilities, but were less life threatening; others were troublesome because of their episodic character but had fewer physical limitations; and other diseases had a very progressive course without being evaluated as immediately life threatening. In particular, pain, physical limitation and a progressive or episodic course contributed to stress. However, the most important effect on mental distress among chronically ill people seems to be the social impact of their functional limitations.

[TABLE 3]

We used GP assessments of generic disease characteristics in order to avoid contamination between several self-reports of the patient. The disadvantage is that the perception of the patient was not taken into account. Therefore, in other analyses (not presented here) we included the effect of generic disease characteristics as perceived by the patient instead of the doctor's assessment. Among these self-reports, perceived health contributed considerably to the prediction of mental disorder. Also the self-perceived life threatening and unpredictable character of the disease and limitations in physical role performance were related to mental disorder, although these effects disappeared after controlling for perceived health. General health status, as perceived by the patients thus had an effect, comparable with the effect of physical functioning, assessed by the doctor.

The study has several methodological strengths. The panel data are a representative sample of the chronically ill Dutch population, as far as index-disease, duration of disease and health status as assessed by the GP are concerned (Rijken, Foets, Peters, Bruin, & Dekker, 1998). A large sample was involved and non-response was negligible; all sub-samples of the chronically ill were sufficiently represented, with 78 respondents in the migraine group being the smallest sub-sample. Secondly, chronic diseases were diagnosed by the GPs or the medical specialists concerned. This approach guarantees no contamination between the medical diagnosis (assessed by an independent medical doctor) and the mental health indicator (assessed by the respondent by completing the GHQ). Social/relationship problems were measured by instruments used previously in the Netherlands of which outcomes were comparable with earlier measurements (Verhaak, 1995). The probability of mental disorder in general was measured by the GHQ, an internationally validated and reliable instrument.

A possible methodological weakness, shared with many other epidemiological studies, is the fact that some the independent variables as well as the dependent variable were based on self-reporting. Social and relationship problems refer to factual events and may be characterised as not completely subjective, but the final appraisal remains of course a subjective one. This may partly explain the large contribution of explained variance in GHQ score by the social and relationship problems.

Although for some chronic conditions, especially neurological diseases and some cancers, a common biological substratum for somatic disease and psychiatric disorder is plausible (Miranda et al., 1994); we did not find differences between diseases. This may be due to the use of the GHQ as indicator for mental disorder. Although the GHQ has proven to be a sensitive and specific predictor for mental disorder, its relationship with a clinical diagnosis of mental disorder may have different specifications for different subgroups. Owing to these different specifications GHQ scores might be connected with different probabilities of mental disorder for different disease categories. The score on the GHQ may be better interpreted as mental distress in general rather than an unequivocal indicator for any mental disorder.

Another explanation for failing to reproduce a relation between specific diseases and mental disorder might be the global categorisation of medical diseases, putting all kinds of cancer and neurological

disease together.

Little was previously known about the specific role of social/relationship problems encountered by chronically ill patients and their impact on mental well being. Our results clearly indicate the independent effects of these social/relationship problems. Recently, Dickens, Jackson, Tomenson, Hay and Creed (2003) have found the same effect of social difficulties on depression among patients with arthritis. These problems are of special importance because they have a large impact on mental disorder and more common among chronically ill people.

We conclude that chronically medical ill people have more psychological distress than the average population, controlling for age and sex. Generic disease characteristics can be held responsible for this mental distress as far as physical functioning of the patient is concerned. However, social and relationship problems account for most of the differences in mental distress, and all the chronically ill are more at riskof these problems, especially those of a relationship character. These findings have important implications for health care providers of the chronically ill in that social and relationships problems are important in explaining how much mental distress is experienced.

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TABLES AND FIGURES

Table 1
The distribution of age and gender for nine chronic medical diseases

Disease	N	Age (mean)	Gender (% male)
1.Ischemic heart dis.	143	$65.8^{2,4-7,9}$ *	69^{2-9}
2. Rheumatoid arthritis	121	$55.3^{1,8,9}$	$29^{1,4}$
3. Cancer	146	$60.7^{5-7,9}$	$45^{1,6}$
4. Diabetes	389	$59.4^{1,5-9}$	$50^{1,2,6-8}$
5. Neurological	177	$54.1^{1,3,4,8,9}$	$55^{1,6}$
6. Migraine	78	$49.2^{1,3,4,8}$	$19^{1,3-5}$
7. Digestive disease	88	$53.1^{1,3,4,8,9}$	$30^{1,4}$
8. Osteoarthritis	182	$65.1^{2,5-7,9}$	$34^{1,4}$
9. Asthma	237	$45.6^{1-5,7,8}$	39^{1}
F-value (df = 8; 1554)		38.53	11.73
P		<0.000	<0.000

*: 2: Significant difference with category 2 ($p<0.01$); 3: Significant difference with category 3; etc.

Table 2
Mean GHQ-score for nine chronic medical diseases (weighted for age and gender)

Disease	GHQ (mean)
1. Ischemic heart disease	1.40
2. Rheumatoid arthritis	2.26
3. Cancer	2.18
4. Diabetes	1.79
5. Neurological	2.43
6. Migraine	2.67
7. Digestive disease	1.30
8. Osteoarthritis	2.30
9. Asthma	2.11
F-value (df = 8;1388)	2.66
p	0.007
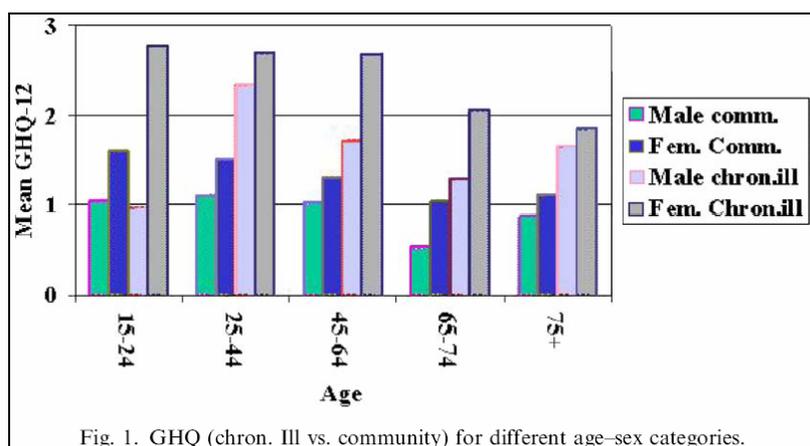
Fig. 1. GHQ (chron. Ill vs. community) for different age–sex categories.

Table 3
Significant beta coefficients from linear regression on GHQ score

	Step 1	Step 2	Step 3	Step 4
Disease				
Ischemic heart disease				
Rheumatoid arthritis			-0.07^*	
Cancer				
Diabetes	-0.07^*			
Neurological disease				
Migraine				
Digestive disease	-0.08^*	-0.09^{**}	-0.09^{**}	-0.08^{**}
Osteoarthritis				
Asthma				
Possible confounders				
Age		-0.11^{**}	-0.13^{**}	
Sex		0.12^{**}	0.12^{**}	0.09^{**}
Illness duration				
Generic disease characteristics/ stressful consequences				
Life threat				
Deteriorating (progressive course)				
Episodic (intermittent course)				
Medical controllable				
Self-controllable				
Pain				
Changes in physical appearance				
Physical functioning			0.08^*	0.09^*
Social/relational problems				
Financial problems				0.13
Housing problems				0.08
Problems with job				0.12
Problems with partner				0.18
Problems with children				0.08
Problems with other people				0.14
Sexual problems				0.10
Problems with leisure time				0.12
Multiple R	0.125	0.198	0.251	0.523
R^2	0.016	0.039	0.063	0.273
F change (significance)		9.54 (0.000)	3.57 (0.000)	41.16 (0.000)

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