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Perceived quality of chronic illness care is associated with self-management: Results of a nationwide study in the Netherlands

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ABSTRACT

Background: Healthcare providers are increasingly expected to help chronically ill patients understand their own central role in managing their illness. The aim of this study was to determine whether experiencing high-quality chronic illness care and having a nurse involved in their care relate to chronically ill people's self-management.

Methods: Survey data from 699 people diagnosed with chronic diseases who participated in a nationwide Dutch panel-study were analysed using linear regression analysis, to estimate the association between chronic illness care and various aspects of patients' self-management, while controlling for their socio-demographic and illness characteristics.

Results: Chronically ill patients reported that the care they received was of high quality to some extent. Patients who had contact with a practise nurse or specialised nurse perceived the quality of the care they received as better than patients who only had contact with a GP or medical specialist. Patients' perceptions of the quality of care were positively related to all aspects of their self-management, whereas contact with a practise nurse or specialised nurse in itself was not.

Conclusion: Chronically ill patients who have the experience to receive high-quality chronic illness care that focusses on patient activation, decision support, goal setting, problem solving, and coordination of care are better self-managers. Having a nurse involved in their care seems to be positively valued by chronically ill patients, but does not automatically imply better self-management.

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1. Introduction

Nowadays, self-management by patients (and their families) is recognised as an essential part of chronic illness care [1–4]. Self-management is defined as the individual's

ability to deal with everything a chronic illness entails [5]. This includes managing symptoms, treating the condition, making lifestyle changes, and coping with the physical and psychosocial consequences of having a chronic condition [5,6]. The aim of self-management is to minimise the impact of the chronic disease and maintain a satisfactory quality of life [7,8]. Given the comprehensive nature of their condition, it is not surprising that many patients find it difficult to achieve optimal self-management [9,10]. Healthcare providers are therefore increasingly expected to help patients understand their own central role in

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managing their illness, make informed choices, and engage in healthy behaviour [5,11].

Historically, Western healthcare systems are built on an acute, episodic model of care, which does not suit the comprehensive needs of the chronically ill [6]. Consequently, there has been a move away from models of care in which the healthcare provider is seen as the main actor and the patient as a passive recipient, towards models in which the patient is ascribed a more active role and healthcare providers and patients are considered equally important partners in chronic illness management [12–14]. In accordance with the Chronic Care Model, high-quality chronic illness care can be defined as a patient-centered collaborative approach to care [15], and is characterised by collaborative goal setting, support for self-management, optimisation of therapy, and intensive follow-up [16].

In the Chronic Care Model, the delivery of care by a multidisciplinary care team is considered an important element of high-quality care [17]: patients might benefit from the varied skills and knowledge of the different professionals involved in their care. In many countries, such as the UK, Sweden, Finland, Australia, New Zealand and the Netherlands, nurses have become important actors in the care for patients with chronic illness, as most doctors have neither the training nor the time to engage in behaviour change counselling, or to give self-management support [17,18]. Generally, doctors (general practitioners or medical specialists) focus on the process of diagnosing and initiating medical treatment, whereas practise nurses and specialised nurses provide education, monitor treatment outcome, support behaviour change, and coordinate active follow-up [18,19]. Several studies indicate that nurses' involvement leads to improved quality of chronic illness care and improved patient outcomes [20–23].

According to the Chronic Care Model, receiving high-quality chronic illness care should enable patients to actively contribute to (decisions regarding) their care and take actions that result in optimal health and quality of life outcomes. Research has shown that several elements of high-quality chronic illness care, such as patient-centered communication [24], self-management support [25], regular follow-up, and collaborative decision making [26], are associated with e.g., greater patient satisfaction, improved health status, and increased care efficiency. However, the relationship between (patient-perceived) quality of chronic illness care and patients' self-management is less clear. The limited number of studies that have examined this relationship used a narrow definition of self-management, focussing solely on the aspects of medical management and self-care [27,28]. One study found a positive association between high quality chronic illness care and patient activation which is a condition for good self-manage [29]. The effects on coping with the psychosocial consequences of chronic illness in daily life, however, have hardly been studied. This is striking, as findings of Elissen et al. [30] showed that self-management support provided by healthcare providers tends to focus mainly on medical and behaviour management and less on helping patients deal with the emotional consequences of being chronically ill.

2. Research focus and context

Considering the important role of the organisation of care as illustrated by the Chronic Care Model for chronically ill patients' behaviour and outcomes, we decided to study the relationships between the perceived quality and the involvement of nurses in the care of chronically ill patients in the Netherlands and their self-management. In the Dutch healthcare system, general practitioners (GPs) function as 'gatekeepers', which means that access to medical specialists and hospital care requires a referral from a GP. Practise nurses and specialised nurses have been introduced to reduce the workload of GPs and medical specialists as well as to improve the quality of chronic illness care [17,31]. In 2008, the Dutch government aimed to stimulate the improvement of the quality of care for patients with chronic conditions by adopting a nationwide chronic disease management approach [32]. This approach included the delivery of well-coordinated care and support by multidisciplinary care teams embedded in primary care, a central role for self-management by the patient and strengthening of the link between prevention and cure [33], with nationally developed care standards being the main instrument for implementation of this policy [34]. Care standards have been developed and regional care programmes based on these care standards have been implemented for several chronic diseases, starting with diabetes mellitus, COPD, and cardiovascular disease. Currently, more care standards have become available, but given their disease-specific nature and the complexity of the delivery and (separate) financing systems of healthcare and social care, chronic illness care in the Netherlands, as in other European countries, seems to be still fragmented [34], and issues of quality and efficiency remain high on the policy agenda.

Given the still actual and pregnant question on the quality of chronic illness care, we will begin our study by exploring the current status of chronic illness care in the Netherlands by examining chronically ill patients' perceptions of the quality of the care they receive and the involvement of nurses in their care. Next, as it is expected that the involvement of nurses contributes to a better quality of care [20,31], we will examine the relationship between nurse involvement and chronically ill patients' perceptions of receiving high-quality chronic illness care (see Fig. 1). Finally, we will examine the associations between the perceived quality of chronic illness care and nurse involvement on the one hand and aspects of chronically ill patients' self-management on the other.

We aim to answer the following research questions:

- How do chronically ill patients perceive the quality of the chronic illness care they receive, and to what extent are nurses (practise nurses or specialised nurses) involved in chronic illness care in the Netherlands, in addition to general practitioners and/or medical specialists?
- To what extent is the quality of chronic illness care as perceived by patients related to the involvement of a nurse in their care?

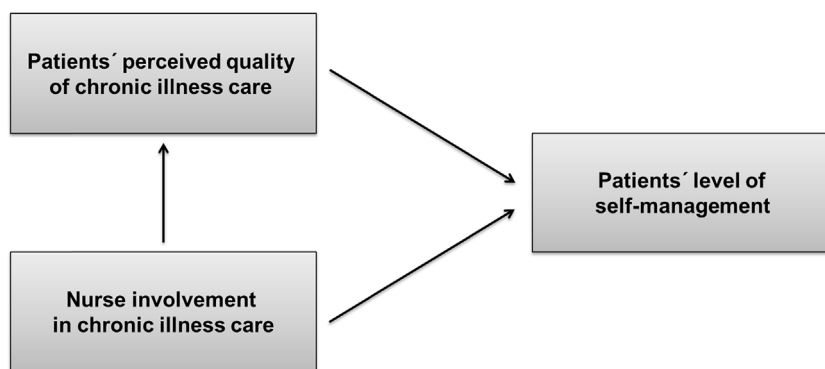


Fig. 1. Conceptual model of study.

- To what extent does the perception of receiving high-quality care and the involvement of a nurse relate to chronically ill patients' self-management?

3. Methods

3.1. Study sample

The sample of the present study consisted of members of the National Panel of people with Chronic illness or Disability (NPCD), used in a nationwide prospective panel study on the consequences of chronic illness in the Netherlands [35]. Participants with chronic illnesses were recruited from more than a hundred general practises (random samples of general practises drawn from the Dutch register of General Practises [36]). These panel members were selected based on the following criteria: they were diagnosed with a somatic chronic disease by a certified medical practitioner, aged ≥ 15 , not permanently institutionalised, aware of the diagnosis, not terminally ill (life expectancy >6 months according to the general practitioner), mentally capable of participating, and sufficiently proficient in Dutch. Annually, 500 new panel members are selected via the standardised procedure to replace panel members who have withdrawn or who have participated for the maximum term of four years. The NPCD is registered with the Dutch Data Protection Authority; all data is collected and handled in accordance with the privacy protection guidelines of the Authority.

On inclusion, NPCD participants received a questionnaire about their socio-demographic characteristics. In addition, GPs provided (with the patients' permission) medical information about the panel members. In October 2012, a questionnaire about experiences with chronic illness care and healthcare providers was sent to the panel members ($n=1064$, response=85%) and in April 2013, a questionnaire about self-management ($n=1227$, response=82%). A total of 699 participants filled in both questionnaires; they constituted the sample of this study. These participants were registered with 35 general practises from all over the country.

3.2. Operationalisation

3.2.1. Self-management

To cover a comprehensive range of aspects of self-management (in accordance with Bayliss [12]), we included two measuring instruments. The first was the Dutch version of the Partners in Health Scale (PIH-Dutch), which measures patients' self-management knowledge and behaviour. This PIH scale was originally developed as part of the 'Flinders Program of Chronic Care Self-Management [37,38]. The PIH-Dutch scale consists of 12 items, which are answered on a nine-point scale with 0 indicating low self-management and 8 high self-management, and is divided into four scales, namely: knowledge, coping with consequences, recognition and management of symptoms, and active involvement in treatment [39]. Scale scores were computed by dividing the sum of participants' item scores by the number of items filled in, with higher scores indicating better self-management.

Since communication with healthcare providers as an aspect of self-management is not addressed sufficiently in the PIH-Dutch, we also included the short version of the Perceived Efficacy in Patient-Provider Interaction (PEPPI-5) scale [40,41]. This scale consists of five items assessing the level of efficacy experienced by patients regarding their interactions with physicians. The items are scored on a scale ranging from 1 (very confident) to 5 (not confident at all). Mean scale scores were used in this study, with higher scores indicating higher levels of perceived efficacy in consultations.

3.2.2. Perceived quality of chronic illness care

We included the short version of the Patient Assessment of Chronic Illness Care questionnaire (PACIC-S) [42,43], to examine patients' perceptions of chronic illness care. The PACIC-S consists of 11 items assessing the extent to which patients experience that the care they received included decision support, goal setting, problem solving, and follow-up/coordination of care. These items are answered on a five-point scale ranging from 1 'almost never' to 5 'almost always'. Mean scale scores were used, with higher scores indicating patients experiencing higher quality of care.

Table 1
Sample characteristics.

		N	%	Mean	Range	SD	
Socio-demographic characteristics	Age	694		64.4	19–92	12.2	
	Female	364	52				
	Educational level	Low	241	36%			
		Intermediate	274	41%			
High		157	23%				
Illness characteristics	Types of disease	Cardiovascular disease	213	31%			
		Asthma	85	12%			
		COPD	84	12%			
		Musculoskeletal disorder	170	25%			
		Cancer	95	14%			
		Diabetes mellitus	162	23%			
		Neurological disease	83	12%			
		Gastrointestinal disease	51	7%			
		Other chronic disease	248	36%			
		Multi-morbidity present	371	53%			
	Illness duration in years	Life-threatening	676		12.4	.9–66	8.9
		To a lesser extent	511	79%			
		Neutral	98	15%			
	Progressive deterioration	To a greater extent	35	5%			
To a lesser extent		376	58%				
Neutral		200	31%				
Self-management	To a greater extent	68	11%				
	Knowledge	677		6.69	0–8	1.19	
	Coping	684		6.36	0–8	1.45	
	Symptom management	678		6.73	0–8	1.53	
	Active involvement	683		7.20	0–8	1.06	
Perceived efficacy in communication	653		3.98	1–5	0.72		

3.2.3. Healthcare providers

Participants were asked whether they had contact with a GP, medical specialist, practise nurse, and specialised nurse during the last 12 months. Based on these questions, we computed one dichotomous variable: patients receiving care provided by a GP and/or medical specialist versus those receiving care provided by a GP and/or medical specialist as well as by a practise nurse and/or specialised nurse.

3.2.4. Socio-demographic and illness characteristics

We included the following socio-demographic characteristics of the participants in our study: age, gender, and highest level of education. In addition, we used data provided by their GPs: the types of chronic disease that had been diagnosed (coded by means of the International Classification of Primary Care [44]), the presence of more than one chronic disease (multi-morbidity), illness duration (time post-diagnosis computed from the month and year of diagnosis of the (first) chronic disease) and whether patients' health status was life-threatening, or progressively deteriorating (on a 3-point scale) according to the GP.

3.3. Statistical analyses

Descriptive analyses were performed to provide information about the characteristics of the study sample and to describe the perceived quality of chronic illness care and the involvement of different types of doctors and nurses in the care participants received during the last year

(question 1). As disease management programmes have been introduced to improve the quality of care but have only been implemented until now for some chronic diseases in the Netherlands, we also wanted to check whether the perceived quality of chronic illness care was different for people with different types of chronic diseases. Therefore, we performed linear regression analyses to check whether the perceived quality of chronic illness care differed for patients with different types of chronic diseases and logistic regression analyses to check whether the odds of having a nurse involved in their care differed between patients with different types of chronic diseases.

T-test for independent samples was used to establish whether the perceived quality of chronic illness care differed between patients who received care from a practise nurse/specialised nurse in addition to the care provided by a GP/medical specialist and patients who only received care from these doctors (question 2).

Finally, we performed linear regression analyses to estimate the associations between patients' perceived quality of chronic illness care and nurse involvement in care (independent variables) and patients' self-management (dependent variables) (question 3). In addition, we also conducted linear regression analyses which included the interaction effect between patients' perceived quality of chronic illness care and nurse involvement in care on patients' self-management. We controlled for the effects of socio-demographic and illness characteristics. We conducted single-level regression analyses instead of multilevel analyses, since intra-class correlations (Appendix 1) showed hardly any clustering of patients' self-management

Table 2
Characteristics of received chronic illness care (care providers involved and perceived quality of care).

	N	% or mean	Std. dev.
Involvement of care providers			
GP	690	88%	
Medical specialist	677	68%	
Practice nurse	671	50%	
Specialised nurse	668	26%	
Patients' perceived quality of chronic illness care (range 1–5)	575	2.53	0.84

abilities within general practises (which was the original sampling framework). In addition, the likelihood ratio test did not show that multilevel analyses had an advantage over ordinary regression analyses. All analyses were performed using Stata 13.1.

4. Results

4.1. Characteristics of the study sample

Table 1 shows the socio-demographic and illness characteristics and self-management scores of the study sample. The mean age was 64.4 years and 52 percent of the participants were female. Cardiovascular disease (31%), musculoskeletal disorders (25%), and diabetes (23%) were the most common chronic diseases within the sample. Half (53%) of the study sample was diagnosed with more than one chronic (somatic) disease and the mean illness duration (time post-diagnosis) was 12 years. The health status of 79% of the participants was not life-threatening or only to a small extent, and in 61% it was not progressively deteriorating or only to a small extent. Mean scores on the self-management scales were high, indicating that participants generally perceived their self-management to be quite good.

4.2. Chronic illness care

The involvement of a GP in their care was reported by almost all participants, followed by the involvement of medical specialists, practise nurses, and specialised nurses (Table 2). More than a third (37%) of the participants only received care from a GP and/or medical specialist, whereas 63% also had a practise and/or specialised nurse involved in their care.

Table 2 also shows that participants had a mean score of 2.53 on the PACIC-S. Considering the item scores (not tabulated), most participants perceived their care as well-organised, were regularly asked about health habits and were given choices to think about (mean item scores >2.99). However, some aspects of high-quality care were reported less often: only a few participants reported having received a copy of their treatment plan, having been contacted after a visit to see how things were going (follow-up care) and having been encouraged to go to a specific group or class to help them cope with their chronic illness (mean item scores <2.00).

Both the odds of having a practise nurse or specialised nurse involved in their care and the quality of chronic illness care that patients experienced were related to the type of chronic disease(s) they suffered from (not tabulated). Participants who had been diagnosed with COPD and/or diabetes were more likely to have a practise nurse or specialised nurse involved in their care (OR = 2.03, $p < .05$, and OR = 6.03, respectively, $p < .01$) and rated the quality of their care higher ($\beta = 11$ and $\beta = 11$ respectively, $p < .05$) than participants who had not been diagnosed with these diseases.

4.3. Associations between healthcare providers involved and perceived quality of care

How chronic illness care is organised is associated with how patients perceive the quality of their care. Participants who received care from a nurse, in addition to care from a GP and/or medical specialist, rated the quality of their care higher than participants who received their care solely from a GP and/or medical specialist(s) (Table 3). The added value of having a nurse involved in the care process was highest regarding patients' experiences with follow-up care, discussing lifestyle issues, and setting goals.

4.4. Associations between chronic illness care and self-management

Participants' perceptions of the quality of chronic illness care were positively related to their self-management (Table 4). The better they perceived the quality of care to be, the higher their level of self-management was. Perceived quality of care had the strongest association with the communication component of self-management and the weakest with patients' knowledge. Having a practise nurse or specialised nurse involved in the care was not associated with a higher level of self-management. Moreover, we have also conducted a separate regression analysis with nurse involvement included as the only predictor variable, besides the confounders (and thus without the perceived quality of care variable), but this analysis also showed that nurses' involvement in care is not associated with patients' self-management (not tabulated). In addition, we also did not find an interaction effect between perceived quality of care and nurses' involvement in the care on the level of self-management (not tabulated).

Furthermore, Table 3 shows that age and being diagnosed with a musculoskeletal disorder have an additional significant effect on participants' level of coping with the consequences of chronic illness, and that gender, education level and being diagnosed with diabetes, musculoskeletal, or neurological disorders all had an additional significant effect on participants' confidence in their communication with healthcare providers.

5. Discussion

This study provides insight into the current state of chronic illness care in the Netherlands and how this relates to chronically ill patients' self-management. As self-management is nowadays considered a key element in

Table 3

Patients' perceived quality of chronic illness care according to the type of healthcare providers involved in their care (N = 528–559).

	Healthcare providers involved		T-test
	Only GP or specialist	Also practice or specialised nurse	
Patients' perceived quality of chronic illness care	2.31	2.64	–4.54**
Over the past 6 months, when I received care for my chronic conditions, I was . . .			
... satisfied that my care was well-organised	3.89	4.01	–1.41
... asked questions, either directly or on a survey, about my health habits	2.73	3.28	–4.46**
... given choices to think about	2.99	3.01	–0.12
... helped to set specific goals to improve my eating or exercise	2.30	2.81	–4.35**
... asked how my chronic illness affects my life	2.31	2.58	–2.31*
... told how my visits to other types of doctors, like the eye doctor or surgeon, helped my treatment	2.08	2.72	–5.23**
... helped to make a treatment plan that I could use in my daily life	1.98	2.30	–2.84**
... helped to plan ahead so I that could take care of my illness even in hard times	2.01	2.28	–2.51*
... given a copy of my treatment plan	1.66	2.08	–3.94**
... contacted after a visit to see how things were going	1.68	2.05	–3.63**
... encouraged to go to a specific group/class to help me cope with my illness	1.68	1.89	–2.12*

* Significant at $p < .05$.** Significant at $p < .01$.

the care for people with chronic illness, it is important that chronic illness care is organised and that healthcare providers provide care in a way that it supports patients to better self-manage their illness. To start with the healthcare providers involved, almost all people with a chronic illness in the Netherlands receive care from a GP and two thirds also receive care from one or more medical specialist(s), but only half of them also had contact with a practise nurse and about a quarter also had a specialised nurse involved in their care. In general, chronically ill patients reported receiving chronic illness care that was of high quality to some extent. In this study, people with chronic illnesses had an average score of 2.53 on the PACIC-S, which was slightly lower than the 2.63 found by Cramm et al. [44] who studied the experiences of people with cardiovascular disease who had all been enrolled in a comprehensive disease management programme (which is still not the case for all chronically ill people in the Netherlands). However, some elements of high quality care are implemented better than other aspects. Incorporating patients' social environment into their treatment and more intensive follow-up to assess patients' progress are aspects that need more attention. Other studies also found that the quality of chronic illness care, in both the Netherlands and other European countries, is still inadequate in terms of patient-provider communication, shared decision-making, and follow-up between visits [30,45,46].

Furthermore, this study shows that patients with different chronic diseases have different experiences with chronic illness care in the Netherlands. We found that nurses were more often involved in the care for patients with diabetes or COPD, which is in line with the competence profile of practise nurses in the Netherlands [47]. Also, patients diagnosed with diabetes or COPD perceived the quality of care as higher than people with other chronic diseases. This difference in nurse involvement and perceived quality may be a direct result of the introduction of disease-specific chronic disease management programmes.

In line with existing literature [20–23], we found that nurses' involvement can improve the quality of care for chronically ill patients. Compared to patients who only had contact with a GP or medical specialist(s), patients who also had contact with a practise nurse or specialised nurse perceived the quality of their care to be better. This confirms the rationale behind current health policy to promote task delegation, as it should lead to GPs and medical specialists having more time to focus on the diagnostic and medical treatment process, while nurses could spend time on other important elements of high-quality care, such as monitoring treatment outcomes, providing education and support with behaviour change, and active follow-up [18,19,48]. However, nurses' involvement in treatment was not associated with higher levels of self-management. This was also the case when we included nurse involvement as the only predictor variable in the model. One of the explanations for this might be that we do not actually know which care these nurses provided. For instance, nurses might have focussed on monitoring the clinical outcomes of medical treatment and organizing follow-up care rather than on providing self-management support. Tension between following clinical guidelines and a patient-centred collaborative approach to care has been previously reported [18]. Another explanation relates to the complicated nature of chronically ill patients' self-management: it has been found to depend on many personal and contextual factors [49,50], and the involvement of nurses is only one of the many factors in this respect.

Nevertheless, our results indicate that patients who experience a higher quality of care have more knowledge of their illness, are more capable of coping with the consequences of their illness, are more able to recognise and manage their symptoms, are more actively involved in their own treatment and are more confident in their communication with healthcare providers. Previous work has already shown a positive relationship between the (perceived) quality of chronic illness care and patient activation [29] and self-management behaviour such as regular

Table 4

Linear regression analysis assessing the relationship between patients' perceived quality of chronic illness care, nurse involvement and self-management of people with chronic illness (standardised coefficients).

	Knowledge (<i>n</i> = 468)		Coping with consequences (<i>n</i> = 469)		Symptom management (<i>n</i> = 469)		Active involvement (<i>n</i> = 469)		Perceived efficacy in communication (<i>n</i> = 458)	
	<i>B</i>		β		β		β		β	
Patients' perceived quality of chronic illness care	.13	**	.17	**	.14	**	.16	**	.21	**
Nurse involvement in care	-.05		-.01		.01		.01		-.04	
Covariates										
Age	-.02		.13	*	-.04		.08		-.06	
Female (ref: male)	-.01		-.08		.06		-.05		-.11	*
Educational level (ref: low)										
Intermediate	.00		.05		-.08		.07		.08	
High	.04		.06		-.03		.09		.15	**
Types of disease ^a										
Cardiovascular disease	-.02		-.01		-.04		-.08		-.09	
Asthma	-.02		-.00		.06		.03		-.01	
COPD	.02		-.04		-.02		.01		-.01	
Musculoskeletal disorder	-.09		-.11	*	-.05		-.02		-.14	*
Cancer	.06		.02		.01		-.01		.01	
Diabetes mellitus	-.03		-.03		.01		-.02		-.11	*
Neurological disease	.00		-.06		-.08		.2		-.10	*
Gastrointestinal disease	-.06		-.03		.02		.04		-.02	
Other chronic disease	-.03		.03		-.05		-.09		-.05	
Multi-morbidity present (ref: no)	.06		-.02		.13		.12		.14	
Illness duration	.03		.00		.01		-.02		-.01	
Life-threatening (ref: to a lesser extent)										
Neutral	-.01		-.04		.03		-.02		-.09	
To a greater extent	.01		-.09		.07		.04		-.06	
Progr. deterioration (ref: to a lesser extent)										
Neutral	-.00		-.09		-.09		-.12	*	-.07	
To a greater extent	.08		.05		-.06		.01		-.04	
R ²	4%		9%		7%		7%		13%	

* Significant at $p < .05$.** Significant at $p < .01$.^a Reference group: people who do not have that specific type of chronic illness. For example, people with COPD were compared with people who have another chronic disease(s).

exercise and healthy diet [27,28]. Our study, however, focusses on a broader array of self-management aspects and shows that the perceived quality of care is also associated with coping with the psychosocial consequences of chronic illness in daily life. However, as mentioned above, chronically ill patients' self-management is determined by many personal and contextual factors, and considering the small part of the variation in each of the self-management aspects explained by the perceived quality of chronic illness care, there are indeed many other factors involved.

5.1. Strengths, limitations and further research

One of the strengths of this study lies in the use of a nationwide representative sample of (medically diagnosed) chronically ill people. The distribution of the chronic disease categories in our sample was similar to that of a large nationwide database which contains the health data, including the medical diagnoses of chronic diseases, of about 10% of the Dutch population (NIVEL's Primary Care Database [51]). This confirmed our confidence that our sample is a good representation of the total population of people with (somatic) chronic illness in the Netherlands and allowed us to assess to what extent high-quality chronic illness care is implemented in the Netherlands. Another strength of this study lies in the fact that we examined several aspects of self-management instead of solely focussing on the medical or lifestyle aspects of self-management.

The most important limitation of this study is that it is not clear whether receiving high-quality chronic illness care lets patients engage in more self-management behaviour or whether more self-management behaviour, better knowledge or confidence in this respect triggers healthcare providers to deliver higher quality care. It will probably be a combination of both. In addition, as the quality of chronic illness care is patient reported, it may be that patients' self-efficacy might impact their perception of the quality of care. Furthermore, chronic illness care and self-management were not assessed at the same time. Both the healthcare providers involved and the perceived quality of care were assessed 6 months prior to the assessment of participants' self-management. Since we examined whether there would be support for the hypothesis, derived from the Chronic Care Model, that the way chronic illness care is provided impacts on chronically ill patients' self-management (and not the other way around), we consider it acceptable that participants' self-management was assessed 6 months later than their report of the healthcare providers involved in their care and their perceptions of the quality of the care they received. Nevertheless, we cannot draw any conclusions about causality in this respect, as the design of our study does not allow to rule out the alternative pathway described above. Longitudinal studies are needed to further study the interaction between the quality of chronic illness care and chronically ill patients' self-management. Future research could also investigate whether some elements of high-quality chronic illness care have more impact on patients' level of self-management than other elements. Finally, it is recommended that more research is carried out to study the effect of nurses'

involvement on the (perceived) quality of chronic illness care, as it is important to know for further improvement of chronic illness care in what way the involvement of nurses contributes to a better quality of care.

5.2. Conclusion and practise implications

This study shows that the way chronic illness care is provided is, to some extent, related to patients' self-management knowledge, skills, behaviour, and efficacy. Helping patients understand their central role in managing their illness, make informed choices and engage in healthy behaviour is likely to improve chronically ill people's level of self-management. The Dutch health policy to improve the quality of chronic illness care by increasing the role of (practise and specialised) nurses in the care for people with chronic diseases seems to be effective. However, it is questionable whether the disease-specific approach of the Dutch care standards and disease management programmes is appropriate to improve care for all people with chronic illness, including those who suffer from less prevalent chronic diseases, or from multi-morbidity. Comprehensive chronic illness care that starts from patients' individual goals, preferences and competencies ('goal oriented care' [52]) instead of patients' chronic disease type(s) may be a promising way to improve the quality of chronic illness care for all.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.healthpol.2015.11.006>.

References

- [1] Clark N, Becker M, Janz N, Lorig K, Rakowski W, Anderson L. Self-management of chronic disease by older adults. *Journal of Aging and Health* 1991;3:3–27.
- [2] Glasgow RE, Davis CL, Funnell MM, Beck A. Implementing practical interventions to support chronic illness self-management. *The Joint Commission Journal on Quality and Patient Safety* 2003;29:563–74.
- [3] Lorig K, Holman H. Self-management education: history, definition, outcomes and mechanisms. *Annals of Behavioral Medicine* 2003;26:1–7.
- [4] Nolte E, McKee M. Caring for people with chronic conditions. A health system perspective. New York, NY: Open University Press; 2008.
- [5] Coleman MT, Newton KS. Supporting self-management in patients with chronic illness. *American Family Physician* 2005;72:1503–10.
- [6] Barlow J, Wright C, Sheasby J, Turner A, Hainsworth J. Self-management approaches for people with chronic conditions: a review. *Patient Education and Counseling* 2002;48:177–87.

- [7] Lorig K, Holman H. Self-management education: history, definition, outcomes and mechanisms. *Annals of Behavioral Medicine* 2003;26:1–7.
- [8] Rijken M, Jones M, Heijmans M, Dixon A. Supporting self-management. In: Nolte E, McKee M, editors. *Caring for people with chronic conditions. A health system perspective*. New York, NY: Open University Press; 2008. p. 116–42.
- [9] Newman S, Steed L, Mulligan K. Self-management interventions for chronic illness. *The Lancet* 2004;364:1523–37.
- [10] Jerant AF, Von Friederichs-Fitzwater MM, Moore M. Patients' perceived barriers to active self-management of chronic conditions. *Patient Education and Counseling* 2005;57:300–7.
- [11] Group Health Research Institute, Chronic Care Model, United States: (<http://www.improvingchroniccare.org/index.php?p=Self-Management.Support&s=22>); 2014 [accessed. 19.05.14].
- [12] Bayliss E, Steiner J, Fernald D, Crane L, Main D. Descriptions of barriers to self-care by persons with comorbid chronic diseases. *Annals of Family Medicine* 2003;1(1):15–21.
- [13] Trappenburg J, Jonkman N, Jaarsma T, Van Os-Medendorp H, Kort H, De Wit N, et al. Self-management: one size does not fit all. *Patient Education and Counseling* 2013;92:134–7.
- [14] Bodenheimer T, Lorig K, Holman H, Grumbach K. Patient self-management of chronic disease in primary care. *Journal of American Medical Association* 2002;288(19):2469–75.
- [15] Goldstein MS. The persistence and resurgence of medical pluralism. *Journal of Health Politics Policy and Law* 2004;29:925–45.
- [16] Wagner EH, Austin BT, Davis C, Hindmarsh M, Schaefer J, Bonomi A. Improving chronic illness care: translating evidence into action. Interventions that encourage people to acquire self-management skills are essential in chronic illness care. *Health Affairs* 2001;20:64–78.
- [17] Wagner E. The role of patient care teams in chronic disease management. *British Medical Journal* 2000;320(7234):569–72.
- [18] Noordman J. *Lifestyle counseling by physicians and practice nurses in primary care. An analysis of daily practice*. Utrecht: NIVEL; 2013.
- [19] Katon W, Von Korff M, Lin E, Simon G. Rethinking practitioners' role in chronic illness: the specialist, primary care physician, and the practice nurse. *General Hospital Psychiatry* 2001;23:138–44.
- [20] Laurant M, Harmsen M, Wollersheim H, Grol R, Faber M, Sibbald B. The impact of nonphysician clinicians: do they improve the quality and cost-effectiveness of healthcare services? *Medical Care Research Review* 2009;66:365.
- [21] Nouwens E, van Lieshout J, van den Hombergh P, Laurant M, Wensing M. Shifting cardiovascular care to nurses results in structured chronic care. *American Journal of Managed Care* 2014;20:278–84.
- [22] Laurant M, Harmsen M, Wollersheim H, Grol R, Faber M, Sibbald B. The impact of nonphysician clinicians: do they improve the quality and cost-effectiveness of health care services? *Medical Care Research and Review* 2009;66:36–89.
- [23] Russell GM, Dahrouge S, Hogg W, Geneau R, Muldoon L, Tuna M. Managing chronic disease in Ontario primary care: the impact of organizational factors. *Annals of Family Medicine* 2009;7:309–18.
- [24] Stewart M, Brown JB, Donner A, McWhinney IR, Oates J, Weston WW, et al. The impact of patient-centered care on outcomes. *Journal of Family Practice* 2000;49(9):796–804.
- [25] Schillinger D, Handley M, Wang F, Hammer H. Effects of self-management support on structure, process, and outcomes among vulnerable patients with diabetes. *Diabetes Care* 2009;32(4):559–66.
- [26] Bodenheimer T. Helping patients improve their health-related behaviors: what system changes do we need? *Disease Management* 2005;8(5):319–30.
- [27] Glasgow RE, Whitesides H, Nelson CC, King DK. Use of the patient assessment of chronic illness care (PACIC) with diabetic patients. Relationships to patient characteristics, receipt of care and self-management. *Diabetes Care* 2005;28:2655–61.
- [28] Schmittidjel J, Mosen DM, Glasgow RE, Hibbard J, Remmers C, Bellows J. Patient assessment of chronic illness care (PACIC) and improved patient-centered outcomes for chronic conditions. *Journal of General Internal Medicine* 2007;23(1):77–80.
- [29] Glasgow RE, Wagner EH, Schaefer J, Mahoney LD, Reid RJ, Greene SM. Development and validation of the patient assessment of chronic illness care (PACIC). *Medical Care* 2005;43(5):436–44.
- [30] Elissen A, Nolte E, Knai C, Brunn M, Chevreur K, Conklin A, et al. Is Europe putting theory into practice? A qualitative study of level of self-management support in chronic care approaches. *BMC Health Services Research* 2013;13:117–26.
- [31] Klein Lankhorts E, Spreeuwenberg C. The Netherlands. In: Nolte E, Knai C, McKee M, editors. *Managing chronic conditions. Experience in eight countries. The European observatory on health systems and policies*. Copenhagen: WHO; 2008. p. 97–114.
- [32] Cramm JM, Nieboer AP. In the Netherlands, rich interaction among professionals conducting disease management led to better chronic care. *Health Affairs* 2012;31(11):2493–500.
- [33] Ministry of Health (VWS). *Programmatiese aanpak van chronisch zieken [Disease management for chronic diseases]*. Den Haag: VWS; 2008.
- [34] Ursum J, Rijken M, Heijmans M, Cardol M, Schellevis F. *Zorg voor chronisch zieken: organisatie van zorg, zelfmanagement, zelfredzaamheid en participatie [Healthcare for chronically ill patients: organisation of health, self-management, self-care and participation]*. Utrecht: NIVEL; 2011.
- [35] Rijken M, Van Kerkhof M, Dekker J, Schellevis FG. Comorbidity of chronic illness. Effect of disease pairs on physical and mental functioning. *Quality of Life Research* 2005;14(1):45–55.
- [36] Hingstman L, Kenens R. *Cijfers uit de registratie van huisartsen: peiling 2011 [Figures from the registration of GPs: survey 2009]*. Utrecht: NIVEL; 2011.
- [37] Battersby MW, Ask A, Reece MM. The partners in health scale: the development and psychometric properties of a generic assessment scale for chronic condition self-management. *Australian Journal of Primary Health* 2003;9(3):41–52.
- [38] Petkov J, Harvey P, Battersby M. The internal consistency and construct validity of the partners in health scale: validation of a patient rated chronic condition self-management measure. *Quality of Life Research* 2010;19:1079–85.
- [39] Heijmans M, Waverijn G, Rademaker J, Van der Vaart R, Rijken M. *Functional, communicative and critical health literacy of chronic disease patients and their importance for self-management*. 2014, submitted.
- [40] Maly RC, Frank JC, Marshall GN, DiMatteo MR, Reuben DB. Perceived efficacy in patient-physician interactions (PEPPI): validation of an instrument in older persons. *Journal of the American Geriatrics Society* 1998;46(7):889–94.
- [41] Ten Klooster PM, Oostveen JC, Zandbelt LC, Taal E, Drossaert CHC, Harmsen EJ, et al. Further validation of the 5-item perceived efficacy in patient-physician interactions (PEPPI-5) scale in patients with osteoarthritis. *Patient Education and Counseling* 2011;87(1):125–30.
- [42] Gugiu PC, Coryn C, Clark R, Kuehn A. Development and evaluation of the short version of the patient assessment of chronic illness care instrument. *Chronic Illness* 2009;5:268–76.
- [43] Cramm JM, Nieboer AP. Factorial validation of the patient assessment of chronic illness care (PACIC) and PACIC short version (PACIC-S) among cardiovascular disease patients in the Netherlands. *Health and Quality of Life Outcomes* 2012;10:104–11.
- [44] Lamberts H, Wood M. *ICPD. International classification of primary care*. Oxford: Oxford University Press; 1987.
- [45] Osborn R, Squires D. *International perspectives on patient engagement. Results from the 2011 commonwealth fund survey*. *Journal of Ambulatory Care Management* 2012;35:118–28.
- [46] Schoen C, Osborn R, How SKH, Doty MM, Peugh J. In chronic condition: experiences of patients with complex healthcare needs, in eight countries, 2008. *Health Affairs* 2009;8:w1–16.
- [47] Landelijke Huisartsen Vereniging (LHV). *Praktijkondersteuner. Competentieprofiel en eindtermen [Practice nurse. Competences profile and end terms]*. Utrecht: LHV; 2010.
- [48] Voogdt-Pruis H. *Cardiovascular prevention. Nurses and doctors working together*. Maastricht: Maastricht University; 2011 (PhD-thesis).
- [49] Van Houtum L, Rijken M, Heijmans M, Groenewegen P. Self-management support needs of patients with chronic illness: do needs for support differ according to the course of illness? *Patient Education and Counseling* 2013;93:626–32.
- [50] Van Houtum L, Rijken M, Huijts T, Heijmans M, Groenewegen P. *Age-related Differences in Self-management Tasks and Support Needs among People with Chronic Illness Explained by their Life Context*, under review.
- [51] NIVEL. *NIVEL Primary Care Database*. (<http://www.nivel.nl/node/3418>); 2015 [accessed 08.07.15].
- [52] De Maeseneer J, Boeckxstaens P. *James Mackenzie lecture 2011: multimorbidity, goal-oriented care, and equity*. *British Journal of General Practice* 2012;62:e522–4.