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Health Related Quality of Life and Care Dependency among Elderly Hospital Patients: An International Comparison

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Many countries in Europe and the world have to cope with an aging population. Although health policy in many countries aims at increasing disability-free life expectancy, elderly patients represent a significant proportion of all patients admitted to different hospital departments. The aim of the research was to investigate the relationship between health-related quality of life (HRQOL) and the care dependency status among elderly hospital patients. In 2012, a descriptive survey was administered to a convenience sample of 325 elderly hospital patients (> 60 years) from The Netherlands ($N = 125$), from Poland ($N = 100$), and from Turkey ($N = 100$). We employed the Functional Assessment of Chronic Illness Therapy (FACIT) Measurement System and the Care Dependency Scale. FACIT is a collection of HRQOL questionnaires that assess multidimensional health status in people with various chronic illnesses. From demographic variables, gender (female) ($r = -0.13$, $p < 0.05$), age and informal care given by family members ($r = -0.27$ to 0.27, $p < 0.01$) were significantly correlated with the care dependency status for the whole samples. All HRQOL variables, hearing aid and duration of illness correlated with care dependency status ($r = -0.20$ to 0.50, $p < 0.01$). Moreover, the FACIT sum score (Poland and Turkey) and functional wellbeing (The Netherlands) are significantly associated with the decrease in care dependency status. Thus, the FACIT variables are the most powerful indicators for care dependency. The study provides healthcare professionals insight into improvement of quality of care in all three countries.

Keywords: elderly patients; functional assessment; health-related quality of life; hospital care; international comparison
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Introduction

Many countries in Europe and the world have to cope with an aging population. Demographic aging is the result of significant economic, social and medical progress in terms of the services offered to the citizens (European Union 2008). Demographic statistics show that the population aging is a generalized process in Europe. According to Eurostat72, the total population aged 65 years and over in The Netherlands is actually 15.3%, whereas in Poland this is 13.5% and in Turkey 7.1% (Giannakouris 2008; TUIK 2009; Erdemir et al. 2011).

Although health policy in many countries is aimed at increasing disability-free life expectancy, elderly patients represent a significant proportion of all patients admitted to different hospital departments. Diseases typical of old age often entail experiences related to bodily changes and reduced functional efficiency that have impact on various aspects of life.

According to the WHO (WHOQOL Group 1993) the concept of Health Related Quality Of Life (HRQOL) includes basic areas of life such as physical, mental, social and emotional aspects. This HRQOL concept supposes that the primary condition for optimal QOL is good health. However, because of accumulation of chronic diseases, during and after hospital admission, the risk of functional decline and loss of independence increase (Factora 2010). The consequences of these health problems affect the daily functioning, the degree of care dependency of the patient, and include the loss of physical and mental functions. Loss of independence can be perceived in relation to loss of personal self-care abilities and to the onset of care dependency.

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Care dependency means that the self-care abilities of a person in terms of their basic physical and psychosocial human needs (e.g. eating and drinking, hygiene, social contacts) has decreased to such an extent that the person's care demands are, to some degree dependent on professional support (Dijkstra et al. 1998a). According to Janssen et al. (2011), care dependency is an important correlate of general and disease-specific health status. Patients confronted with care dependency are at risk for having an impaired health status. Impairment in the ability to perform normal daily tasks can lead to patients becoming dependent on healthcare professionals (Fitzsimons et al. 2007). Therefore, it becomes necessary to understand both the basic areas of life - such as the physical, mental, social, and emotional aspects - and the needs of patients admitted in hospitals in order to plan their optimal care plan. Assessment of the functional state of a patient using a standardized research tool is a very important item in treatment and care (Muszalik et al. 2009). For this reason, regular assessment of care dependency should be included in clinical care (Janssen et al. 2011, 2013) to contribute to the maintenance of independent function and quality of life in the elderly individual (Factora 2010). Maintaining their daily self-care ability and achieving improvement or maintained their attitude of quality of life is the main goal of nursing care to elderly hospital patients.

The assumption that HRQOL influences care dependency was tested in three countries: The Netherlands, Poland and Turkey. The choice of these countries arose from an existing research cooperation of the authors in the field of HRQOL and care dependency. In comparison with these countries, figures from the OECD (2013) show that in 2011 58% of the Dutch population aged 65 years and over reported being in good health, while these percentages were respectively 18% in Poland and 13% in Turkey. Strong limitations in daily activities were reported within the population aged between 64-74 years for The Netherlands 39%, for Poland 45%, and for Turkey 52% (OECD 2013).

The aim of this study was to identify the effect of HRQOL on care dependency status among elderly hospital patients. Research questions addressed in this study were: (1) What are the HRQOL variables of the patients?; (2) What degree of care dependence do patients measured with the Care Dependency Scale have?; and (3) Which HRQOL variables affect the care dependency status of patients?

Methods

Sample

A descriptive cross-cultural survey was administered to a convenience sample of 325 older hospital patients. Patients were recruited from a hospital in The Netherlands (NL) (N = 125), from a hospital clinic of geriatrics in Poland (PL) (N = 100) and from a hospital in Turkey (TR) (N = 100). Data were collected from August 2012 to March 2013. The inclusion criteria for research were:

- Patients > 60 years, with a Mini-Mental State Examination (MMSE) 12-item score > 7 points, what means that these patients are not identified with severe cognitive impairments (Folstein et al. 1975; Kempen et al. 1995);
- Not having a psychiatric disease;
- Not being unconscious;
- Not having communication problems.

Measures

Individual-related variables were collected using a demographic questionnaire, including questions about age, gender, educational level, living situation, place of living, family composition, and informal care. Beside the demographic questionnaire, the data collection form consisted of three measurement instruments, questions about the use of glasses and hearing aid, and the clinical diagnosis as reason for admission to the hospital and duration of illness.

1. The Functional Assessment of Chronic Illness Therapy (FACIT) Measurement System is a collection of HRQOL questionnaires that assess multidimensional health status in people with various chronic illnesses (Webster et al. 2003). The FACIT-F assesses five quality of life areas of chronically ill patients: Physical Wellbeing (PWB), Social/family Wellbeing (SWB), Emotional Wellbeing (EWB), Functional Wellbeing (FWB), and supplemented with the Fatigue Subscale (FS).

The FACIT-F has been designed for patient self-administration, but in this study the questionnaire has been administered by interview format. The evaluating scale of FACIT-F answers is the following: (i) not at all: 0 points; (ii) a little bit: 1 point; (iii) somewhat: 2 points; (iv) quite a bit: 3 points; (v) very much: 4 points. Each patient was assessed in all areas and then the global scores were calculated. High scores indicate better quality of life (Webster et al. 2003). Internal consistency reliability of the subscales range from $\alpha = 0.69$ (social wellbeing) to $\alpha = 0.82$ (physical wellbeing), with an overall internal consistency of $\alpha = 0.89$. Construct validity was demonstrated by distinguishing between groups known to differ on stage of disease, performance status, and need for emotional support (Lyons et al. 2009). The FACIT-F was found to have high internal validity (Cronbach's alpha = 0.96) (Chandran et al. 2007). Further, FACIT-F is a brief, valid measure for monitoring this important symptom and has demonstrated reliability and sensitivity to change in clients with a variety of chronic health conditions (Cella et al. 2005; Tennant et al. 2012). Another efficient summary index of physical/functional outcomes, used in this study, is the FACIT-F Trial Outcome Index, which is the sum of the PWB, FWB, and FS (Webster et al. 2003).

2. The Care Dependency Scale (CDS) provides a tool for assessing the care dependency status of institutionalized patients. It measures 15 human needs: eating and drinking, continence, body posture, mobility, day/night pattern, getting dressed and undressed, body temperature, hygiene, avoidance of danger, communication, contact with others, sense of rules and values, daily activities, recreational activities and learning ability. The instrument consists of these 15 care dependency items, each one of which has an item description and five care dependency criteria. Healthcare professionals rate all items by selecting one criterion out of the five. Low scores on the items indicate that patients are completely dependent on care. On the other hand, high scores mean that patients are almost independent of care. Development and psychometric testing of the CDS have been described in several studies (Dijkstra et al. 1996, 1998a, 1998b, 1999, 2000b). Besides these studies, the international psychometric properties of the CDS were determined using data sets from Canada, Italy, Norway and The Netherlands (Dijkstra et al. 2000a), Finland,

Spain and the United Kingdom (Dijkstra et al. 2003), Germany (Lohrmann et al. 2003), Japan (Suzuki et al. 2010), Poland (Dijkstra et al. 2010), and Turkey (Hakverdioğlu-Yönt et al. 2010; Dijkstra et al. 2012). The outcomes confirm that the CDS proved to be a reliable and valid scale in terms of internal consistency, inter-item correlation and principal component analysis.

3. The MMSE was introduced by Folstein et al. (1975) as a brief screening method for assessing the mental status of patients with psychiatric disorders. Later, the MMSE was also recommended as a primary screening test of cognitive functioning in the routine clinical examination of elderly patients. Cognitive function was measured with the 12-item version of the MMSE (MMSE-12), which is simpler to use and takes less time. In case of identification of older people with severe cognitive impairments (threshold value 17 or 18 on the MMSE-20), Kempen et al. (1995) found a corresponding threshold on the MMSE-12 of 7 (Cohen's kappa 0.87 and 0.91, respectively).

Healthcare professionals most involved in the daily care of the patients were trained in the data collection and performed all assessments by filling in the data collection form for each patient who had given his/her informed consent.

Ethical consideration

Permission to use the CDS was given by the Care2Share foundation, and from the FACIT organization a licensing agreement was obtained on September 2012 to use the Dutch, Polish and Turkish versions of the FACIT-F in this study. In the participating countries, patients were informed about the purpose of the study. They were told that participation was voluntary and that a nurse involved in the patient's daily care should complete a questionnaire. Those who volunteered to participate and who signed an informed consent form were included in the final sample. In The Netherlands, permission regarding the research was obtained in 2012 from the Regional Medical Ethical Committee in Leeuwarden. In Turkey permission was obtained from health care authorities of the participating organizations. In Poland permission to do this research was given in 2012 by the Bio-EthicalCommittee at the Nicolaus Copernicus University in Torun.

Data analysis

Descriptive statistics (mean and standard deviation) were performed. Further, Kruskal-Wallis test was used to compare the means of item variables for patients at study entry. In order to examine variables explaining influence, a multiple regression analysis was performed. The statistical threshold for significance was set at 0.05. SPSS-19.0 for Windows (SPSS, Chicago, Il, USA) was used for all statistical analyses.

Results

Descriptive analyses

Table 1 depicts the descriptive results. Regarding individual-related variables, respondents' mean age was 73.7 years old, with a range between the participating countries from 73.0 (NL) up to 77.7 (PL). Except for The Netherlands (49.6%), most respondents were female, respectively 57% in Poland and 52% in Turkey. Most respondents in the three countries had a multiple-person person household, with elementary (TR) or secondary (NL, PL) education level, lived in a city (NL, PL) and received sporadic (NL, TR) or regular informal care (PL).

From the health-related outcomes, in order to answer the research question, 'What are the HRQOL variables of the patients?,' the HRQOL results showed that participants from The Netherlands rated on the 5 FACIT-F subscales, the FACIT-F Trial Outcome Index, and FACIT-F sum score higher than participants in Poland and Turkey. Regarding the ICD-10 diagnostic categories, most of the participants from Poland and Turkey were diagnosed as 'Diseases of the circulatory system', respectively 54% and 42%. These in contrast with The Netherlands were most of the participants were diagnosed in the categories: 'Diseases of the musculoskeletal system and connective tissue' (33.6%) and 'Certain infectious and parasitic diseases' (19.2%). The distribution of the duration of the disease between the countries was as follows: 84% of the patients in The Netherlands and 69% of the patients in Turkey had suffered for up to 5 years; while in Poland 38% had suffered between 5 and 10 years, and 40% for over 10 years. In the participating countries almost all respondents used glasses and, except for Poland (41%), hardly any hearing aids.

Care dependency measures

With regard to the second research question, 'What degree of care dependence do patients measured with the Care Dependency Scale have?,' Table 2 depicts basic statistics for each country separately as well as for the three data sets combined. Patients from Poland have problems meeting their needs connected with continence, changing body posture, mobility, getting (un)dressed, maintaining hygiene, avoidance of danger, daily activities, recreational activities and learning ability. The groups from Turkey and The Netherlands were comparative in these ranges. The CDS sum score in the Polish group was the lowest. According to the One-way Analysis Of Variance, item analysis revealed that the mean values on 12 of the 15 CDS items were significantly different across the three countries. Taking the CDS as a whole, no significant equality was found among the CDS sum score in the three countries.

Correlations outcomes and CDS predictors

Providing an answer to the third research question, 'Which HRQOL variables affect the care dependence of patients?,' Table 3 presents the significant bivariate correlations both at the 0.01 level (2-tailed) and/or at the 0.05 level (2-tailed), for the three countries separately and combined, between the individual-related variables, health-related variables, and the CDS sum score. Regarding the individual-related variables, outcomes show that there is no or hardly a relationship between both (sub)variables: not for the individual countries as combined. For the health-related variables, a different picture emerges. The relationship between FACIT-F and the CDS sum scores, shows low outcomes for The Netherlands and Turkey, and low to moderate outcomes for Poland and the three countries combined. The other health-related variables (ICD-10 diagnostic cate-

Table 1. Results of individual-related and health-related variables (*N* = 325).

Variable	The Netherlands (*N* = 125)	Poland (*N* = 100)	Turkey (*N* = 100)	Total (*N* = 325)	Kruskal Wallis $p < 0.05$
Age (years), mean (s.d.)	73.0 (8.91)	77.7 (5.95)	70.8 (6.95)	73.7 (7.97)	0.000
Gender (female), *N* (%)	62 (49.6%)	57 (57.0%)	52 (52.0%)	171 (52.6%)	
Educational level, *N* (%)					
– Elementary education	47 (37.6%)	18 (18.0%)	60 (60.0%)	125 (38.5%)	
– Secondary education	58 (46.4%)	44 (44.0%)	15 (15.0%)	117 (36.0%)	
– Higher education	17 (13.6%)	28 (28.0%)	17 (17.0%)	62 (19.1%)	
– University	3 (2.4%)	10 (10.0%)	8 (8.0%)	21 (6.5%)	
Family composition, *N* (%)					
– Single household	44 (35.2%)	25 (25.0%)	21 (21.0%)	90 (27.7%)	
– More person household	81 (64.8%)	75 (75.0%)	79 (79.0%)	235 (72.3%)	
Place of living, *N* (%)					
– Country	19 (15.2%)	25 (25.0%)	51 (51.0%)	95 (29.2%)	
– City	106 (84.8%)	75 (75.0%)	49 (49.0%)	230 (70.8%)	
Informal care, *N* (%)					
– Frequent	5 (4.0%)	9 (9.0%)	11 (11.0%)	25 (7.7%)	
– Regular	29 (23.2%)	56 (56.0%)	40 (40.0%)	125 (38.5%)	
– Sporadic	91 (72.8%)	35 (35.0%)	49 (49.0%)	175 (53.8%)	
FACIT-F (range), mean (s.d.)					
– Physical Wellbeing Subscale (0-28)	20.9 (5.63)	14.8 (5.35)	17.4 (6.25)	18.0 (6.27)	0.000
– Social/Family Wellbeing Subscale (0-28)	22.3 (5.12)	15.5 (5.84)	17.9 (4.90)	18.8 (6.01)	0.000
– Emotional Wellbeing Subscale (0-24)	18.0 (4.59)	13.2 (5.11)	15.0 (5.04)	15.6 (5.28)	0.000
– Functional Wellbeing Subscale (0-28)	17.2 (5.68)	14.9 (5.73)	15.7 (6.25)	16.0 (5.94)	0.009
– Fatigue Subscale (0-52)	31.7 (11.63)	26.3 (10.72)	29.9 (12.17)	29.5 (11.72)	0.001
– FACIT-F Trial Outcome Index (0-108)	69.9 (19.56)	56.0 (19.34)	63.1 (21.31)	63.5 (20.80)	0.000
– FACIT-F sum score (0-160)	110.1 (23.63)	84.6 (25.21)	95.9 (26.64)	97.9 (27.17)	0.000
ICD-10 diagnostic categories, *N* (%)					
– Certain infectious and parasitic diseases	24 (19.2%)		1 (1.0%)	25 (7.7%)	
– Neoplasms	4 (3.2%)		17 (17.0%)	21 (6.5%)	
– Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	7 (5.6%)			7 (2.2%)	
– Endocrine, nutritional and metabolic diseases	2 (1.6%)	29 (29.0%)	4 (4.0%)	35 (10.8%)	
– Diseases of the nervous system	2 (1.6%)	1 (1.0%)	1 (1.0%)	4 (1.2%)	
– Diseases of the circulatory system	2 (1.6%)	54 (54.0%)	42 (42.0%)	98 (30.2%)	
– Diseases of the respiratory system	3 (2.4%)	2 (2.0%)	7 (7.0%)	12 (3.7%)	
– Diseases of the digestive system	11 (8.8%)		7 (7.0%)	18 (5.5%)	
– Diseases of the skin and subcutaneous tissue	4 (3.2%)		3 (3.0%)	7 (2.2%)	
– Diseases of the musculoskeletal system and connective tissue	42 (33.6%)	4 (4.0%)	8 (8.0%)	54 (16.8%)	
– Diseases of the genitourinary system	12 (9.6%)	10 (10.0%)	10 (10.0%)	32 (9.8%)	
– Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	12 (9.6%)			12 (3.7%)	
Duration of illness, *N* (%)					
– < 5 years	105 (84.0%)	22 (22.0%)	69 (69.0%)	196 (60.3%)	
– 5-10 years	16 (12.8%)	38 (38.0%)	20 (20.0%)	74 (22.8%)	
– > 10 years	4 (3.2%)	40 (40.0%)	11 (11.0%)	55 (16.9%)	
– Use of glasses (yes), *N* (%)	87 (69.6%)	88 (88.0%)	63 (63.0%)	238 (70.8%)	
– Use of hearing aid (yes), *N* (%)	24 (19.2%)	41 (41.0%)	14 (14.0%)	79 (23.5%)	

Table 2. Care dependency measures: mean (s.d.).

Variable	The Netherlands ($N = 125$)	Poland ($N = 100$)	Turkey ($N = 100$)	Total ($N = 325$)	Kruskal Wallis $p < 0.05$
Eating and drinking	4.1 (1.19)	4.0 (0.98)	4.3 (1.10)	4.2 (1.11)	0.007
Continence	4.4 (0.91)	3.5 (1.40)	4.3 (1.16)	4.1 (1.22)	0.000
Body posture	4.0 (1.12)	3.6 (1.16)	4.1 (1.20)	3.9 (1.17)	0.002
Mobility	3.9 (1.26)	3.0 (1.44)	4.0 (1.30)	3.6 (1.39)	0.000
Day/night pattern	4.1 (1.17)	4.0 (1.01)	4.0 (1.19)	4.1 (1.12)	ns
Getting (un)dressed	4.2 (1.25)	3.6 (1.40)	4.2 (1.22)	4.0 (1.32)	0.000
Body temperature	4.5 (0.94)	4.1 (0.99)	4.3 (1.09)	4.3 (1.01)	0.004
Hygiene	4.2 (1.29)	3.5 (1.39)	4.1 (1.27)	4.0 (1.35)	0.000
Avoidance of danger	4.6 (0.76)	3.7 (1.15)	4.0 (1.25)	4.1 (1.13)	0.000
Communication	4.4 (0.78)	4.6 (0.57)	4.4 (1.09)	4.5 (0.84)	ns
Contact with others	4.4 (0.98)	4.0 (1.08)	4.4 (1.11)	4.2 (1.06)	0.001
Sense of rules and values	4.6 (0.94)	4.1 (1.07)	4.4 (1.11)	4.4 (1.05)	0.000
Daily activities	3.7 (1.34)	3.5 (1.31)	4.3 (1.13)	3.8 (1.31)	0.000
Recreational activities	4.1 (1.27)	2.9 (1.48)	4.0 (1.31)	3.7 (1.45)	0.000
Learning ability	3.8 (1.21)	3.2 (1.05)	4.2 (1.16)	3.7 (1.20)	0.000
CDS sum score	62.8 (11.43)	55.3 (13.45)	62.9 (15.20)	60.5 (13.71)	0.000

gories, duration of illness, and hearing aid) show no or hardly any relationship.

Besides a bivariate correlation analysis, a regression analysis was conducted to answer the third research question. In line with the previous analysis, only those variables that were statistically significant in the correlation matrix, as shown in Table 3, were included as independent variables in the analysis. The possible interaction effects between both dependent (CDS sum score) and independent variables were entered into a stepwise procedure, with a criterion for entry set at the 0.05 level of significance. In Table 4, the first column presents standardized beta coefficients for each predictor, showing the relative influence of each predictor on care dependency when all the others are considered simultaneously. The second column presents the adjusted R square, which is designed to compensate for optimistic bias and which can be seen as the proportion of the total variance on care dependency accounted for by each independent variable (Polit and Beck 2004). As Table 4 shows, the FACIT-F subscales 'Functional Wellbeing' (NL), 'FACIT-F Trial Outcome Index' (PL), the 'FACIT-F sum score' (TR), and the 'FACIT-F sum score' (the 3 countries combined) were the most powerful variables that affect care dependency, accounting for 10.6%, 34.3%, 22.6% and 24.7% of the variance, respectively.

Discussion

Descriptive analyses

Regarding the first research question, in a general sense, similarities between the three countries were found in gender and family composition. The descriptive findings highlighted that most of the Turkish patients had an elementary education (60%), whereas in The Netherlands and Poland patients had a secondary education (44% and 46.4%). Another difference was found regarding the place of living; Dutch and Polish patients lived to a large extent in cities, while in Turkey patients came from both the countryside and the city. In most cases, respondents from Poland received regular informal care, whereas Dutch patients received sporadic help. Most of all Polish patients suffered from endocrine, nutritional, metabolic diseases and diseases of the circulatory system. Diseases of the circulatory system dominated in the Turkish patients group as well, while patients from The Netherlands suffered from diseases of the musculoskeletal system and certain infectious and parasitic diseases. The duration of illness in the Dutch and Turkish patient groups was shorter than in Poland. Most of the individual-related variables play a less dominant role in affecting the care dependency status of the patients. An interesting point can be made about age. Although, in public mind, dependency is closely associated with getting older, age proved to be not a factor of significance in being care dependent.

Care dependency measures

Concerning the second research question, Table 2 shows that the Dutch and Turkish sum scores on the CDS show almost the same scale means in comparison with the corresponding Polish scores. Thus, Polish patients may be described as somewhat more care dependent than patients in The Netherlands and Turkey. A possible reason for this may be the higher age of the Polish patients. Differences between the countries may be due to the way patients communicate with their healthcare professionals about their functioning. Despite the training in the use of the CDS, healthcare professionals could also have differed in their ability and experience in assessing care dependency.

Table 3. Correlations between individual-related variables, health-related variables and Care Dependency Scale (CDS) sum score.

	Care Dependency Scale (CDS) sum score			
	The Netherlands	Poland	Turkey	Total
Individual-related variables				
Age	−0.23**		−0.22*	−0.27**
Gender		−0.21*		−0.13*
Educational level	0.20*			
Informal care		0.24*	0.28**	0.27**
Health-related variables				
FACIT-F				
– Physical Wellbeing		0.54**	0.31**	0.36**
– Social/Family Wellbeing		0.36**	0.26**	0.31**
– Emotional Wellbeing		0.26**	0.34**	0.31**
– Functional Wellbeing	0.34**	0.48**	0.38**	0.41**
– Fatigue	0.31**	0.54**	0.46**	0.46**
– FACIT-F Trial Outcome Index	0.32**	0.59**	0.46**	0.48**
– FACIT-F sum score	0.33**	0.59**	0.48**	0.50**
ICD-10 diagnostic categories				
– Certain infectious and parasitic diseases			−0.21*	
– Endocrine, nutritional and metabolic diseases				−0.12*
– Diseases of the nervous system	−0.18*			
– Diseases of the digestive system	0.18*			0.15**
– Diseases of the musculoskeletal system and connective tissue	0.20*		−0.21*	0.11*
Duration of illness				−0.22**
Hearing aid				0.20**

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

Table 4. Significant predictors of Care Dependency Scale sum score.

Significant Predictor	β	Adjusted R^2	p value
The Netherlands (N = 125)			
– FACIT-F subscale: Functional Wellbeing	0.31	0.106	< 0.001
– Age	−0.25	0.173	0.002
– Diseases of the digestive system	0.24	0.197	0.003
– Diseases of the musculoskeletal system and connective tissue	0.31	0.225	0.001
– Gender	−0.20	0.253	0.012
– Certain infectious and parasitic diseases	0.19	0.276	0.030
Poland (N = 100)			
– FACIT-F Trial Outcome Index	0.52	0.343	< 0.001
– Informal care	0.22	0.383	0.006
– FACIT-F subscale: Social/Family wellbeing	0.20	0.414	0.016
Turkey (N = 100)			
– FACIT-F sum score	0.48	0.226	< 0.001
Total (N = 325)			
– FACIT-F sum score	0.56	0.247	< 0.001
– Age	−0.18	0.277	< 0.001
– Informal care	0.14	0.292	0.004
– FACIT-F subscale: Emotional wellbeing	−0.18	0.305	0.011
– Diseases of the digestive system	0.10	0.311	0.043

Another explanation for the differences could be that patients in the three countries were classified with different diagnosis categories. Although there is, according to the ICD-10 classification, a heterogeneous group of patients in the three countries, a correlation connection between care dependency sum score and diagnosis categories was hardly found (see Table 3).

Correlations outcomes and CDS predictors

From the cross-sectional findings, it may be concluded that most of the individual-related and health-related variables play hardly in affecting care dependency. It reveals that the individual-related variables - age, gender, educational level, and informal care - have a weak effect on the CDS sum score. With the exception of three variables in the Dutch dataset, all FACIT-F related variables gave significant correlations with the CDS sum score. FACIT-F questionnaires assess the functional and QOL state of hospital admitted patients. With respect to the ICD-10 diagnostic categories, Table 3 shows weak to moderate correlations on the CDS sum score.

Another picture emerges from regression analysis. Table 4 shows the findings of the regression analysis. Only those variables are shown that added a significant increase ($p < 0.05$) to the variance explained. As can be seen in Table 4, despite the findings of significant coefficients in the bivariate analysis, no other factors than 3 individual-related and 8 health-related variables seem to have a significant effect on the CDS sum score. The FACIT-F Functional Wellbeing outcome in the Dutch subsample accounted for 10.6% of the variation. More specifically, a low score on Functional Wellbeing affects the degree of a person's care dependency negatively.

For the Polish subsample, the FACIT-F Trial Outcome Index accounted for 34.3% of the variation. This index is an efficient summary index of physical and functional outcomes, because it is sensitive to changes in physical and functional outcomes, sometimes more than a total (overall) multidimensional aggregated score that includes social and emotional wellbeing (Webster et al. 2003). Although this contribution was limited, the effects of informal care and FACIT-F subscale 'Social/Family Wellbeing' accounted for 4.0% and 3.1% of the variance. This indicates that lack of care from others has a negative effect on the care dependency status of the Polish patient. Regarding the Turkish subsample, the FACIT-F sum score accounted for 22.6% of the variance and was the only variable affecting the care dependency of the patients. This means that there is a negative relationship between patients health status measured by FACIT-F and care dependency. This can be caused by the way in which patients are diagnosed: 42% were diagnosed as diseases of the circulatory system.

Care dependency in the total samples was affected mainly by FACIT-F sum score and to a lesser extent by age, informal care, FACIT-F Emotional Wellbeing, or diseases of the digestive system. These factors may be causally related to the CDS sum score, but they have only a weak effect on the CDS sum score. The relative impact of informal care can be justified by the positive contribution of family members in reducing care dependency of others. While emotional wellbeing can be seen as very important to quality of life (Webster et al. 2003). It is not likely that emotional wellbeing will change quickly or dramatically over time and therefore emotional wellbeing hardly has an effect on patient's degree of care dependency. The fact that diseases of the digestive system, e.g. malnutrition, affect care dependency can make patients vulnerable to increasing care dependency.

Study limitations

Some remarks can be made with respect to the methodological aspects of this study. A limitation of this study was the cross-sectional design, which prevents the possibility of determining causal relationships between individual-related, health-related variables and care dependency. Therefore a longitudinal design is required to determine causal relationships. The study population in each country consisted of a convenience sample of patients, which was limited to patients from one hospital and the patients groups differ from diagnosis categories. Thus the findings may not be generalized to other hospital settings and/or wards. The study indicated that HRQOL variables affected care dependency. However, these associations do not show a strong causal link. That is, the association could be because of some other influencing or confounding variable.

Conclusion

In both the sample of each country separately and combined, the health-related FACIT-F variables play a significant role as the most powerful variables that affect care dependency. Further, this study demonstrates that most of the individual-related variables play a less dominant role in affecting the care dependency status of patients. Outcomes of this study offer healthcare professionals insight into which individual-related variables and health-related variables affect the care dependency status of the patient. Especially regarding the HRQOL variables, questionnaires such as FACIT-F may help healthcare professionals gain insight into the factors for influencing the onset and reduction of care dependency. In addition, the study results provide healthcare professionals insight into the improvement of quality of care. Further study is needed to explore factors that mediate the relationship between HRQOL and care dependency. A longitudinal study might help to better understand how HRQOL affects care dependency over time. Finally, it is also interesting to add the concept of frailty in further studies. Although the definition of dependency and frailty are distinct, they are overlapping syndromes (Fried et al. 2004). Better understanding of the interactive nature of these concepts and how they affect health outcomes may improve our understanding of the aging process (Woo and Leung 2014).

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Conflict of Interest

The authors declare no conflict of interest.

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