Financial Performance and Quality of Care in Nursing Homes in the Netherlands

Aniek Bresser (1858335)

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VU University Amsterdam

Placement organization:

Celsus, academy for sustainable healthcare

Geert Grooteplein 21, route 114, 6525 EZ Nijmegen

On-site supervisor: Dr. Patrick Jeurissen

Daily supervisor: Niek Stadhouders

IQ healthcare

Postbus 9101, 114, 6500 HB Nijmegen

VU supervisor: Dr. A.H.E. Koolman

VU University Amsterdam, Faculty of Earth & Life Sciences, Department of Health Sciences

De Boelelaan 1085, 1081 HV Amsterdam

Master Health Sciences

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Abstract

Introduction: In the nonprofit nursing home sector in the Netherlands prices for provided care are fixed. The fixed prices enable institutions to save money by operating efficiently and generate excess revenues. Consequently, the institutions need to be able to reinvest excess revenues in full into quality improvements due to the nonprofit market. The purpose of this study was to examine the relationship between financial performance and quality of care in Dutch nursing homes.

Methods: Three data source, Digi-MV-dataset, dataset 'Zichtbare Zorg' and CVZ data were merged before analyzing. Quantitative analyses were performed using a multivariable linear regression on cross-sectional data of 2012 (N=319). Quality of care, the dependent variable, was expressed in Consumer Quality (CQ) indicators and in care-related outcome (CRO) indicators. We selected solvency ratio and profit to represent the financial performance, the independent variable. In addition, we selected urbanization, care intensity, total operating budget and part-time quote as control variables.

Results: No significant relationship between the financial performance and quality of care with the CRO indicators was observed. However, we identified a significant relationship between the financial performance and quality of care with the CQ indicators. All control variables had a negative significant relationship with quality of care with the CQ indicators.

Conclusion: Nursing homes were not always able to reinvest excess revenues in quality of care. This might indicate waste of money, inefficiencies in labor processes or investments. Cutbacks will not necessarily influence the quality of care considering our results. However, to ensure no relationship between financial performance and quality of care arise when expenditures are reduced, further research is required.

Keywords: care-related outcome (CRO) indicators, Consumer Quality (CQ) indicators, financial performance, long-term care, nursing homes, quality of care

Introduction

In Dutch institutional care only nonprofit is allowed and prices for provided care are fixed and regulated by the government (Mot, 2010). The fixed prices enable institutions to save money by operating efficiently and, as a result, generate excess revenues. Consequently, the institutions need to be able to reinvest excess revenues in full into quality improvements due to the nonprofit market. Therefore, a positive relationship is expected between financial performance and quality of care in nursing homes. If no relationship between financial performance and quality of care is found, it could indicate inefficiencies in labor processes or investments. This could be improved by organizing labor processes more productively, by trying to reduce waste and work on shortcomings (Weech-Maldonado, Neff, & Mor, 2003) or by reinvesting the excess revenues differently.

In the Netherlands, long-term care is leading in terms of expenditures compared to other western countries despite of the relatively low level of ageing currently (Bijenhof & Slobbe, 2013). Dutch long-term care consists to a great extent of elderly care and covers a large part of the total budget spent on healthcare (Colombo, Llena-Nozal, Mercier, & Tjadens, 2011; Van Ewijk, Van der Horst, & Besseling, 2013). In 2012 3.8% of gross domestic product (GDP) was spent on long-term care of which 2% was spent on elderly care (Colombo et al., 2011). In addition, the number of elderly will rise in the coming years due to ageing. In 2050 one fourth of the total Dutch population will be aged above 65 and the percentage aged above 80 will rise from around 4% to almost 10% (Colombo et al., 2011; Van Ewijk et al., 2013). Schut, Sorbe, and Høj (2013) predict an increase of dependent elderly people to 1 million in 2060 which results in an increase of long-term care expenses to 8.1% of GDP (Schut, Sorbe, & Høj, 2013). To ensure that elderly care remains affordable for the growing elderly population in the future, expenditures on elderly care need to decrease. The question arises is; what will happen to the quality of care in nursing homes when the expenditures are reduced.

Previous research showed mostly a weak positive association on the relationship between financial performance and quality of care in various healthcare institutions. Oetjen, Zhao, Liu, and Carretta et al. (2011) examined the relationship between financial performance and quality of care in freestanding nursing homes in Florida in the US. Nursing homes were divided into four quartiles depending on financial performance which, in this study, is equal to profit. Nursing homes in the lowest quartile, i.e. the ones with the poorest financial performance, performed the lowest on most resident safety measures. In addition, evidence was found that nursing homes with accurate financial performance experience deficiencies in quality of care as well (Oetjen, Zhao, Liu, & Carretta, 2011). In addition, O'Neill, Harrington, Kitchener, and Saliba (2003) reported deficiencies when the profit margin rises above an extraordinarily threshold in the proprietary nursing care sector. High profit rates in the nonprofit nursing care sector were not associated with poorer quality (O'Neill, Harrington, Kitchener, & Saliba, 2003). Park and Werner (2011) investigated the change of the relationship between financial performance and quality of care under public reporting in US. The results of this study indicated that in general better financial performance is significantly related to higher quality of care, only under public reporting (Park & Werner, 2011). Park and Werner (2011) suggested that public reporting influences the relationship between financial performance and quality of care positively due to increasing competition on quality between providers (Park & Werner, 2011). Encinosa and Bernard (2005) conducted a study to the relationship between financial performance and quality of care in hospitals in US. The study showed a significantly higher possibility of adverse patient safety events in hospitals with a reduced profit margin for several years. Costly investments in patient safety could not be realized due to the financial pressure which results in safety problems in the hospitals and reduced quality of care (Encinosa & Bernard, 2005).

The relationship between financial performance and quality of care is more often analyzed in a reversed causal direction. In these studies the influence of good quality on costs is examined. The objective of the study of Hicks, Rantz, Petroski, and Mukamel (2004) was to examine whether higher quality of care is associated with lower costs in certified nursing homes in Missouri, US. The results showed that variable costs can be reduced by better quality of care (Hicks, Rantz, Petroski, & Mukamel, 2004). Correspondingly, the study of Alexander, Weiner, and Griffith (2006) in hospitals stated that investments in quality do not place hospitals at risk and it could be assumed that quality improvements results in improvement of the financial performance (Alexander, Weiner, & Griffith, 2006). Furthermore, findings of the study of Weech-Maldonado, Neff and, Mor (2003) defined that better quality outcomes were not associated with higher costs. Good quality enables nursing homes to reduce the costs per patient (Weech-Maldonado et al., 2003).

Hussey, Wertheimer, and Mehrotra (2013) systematically reviewed literature of the association between costs and quality in US. Literature about the influence of quality of care on costs and the influence of costs on quality were both included. This systematic review reported inconsistent evidence on the association between costs and quality of care. The differences in findings between studies could be explained by differences in quality definitions and measurements (Hussey, Wertheimer, & Mehrotra, 2013). In accordance, the study of Weech-Maldonado, Shea, and Mor (2006) stated the relationship as complicated where the level of quality and the type of quality outcome measure used in nursing homes determines the cost-quality relationship (Weech-Maldonado, Shea, & Mor, 2006). Furthermore, Beauvais and Wells (2006) published a review of the literature on the relationship between finances of healthcare institutions and quality of care in the US. Sixteen studies were included of which twelve investigated the relationship in hospitals. Various associations between financial performance and quality were observed. Nevertheless, the

most remarkable finding was the little research conducted on this topic (Beauvais & Wells, 2006).

To date, studies investigating the relationship between financial performance and quality of care have produced equivocal results. In addition, research was mostly conducted in hospitals with limited quality care-related outcome (CRO) indicators and in the in US, a for-profit market. Little research has been conducted in different settings, where we expect different results. Therefore, it is important to investigate the relationship between financial performance and quality of care in nursing homes in the Netherlands. The Netherlands is leading in term of expenditures on long-term care whereby other (western) countries will probably face expenditure growth on long-term care in future. The Netherlands might be an appropriate example in dealing with high long-term care expenditures and the influence of cutbacks on quality of care. Moreover, much uncertainty still exists about the relationship between financial performance and quality of care in nonprofit markets because most research was conducted in for-profit markets. Furthermore, in this study patient experience will be taken into account as a quality of care indicator in addition to CRO indicators. The objective of this research was to examine the relationship between financial performance and quality of care in nursing homes in the Netherlands in 2012.

The paper can be divided in four distinct chapters. The first chapter deals with the methodology. The second part presents the results of the research whereafter we include a discussion of the implication of the findings for future research into this area. Finally, the conclusion gives a brief summary of the findings.

Methods

Data Collection

The data of three sources were collected to investigate the relationship between financial performance of nursing homes and the quality of care. The publicly available

DigiMV-dataset provided insight into the financial performance of the institutions (CIBG, 2012). The publicly available dataset 'Zichtbare Zorg', monitored by the Dutch Health Care Inspectorate, provided insight into the quality of care data of the institutions (Zorginstituut Nederland – Zorginzicht, 2012). Aggregate anonymous data on average care intensity was derived from CVZ data. The datasets were merged by chamber of commerce number. The data was analyzed at the level of the legal entity (concern level). The dataset about the financial performance of the institution was solely available at concern level. Therefore, the quality of care data was aggregated to concern level by using an average value of the quality of care of the different locations.

The dataset contained financial information of all Dutch health care institutions. We restricted our analysis to nursing homes with inpatient care. Missing or implausible data of financial performance were collected manually from the annual reports of the nursing homes. Institutions were excluded when the operating income and operating costs were equal. In these cases we were not able to investigate the relationship between financial performance and quality of care. Institutions were excluded when data on key variables were missing or when implausible values on the solvency ratio and profit were obtained. In total, 39 institutions were excluded resulting in a sample of 319 nursing homes.

Quality of Care Measures

In 2012 the quality of care in nursing homes was determined by Consumer Quality (CQ) indicators and care-related outcome (CRO) indicators. The CQ indicators referred to the patient experiences of the delivered care of the healthcare provider. The patient experiences were measured by an independent organization biannually using standardized questionnaires. The independent organization conducted a Consumer Quality Index according to the guidelines of the manual requirements and methods Consumer Quality Index measurements

(LOC Zeggenschap in zorg, Zorgverzekeraars Nederland, & Inspectie voor de Gezondheidszorg, 2012). In this study fifteen indicators were acquired:

1. Respect: the way personal contact is experienced.

2. The way the availability of staff is experienced.

3. The way information provision is experienced.

4. The way patients are involved.

5. The way the quality of staff is experienced.

6. The way security is experienced.

7. The way (physical) care is experienced.

8. The way food and drink are experienced.

9. The way meals are experienced: ambiance.

10. The way meals are experienced: taste.

11. The way privacy is experienced.

12. The way living quarters are experienced.

13. The way cleaning is experienced.

14. Contact with other patients.

15. Sense of meaningfulness.

The care-related outcome (CRO) indicators referred to measurements of care-related incidences or activities by patients. The healthcare institutions were required to measure and register the CRO indicators and submitted the results to the Dutch Health Care Inspectorate once a year. The Dutch Health Care Inspectorate, a government organization, monitored the results. In this study the following six indicators were acquired:

1. Symptoms of depression.

2. Living in freedom: use of antipsychotics.

3. Freedom-restricting measures: prevalence.

4. Medication incidents.

5. Occurrence of problematic behavior.

6. Fall incidents.

Average quality score. Per institution an average quality score for the CQ indicators and an average quality score for the CRO indicators was calculated. To do so, the quality indicators were standardized. First, the individual quality scores were transformed to a z-score. The z-score is a benchmark score which estimates an average deviation of the mean per indicator, i.e., per indicator a mean score of all the institutions was calculated and the quality score per institution was compared to the mean score. The degree of deviation of the quality score and the mean was reflected in the z-score. When the score is normally distributed 95% of the observations have a z-score between 1.96 and -1.96. Within the CRO indicators a low score is superior to a higher score whereas a high score at the CQ indicators was superior to a lower score. To transform the outcome scales of all indicators in the same direction, the z-score of the CRO indicators was multiplied with -1. Next, average z-scores of the CQ indicators and the CRO indicators per institution were calculated. The sum of the individual z-scores of the indicators was divided by the total available z-scores per institution. The average z-score per institution measures the extent to which an institution scores above or below average. The benchmark score described the position of an institution compared to the other institutions but does not describe the level of quality of care of the institution. Advantages of this method are the transformation of the different measures scales to a conformable outcome scale whereby an average quality score was calculated. In this study, the CQ indicators were measured using a 5-point scale. Extraordinary is the way the living quarters are experienced, this indicators was measured in percentages. The CRO indicators were measured in percentages. Moreover, nursing homes could be compared even if the type and number of measured indicators were not similar. In this study, two average z-scores were generated and

used as dependent variables; an average z-score of the CQ indicators and an average z-score of the CRO indicators.

Factor-analysis. To verify the classification of the quality of care indicators in an average z-score of the CQ indicators and an average z-score of the CRO indicators, a factor-analysis was conducted. See Appendix I Table A for the results. A factor-analysis explores fundamental explanatory factors between the quality of care indicators. Cohesion between indicators can be explored resulting in a factor. Factor-analysis identified an underlying construct which could not be measured directly. The underlying construct in this study is quality of care. The factor stands for communality in variance of observed variables (Suhr, 2005). The factor-analysis resulted in two relevant factors. Factor 1 included all CQ indicators excepted the way (physical) care is experienced. Whereby, the average z-score of the CQ indicators was correlated to factor 1 with 97.8 percent. Factor 2 contained to a great extent the CRO indicators. Whereby, the average z-score of the CRO indicators was correlated to factor 2 with 86.6 percent. The factor-analysis supported the classification of the average z-score with CQ indicators and the average z-score of the CRO indicators to a great extent. Therefore, the classification was maintained.

Financial Performance Measures

To represent the financial performance of the nursing homes, two variables were created; solvency ratio and profit. See Table 1. Solvency ratio defined the extent to which an institution is capable of holding on during bad times or the extent in which an institution is solvent. The solvency ratio is calculated by dividing equity by total liabilities. In the group of concerns studied, equity consists mostly of retained profits and provided insight into the performance of the institution in the past years. Equity can be compared to a buffer and a higher equity enables the institutions to cope better with misfortunes. The variable profit defined primarily the financial condition of an institution over the past year. Profits were

gained when the revenues exceed the expenditures. Nursing homes in the Netherlands are foundations and nonprofit institutions, resulting in no pay out of profits but reinvestment in equity or in the quality of care. The profit was calculated by dividing the operational profits after tax by total operating budget. Both financial performance measures were calculated as percentages to make comparisons between institutions with different turnovers possible.

Control Variables

A literature review led to adjustment of the multivariable linear regression for several variables. Table 1 provides an overview of the control variables. The urbanization of the institutions was taken into account since institutions in rural areas might have higher quality of care while institutions in urban areas have lower quality of care (ActiZ, 2013). Furthermore, institutions in urban area could have more problems to recruit appropriate staff due to competition and have higher rent of buildings which both could influence the financial performance of the institution (ActiZ, 2013). According to the postal address of the concern, the institutions in cities with less than 70.000 residents were labeled as rural and over 70.000 residents the institution was labeled as urban. Type of patients was accounted for using the care intensity. Institutions with higher care level generated more budget than institutions with lower care levels which could give opportunities for higher quality of care. Moreover, in institutions with higher care intensity more patients were physically or mentally unable to fill in the questionnaires. In these circumstances the questionnaire were filled in by a close relative of the patients. Possibly the family was more critical than the residents which could bias the quality indicators. Therefore, adjusting for care intensity was necessary. The total operating budget was applied as a proxy variable for the size of the institution. The hypothesis was that the quality of care is better in small institutions compared to bigger institutions because small institutions could be more able to adapt to the needs of patients. In contrast, big nursing homes could be more able to meet the objective quality requirements due to benefits

Table 1. Definition of Independent Variables and Control Variables

Variable	Definition
Financial performance	
Solvency ratio	Equity divided by the total liabilities. Equity consists mostly of retained profits and provided insight into the performance of the institution in the past years. High equity mostly generates a good financial position. In general a higher solvency ratio indicates a stronger financial position.
Profit	Operational profits after tax divided by total operating budget.
Control variables	
Urbanization	Urbanization of the nursing homes. Urban >70.000 residents, rural <70.000 residents.
Care intensity	Care intensity is an average care intensity of the institution. In the Netherlands, the care intensity is classified in ten levels. Level 1 are patients with the lowest demand for care and level 10 are the patients with the highest demand of care. The number of patients with a certain demand for care is described in the dataset. The number of patients with care level 1 is multiplied by 1, the number patients with care level 2 is multiplied with 2, and so on till care level 10. The outcome of the multiplications are added and divided by the sum of patients in all care levels.
Total operating budget	Log transformation of the total operating budget.
Part-time quote	Number of FTE divided by the number of employees. A higher percentage stands for more full-timers in the institution.

of scale and might have more financial resources compared to small institutions and, therefore, could size of the institutions have a positive effect on the CRO indicators. Nevertheless, the expectation was that small nursing homes were more able to meet the patients' needs as regards the quality of care and, therefore, a negative relationship was expected between size of institution and quality of care with the CQ indicators. Due to skewedness of the data the log-transformation of the total operating budget was used. The part-time quote was added to the model and was calculated by dividing the total FTE by the total employees. The hypothesis was that more part-timers will negatively influence stability in the institution as more part-timers will result in more work shift transfer moments. Transfer moments might increase the chances of miscommunication. And, therefore, more part-timers could result in a lower quality of care. More part-timers also cost more compared to the same FTE in full-timers, which influences the financial performance. Total operating budget and part-time quote were variables which can be controlled by the management of the institutions.

Statistical Analyses

Quantitative analyses were performed using a multivariable linear regression on cross-sectional data of 2012. The dependent variable was quality of care whereby the financial performance was the independent variable. Missing values were not taken into account in the analyses. In the first model the control variables urbanization and care intensity were taken into account. The following equations were generated to investigate the relationship between quality of care and financial performance:

1. $Quality\ of\ care\ with\ the\ CQ\ indicators = \text{ß}_0 + \text{ß}_1 Solvency\ ratio + \text{ß}_2 Profit + \text{ß}_3 Urbanization + \text{ß}_4 Care\ intensity + \varepsilon$

2. $Quality\ of\ care\ with\ the\ CRO\ indicators = \text{ß}_0 + \text{ß}_1 Solvency\ ratio + \text{ß}_2 Profit + \text{ß}_3 Urbanization + \text{ß}_4 Care\ intensity + \varepsilon$

In the second model the control variables total operating budget and part-time quote were added to the model. The following equations were generated to investigate the relationship between quality of care and financial performance:

3. $Quality\ of\ care\ with\ the\ CQ\ indicators = \text{ß}_0 + \text{ß}_1 Solvency\ ratio + \text{ß}_2 Profit + \text{ß}_3 Urbanization + \text{ß}_4 Care\ intensity + \text{ß}_5 Total\ operating\ budget + \text{ß}_6 Part-time\ quote + \varepsilon$

4. $Quality\ of\ care\ with\ the\ CRO\ indicators = \text{ß}_0 + \text{ß}_1 Solvency\ ratio + \text{ß}_2 Profit + \text{ß}_3 Urbanization + \text{ß}_4 Care\ intensity + \text{ß}_5 Total\ operating\ budget + \text{ß}_6 Part-time\ quote + \varepsilon$

ε=standard error

Table 2. Descriptive Statistics of the Quality Indicators, Independent - and Control Variables

	All nursing homes Mean (SD) N = 141-308
Consumer Quality (CQ) indicators	
Respect: the way personal contact is experienced	3.337 (0.138)
The way the availability of staff is experienced	2.784 (0.237)
The way information provision is experienced	3.446 (0.121)
The way patients are involved	3.240 (0.125)
The way the quality of staff is experienced	3.526 (0.084)
The way security is experienced	3.801 (0.077)
The way (physical) care is experienced	3.358 (0.086)
The way food and drink are experienced	3.487 (0.097)
The way meals are experienced: ambiance	3.531 (0.152)
The way meals are experienced: taste	3.118 (0.226)
The way privacy is experienced	3.812 (0.110)
The way the living quarters are experienced	94.242 (5.943)
The way cleaning is experienced	3.291 (0.181)
Contact with other patients	3.124 (0.204)
Sense of meaningfulness	3.442 (0.179)
Care-related outcome (CRO) indicators	
Symptoms of depression	17.623 (5.417)
Living in freedom: use of antipsychotics	9.480 (5.705)
Freedom-restricting measures: prevalence	0.901 (0.756)
Medication incidents	5.849 (4.322)
Occurrence of problematic behavior	16.635 (4.819)
Fall incidents	10.286 (1.427)

	All nursing homes Mean (SD) N = 313-319	Nursing homes delivered CQ indicators Mean (SD) N = 202	Nursing homes delivered CRO indicators Mean (SD) N = 303
Financial performance			
Solvency ratio	32.383 (21.879)	32.564 (18.477)	32.968 (18.322)
Profit	3.317 (4.672)	3.177 (4.925)	3.376 (3.964)
Control variables			
Urbanization	0.380 (0.485)	0.420 (0.495)	0.360 (0.482)
Care intensity	3.957 (1.583)	4.028 (1.615)	4.005 (1.531)
Total operating budget	16.991 (1.316)	17.096 (1.295)	17.033 (1.276)
Part-time quote	0.537 (0.087)	0.545 (0.090)	0.537 (0.088)

Note: The upper section of the table presents the mean and standard deviation of the indicators representing quality of care. The lower section of the table presents the mean and standard deviation of the independent - and control variables in all nursing homes, in nursing homes which delivered Consumer Quality (CQ) indicators, and in nursing homes which delivered care-related outcome (CRO) indicators.

Robustness checks. Stratifications were performed to check the robustness of the model. Stratifications were performed with the average z-scores of quality of care as independent variables and the solvency ratio and profit as dependent variable. In these models the control variables were added separately and in different compositions. The number of added control variables differed per model.

Descriptive Statistics

Table 2 shows the descriptive statistics of the indicators presenting quality of care, the independent variables and control variables. In the upper section of Table 2 the mean and standard deviation of the individual quality of care indicators are described. The lower section of Table 2 describes the mean and standard deviation of the independent and control variables. The second column presents the mean and standard deviation of all nursing homes. The third column shows the mean and standard deviation of nursing homes who delivered CQ indicators in 2012. And, the fourth column shows the mean and standard deviation of nursing homes who delivered CRO indicators in 2012.

<div align="center">

Results

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Specification Tests

Table 3 shows the estimated results between financial performance and quality of care with the CQ indicators. In the first model the relationship between financial performance and the quality of care with the CQ indicators is described adjusting for the control variables urbanization and care intensity. See equation 1 in the methods section. These results indicated that the model of financial performance and quality of care with the CQ indicators was statistically significant (F=17.563, p<.001). This means that the null hypothesis, that financial performance does not predict the quality of care, can be rejected. When the quality of care with the CQ indicators were predicted, it was found that both the solvency ratio (ß=.008, p<.001) and profit (ß=.017, p<.05) were significant predictors. This means that a 10%

Table 3. Results of Regression Analyses: Effects of Financial Performance on Quality of Care

with the Consumer Quality (CQ) Indicators in Nursing Homes

	Restricted model 1 Coefficient (SE)	Unrestricted model 1 Coefficient (SE)	Restricted model 2 Coefficient (SE)	Unrestricted model 2 Coefficient (SE)
Constant	-0.343 (0.075)***	0.213 (0.126)	-0.558 (0.086)***	2.940 (0.626)***
Solvency ratio	0.008 (0.002)***	0.008 (0.002)***	0.015 (0.002)***	0.009 (0.002)***
Profit	0.025 (0.009)**	0.017 (0.009)*	0.017 (0.009)	0.010 (0.008)
Urbanization		-0.351 (0.084)***		-0.230 (0.082)**
Care intensity		-0.101 (0.025)***		-0.052 (0.024)*
Total operating budget				-0.124 (0.033)***
Part-time quote				-1.585 (0.464)***
	F = 14.554*** Adj R² = 0.118 N = 204	F = 17.563*** Adj R²= 0.246 N = 204	F = 25.940*** Adj R²= 0.199 N = 202	F = 21.241*** Adj R² = 0.377 N = 202

Note: The dependent variable is quality of care expressed in an average z-score of the Consumer Quality (CQ) indicators.
*p ≤.05, **p ≤.01, ***p≤.001

increase of the solvency ratio provides 0.08 SD increase in the quality of care with the CQ indicators. Whereby 10% increase of profit provides 0.17 SD increase in the quality of care with the CQ indicators. The adjusted R-square increased from 0.118 to 0.246 when control variables were added to the model. This indicates that 25% of the variability in the quality of care can be explained by the model. Both urbanization and care intensity had a negative significant relationship with the quality of care with the CQ indicators. From this we can hypothesize that institutions in more urban areas showed lower quality of care than institutions in more rural areas. And, institutions which care for patients with higher care intensity experienced lower quality of care. Table 3 also presents the results of the second model. In the second model is adjusted for urbanization, care-intensity, total operating budget and part-time quote. See equation 2 in the methods section. The results indicated that the second model of financial performance and quality of care with the CQ indicators was statistically significant (F=21.241, p<.001). When the quality of care with the CQ indicators is predicted, it was found that only the solvency ratio (ß=.009, p<.001) is a significant predictor

Table 4. Results of Regression Analyses: Effects of Financial Performance on Quality of Care

with the Care-Related Outcome (CRO) Indicators in Nursing Homes

	Restricted model 3	Unrestricted model 3	Restricted model 4	Unrestricted model 4
	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Constant	-0.067 (0.060)	-0.026 (0.105)	-0.072 (0.061)	-0.376 (0.476)
Solvency ratio	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Profit	0.012 (0.008)	0.010 (0.008)	0.012 (0.008)	0.010 (0.008)
Urbanization		-0.089 (0.062)		-0.118 (0.068)
Care intensity		-0.001 (0.019)		-0.003 (0.020)
Total operating budget				0.011 (0.026)
Part-time quote				0.305 (0.374)
	F = 1.804	F = 1.426	F = 1.845	F = 1.146
	Adj R² = 0.005	Adj R²= 0.006	Adj R²= 0.006	Adj R² = 0.003
	N = 308	N = 308	N = 303	N = 303

Note: The dependent variable is quality of care expressed in an average z-score of the care-related outcome (CRO) indicators.
*$p \leq .05$, **$p \leq .01$, ***$p \leq .001$*

for the quality of care with the CQ indicators. It means that 10% increase of the solvency ratio

provides 0.09 SD increase in the quality of care with the CQ indicators. Profit (ß=.010, n.s.) is

not significant. The adjusted R-square increased from 0.199 to 0.377 when control variables

are added to the model. This means that 38% of the variability in the quality of care with the

CQ indicators can be explained by the model. As shown in Table 3, all the indicators have a

negative relationship with the quality of care with the CQ indicators. Higher total operating

budget results in a lower quality of care. So, smaller institutions on average have a better

quality of care compared to bigger institutions. A low part-time quote means more part-timers

compared to a high part-time quote which is equal to more full-timers. In this study, a

negative significant relationship indicates that institutions with more full-timers on average

had a lower quality of care.

Table 4 shows the estimated results for the relationship between financial performance

and quality of care with the CRO indicators. In the third model the relationship between

financial performance and the quality of care with the CRO indicators is described adjusting

for the control variables urbanization and care intensity. See equation 3 in the methods section. The results with financial performance and quality of care with the CRO indicators were not statistically significant (F=1.426, p=.225). The financial performance was not a predictor for the quality of care with the CRO indicators. Despite the increase of the adjusted R-square from 0.005 to 0.006, none of the variability in quality of care with the CRO can be explained by the model. Furthermore, none of the control variables have a significant relationship with the average z-score of the CRO indicators. As shown in Table 4, the results of the fourth model with financial performance and quality of care with the CRO indicators (see equation 4 in methods section) were neither statistically significant (F=1.146, p=.336). The adjusted R-square decreased from 0.006 to 0.003. This means that none of the variability in quality of care can be explained by the model. Furthermore, none of the control variables had a significant relationship with the average z-score of the CRO indicators.

Robustness checks. The findings are tested for robustness where alternative specifications were provided and proven to be robust. In total 13 specification checks were conducted. The results of the specifications were to a great extent similar to the findings presented in this study in magnitude, direction and significance. The only deviant result was the variable profit. In 30% of the specifications profit was significant and in the other 70% the variable was not significant.

Discussion

The purpose of this study was to examine the relationship between financial performance and quality of care in Dutch nursing homes in 2012. The financial performance was described in terms of solvency ratio and profit. The quality of care was composed of CQ indicators and CRO indicators. In contrast to the hypothesis, the main findings indicated no significant relationship between solvency ratio and profit and quality of care with the CRO indicators. In addition, neither the control variables had a significant relationship with quality

of care with the CRO indicators. This is remarkable because a relationship was expected and found in multiple studies (Oetjen et al., 2011; Park & Werner, 2011). Possible explanations could be given for those findings. First, inaccurate control variables are taken into account in the current model because the variables cannot explain the variability in the quality of care with the CRO indicators. Perhaps the relationship depends not on the financial performance but on other variables. Second, the question arises if the CRO indicators are measuring quality of care and, therefore, are representative as quality of care indicators. Third, measurement errors in the CRO indicators could be an explanatory factor in the missing relationship between financial performance and quality of care with the CRO indicators. Finally, institutions could be reinvested excess revenues in equity instead of quality of care.

In accordance with the hypothesis, the findings of the relationship between the financial performance and quality of care indicated a significant relationship. The relationship between solvability and quality of care with the CQ indicators was in both models significant whereas the relationship between profit and quality of care was occasionally significant. This is partly comparable to Park and Werner (2011), which also explored a relationship between financial performance and quality of care after public reporting. However, in the study of Park and Werner the financial performance was only represented by profit (Park & Werner, 2011). Moreover, significant relationships with the control variables were determined in the model of financial performance and quality of care with the CQ indicators. An outcome corresponding to the hypothesis is the negative significant relationship between care intensity and quality of care. As expected a higher care intensity was correlated with lower quality of care. As already mentioned, relatives or others closely involved complete the questionnaire for patients with high care intensity and, in general, relatives turned out more negative about the experienced quality of care than patients. An interesting finding was the negative significant relationship between quality of care with the CQ indicators and the part-time quote. Institutions with more

part-timers on average had a better quality of care than institutions with more full-timers. An explanation for this finding could be the flexibility for the management in scheduling employees at peak hours when an institution has more part-timers. It could be that patients will experience better quality of care because of that. Furthermore, employees in full-time employment may spend more time on non-patient-related tasks like meetings or administrative tasks compared to part-timers. Therefore, it could be that part-timers have more time to spend on the patient.

Nevertheless, these results were not very encouraging. No relationship between financial performance and quality of care with the CRO indicators might indicate waste of money. Institutions which were able to generate excess revenues by operating efficiently did not reinvest the money in quality of care considering the results found in this study. Cutbacks would possibly not cause an inferior quality improvement or decrease of quality of care depending on the extent of budget healthcare institutions receive from the government. Note that a relationship between financial performance and quality of care could arise if institutions receive less money for provided care.

In this study all nursing homes of the Netherlands were included and, therefore, the results supposed to be representable for the Netherlands. Further, the healthcare institutions must submitted the annual reports online whereby data entry errors may occur and it might not be completely accurate. For these data entry errors was controlled when the dataset was checked for validity and these errors were extracted from the dataset. However, measurement errors could be present in the CRO indicators. CRO indicators were measured by the healthcare institutions and due to time pressures it could be that the data were not correctly entered into the system. Therefore, the CRO indicators might not be valid.

Limitations

This study faced some limitations. First, the analyses were performed with cross-sectional data. The long-term effects of financial performance on the quality of care cannot be described. Partially this problem was solved by using the solvency ratio as indicator for financial performance which described the financial state of an institution using the past. Second, the N of the data of quality of care with the CQ indicators was small because the CQ indicators were measured once in two years. The power could be increased by conducting this analysis over multiple years to increase the number of CQ indicators. In this study, it was not possible to generate the CQ indicators of the year 2011 because other indicators were measured. Third, the analyses were performed at concern level instead of location level. As financial performance data was not obtained at a location level, poor performance could be masked by good performance, as it is based on averages. This also applies to the quality of care indicators, locations with low quality of care can be averaged by locations with good quality within the same institution. In general, the method used in this study says something about the overall management performance of the institution.

Further research

Despite the limitations, this study does suggest the importance of the relationship between financial performance and quality of care in nursing homes. For further research it would be interesting to investigate the relationship over several years. The CQ indicators are measured biannually, the N of the CQ indicators will increase when research is performed over several years. Therefore the power of the research will increase. Furthermore, it will be interesting to investigate the validity of the CRO indicators. Contrary to expectations, no relationship was determined between financial performance and quality of care with the CRO indicators. The CRO indicators might be a right representation of the quality of care but measurement errors could reduce the usefulness. Moreover, it should be interesting to

investigate the effect of cutbacks in institutional care. Research of Encinosa & Bernard (2005) assumed restrictions of hospitals in improvement of patient safety by financial pressure. In this study is found that excess revenues were partly reinvested in quality of care. Cutbacks might or might not cause an inferior quality improvement or decrease of quality depending on the extent of budget healthcare institutions receive from the government. To ensure the effect of cutbacks on the relationship of financial performance and quality of care further research would be helpful.

Conclusion

Nursing homes are important institutions for inpatient care for elderly. Due to a growing ageing population in the future, cutbacks might be needed to remain elderly care affordable. In this study, the effect of financial performance on quality of care was investigated resulting in significant and non-significant relationships between financial performance and quality of care. This might indicate that excess revenues, generated by efficiently operating institutions, were not always reinvested in quality of care. This might indicate waste of money, inefficiencies in labor processes or investments. Cutbacks will not necessarily influence the quality of care considering our results. However, to ensure no relationship between financial performance and quality of care arise when expenditures are reduced, further research is required. Further research could be helpful for policymakers to make solid decisions about cutbacks and the effects of cutbacks on quality of care.

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APPENDIX I

Table A. Factor-analysis of the quality of care indicators

N=103		Factor 1	Factor 2	Factor 3
Eigenvalue		7.255	1.628	1.120
Difference		5.627	0.507	0.228
Proportion		0.612	0.137	0.095
Cumulative		0.612	0.750	0.844
	Uniqueness	Factor 1	Factor 2	Factor 3
Consumer Quality (CQ) indicators				
Respect: the way personal contact is experienced	0.080	0.934	-0.030	-0.080
The way the availability of staff is experienced	0.143	0.874	-0.008	0.012
The way information provision is experienced	0.327	0.705	-0.123	-0.145
The way patients are involved	0.219	0.819	0.041	-0.108
The way the quality of staff is experienced	0.073	0.898	0.042	-0.151
The way security is experienced	0.565	0.516	-0.145	-0.059
The way (physical) care is experienced	0.560	-0.022	0.181	-0.136
The way food and drink are experienced	0.379	0.676	-0.076	0.177
The way meals are experienced: ambiance	0.433	0.526	-0.061	-0.141
The way meals are experienced: taste	0.413	0.638	0.015	-0.120
The way privacy is experienced	0.286	0.634	-0.198	0.426
The way living quarters are experienced	0.313	0.446	-0.337	0.540
The way cleaning is experienced	0.380	0.659	0.072	-0.231
Contact with other patients	0.421	0.584	0.040	-0.222
Sense of meaningfulness	0.201	0.823	0.000	0.014
Care-related outcome (CRO) indicators				
Symptoms of depression	0.339	0.207	0.680	0.313
Living in freedom: use of antipsychotics	0.749	0.046	0.240	0.117
Freedom-restricting measures: prevalence	0.728	0.181	0.167	0.366
Medication incidents	0.585	-0.054	0.362	-0.138
Occurrence of problematic behaviour	0.264	0.317	0.706	0.246
Fall incidents	0.579	0.051	0.458	-0.264