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分担研究報告書

老人保健施設におけるケアのアウトカム評価

老人保健施設におけるアウトカム指標（Quality Indicators）と関連する施設の構造的要因

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目的: 老人保健施設におけるアウトカム指標（Quality Indicators）と関連する施設の構造的(Structure)要因を明らかにする。
方法: 107の施設から各施設ランダムに選ばれた約10人からなる合計1057人の居住者を対象として、各施設ごとのＱＩ発生率を計算し、各ＱＩの分布により、大変よいパフォーマンスの施設とそうでない施設の２群に分け、施設の構造特性との関係をロジスティック回帰分析によって分析した。
結果：性・年齢・要介護度などの基本属性をコントロールした後に、転倒は、利用者１００人あたりの看護師が多いほど少ない、ＯＲ(95%CI)=0.77(0.593～0.979)関係がみられた。褥瘡では、正看護婦(RN)が多いほど（1.296(1.077～1.6)）、24 時間看護師配置がある施設ほど（3.522(1.004～13.771)）褥瘡の発生が多いという関係がみられた。
脱水症に関しては、人員配置との関係はみられなかった。
結論:看護師配置は、老人保健施設のＱＩに影響する重要な説明変数とである可能性がある。本研究は、我が国の施設ケアにおいてＱＩを算出した最初の研究である。今後、プロセス指標も含めて、ケアの質に関連する要因を検討していく必要がある。

Introduction

Populations in developed countries are ageing rapidly and Japan is the fastest among them. By 2000, the proportion of those aged 65 years and over went up to 17.4% [1]. To face this scenario, in April 2000, Japan implemented a public mandatory insurance system named *Long-Term Care Insurance* (hereinafter referred to as LTCI) aimed at providing institutional, community and at-home based care[2] to every elderly aged 65 or older based only on physical and mental disability[3, 4].

However, the high demand and ensuing cost containment may pose a vulnerable situation regarding the quality of care provided at Long Term Care Facilities (LTCF). In the USA, quality related problems attributed to long-term care system have been detected as early as 1956[5] and continued until today[6], while in Japan, it was not until the *revision to the LTCI* in 2005 that the concept of quality assurance was strengthened.

This new incorporation, referred to as "maintenance and improvement of quality service" consisted of mandatory information disclosure by the provider, improvement of service experience and living environments, and the revision of the regulations for service providers and care management[7]. Nevertheless, because these concepts mainly address structure regulations, little is known about the relationship between the structure characteristics of the LTCFs and the quality outcomes of the care provided and how they differ across facilities.

In Japan, there are three types of LTCFs: Long-term care hospitals (LTCHs), health care facilities for the elderly (HCFEs), and special nursing homes (SNHs). In this study, we focused on the HCFEs.

Using the pervasive structure-process-outcome model to analyze aspects of quality by Donabedian[8-11], we take a lead from the experience of the USA to hypothesize that structure characteristics of the LTCFs are important predictors of quality outcomes by using QI as a quantitative form to express quality [8].

Outside of Japan, the importance of structure characteristics on QIs has been studied extensively in terms of ownership[12-14], and staffing levels[15-17] and their number is increasing as time goes by[17]. It should be noted, that other structure aspects that are important in a Japanese context of long term care are not found in the literature overseas, such as cooperating institutions, availability of 24-hour nurse staffing, etc.

The methodology for comparing quality among LTC facilities was developed by Zimmerman et al [18-20] with the name of Quality Indicators (QIs). QIs are calculated by dividing the number of residents with negative outcomes in each facility by the number of those at risk, while adjusting for case-mix differences by either exclusion criteria in the denominator and/or levels of risk stratification according to the indicator used

In this study, as QIs we have selected: prevalence of falls, prevalence of pressure ulcers and prevalence of dehydration, after a systematic search because they are common

problems, with a heavy burden on the users and the system to a greater extent and highly preventable with low cost solutions. When not addressed timely, all of them result costly and dangerous for the wellbeing of the people affected.

The present study tried to clarify two main questions:

1) What is the performance situation of selected major QI (Falls, pressure ulcers and dehydration) regarding quality of care across HCFE in Japan, and

2) What structural characteristics are related to these QIs?

Methods

The present study is observational, cross-sectional and analytic, using secondary data from a survey carried out in March 2009 by the Japan Association of Health Care Facilities for the Elderly Requiring Long-Term Care (JAHCFE) and covering the previous six months.

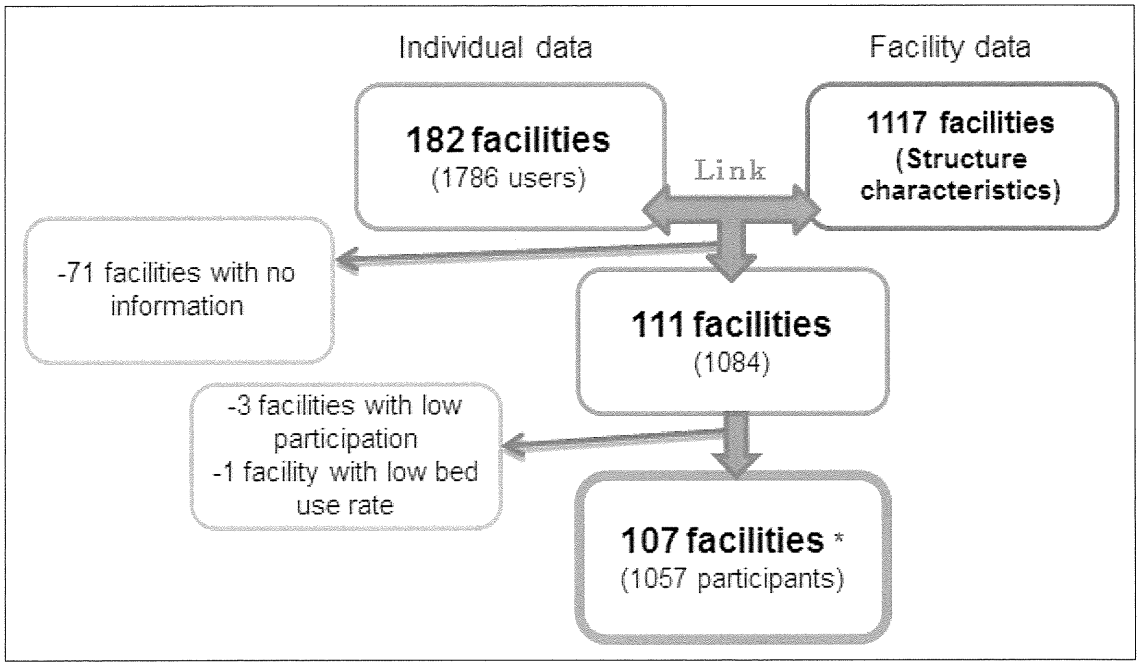
Data collection

The data was collected by means of a postal survey sent to 331 member facilities of the JAHCFE. One hundred eighty two replied (55%). It was reported by nurses (44%), rehabilitation specialists (8%), care workers (46%) and unknown (2%).

Participants

The final sample was around 10 randomly selected institutionalized care-level users from 107 institutions accounting up to 1057 residents. The flowchart is presented in figure 1.

Fig 1. Flowchart



Consent and approval

We obtained written permission to analyze the data from the JAHCFE. The study was approved by the ethical committee of the University of Tsukuba

Dependent variables

Quality Indicator Building

Description: The numerator is the number of people that had at least once the negative outcome and the denominator is the number of people at risk sampled from each institution (around ten) during the defined span of six months.

All of the tests rejected the null hypothesis of normality for the three outcome variables. Due to this positive skewness of the prevalence rates, the QIs were modeled as a binary response variable.

Independent Variables

Categorical:
Ownership, cooperating institutions, and availability of 24-hour nursing staff.

Continuous Variables:
Age of the institution, number of staff allocated per 100 users, main medical conditions, proportion of gait impaired users per facility, proportion of bedridden users per facility.

Statistical analysis
For the purpose of this study, the level to consider two variables to be correlated was a coefficient of 0.8 or higher. No variable was correlated at this level. The logistic regression analysis was carried out by the logistic procedure in SAS version 9.1 on a Windows XP environment.

The statistical significance of individual regression coefficients was tested using the Wald chi-square statistic.

In the following three models the variable for "female proportion", "age of the institution" and "average age of the users" were held constant to adjust. Moreover, the overall model evaluation for the three models was performed with three inferential statistical tests: the likelihood ratio test, score test, and Wald tests.

For falls, the approach used was stepwise entry of variables. The following variables were used as exposure variables: female proportion, average age of the users, number of users, and nurses per 100 users. Significance was set at 0.05. For pressure ulcers, the approach used was direct entry of variables. For this model, the following variables were used as exposure variables: female proportion, average age of the users, number of users, proportion of bedridden users, availability of 24-hour nursing staff and RN per 100 users. Significance was set at 0.06. For dehydration, the modeling approach used was direct entry of variables. For this model, the following variables were used as exposure variables: female proportion, average age of the users, number of users, dietitians per 100 users, proportion of bedridden users, and the proportion of users with renal urological disorders. Significance was set at 0.05.

Results

Bivariate analysis
We tested this relationship using Chi-Square test for Categorical variables and T-test for Continuous variables. The following tables (Table 1, 2 and 3) present the characteristics of these relationships and significance per each outcome:

Falls

Table 1. Bivariate Analisys Falls

	Very Good performers				Not so good performer				Total		
Categorical Variables	n	(%)			n	(%)			n	(%)	*p-value*
Non-Medical Ownership (ref)	5	4.81			17	16.4			22	21.2	
Medical Ownership	29	27.9			53	51			82	78.9	0.2618
No 24-hour Nursing care (ref)	6	5.66			13	12.3			19	17.9	
24-hour Nursing care	28	26.4			59	55.7			87	82.1	0.9592
Other Cooperating Institutions (ref)	15	14.4			28	26.9			43	41.4	
Cooperating Hospital	19	18.3			42	40.4			61	58.7	0.6892
Continuous Variables	Mean	SD	Min	Max	Mean	SD	Min	Max	n	(%)	*p-value*
Female Proportion	79.2	14.1	40	100	73.9	15.7	40	100	107	100	0.0974
Years of the Institution	12.1	4.5	3	21	11.7	4.4	2	21	104	97.2	0.6576
Average Age of the Users	84.7	2.3	77.8	89.6	84.2	3.4	77.3	91	107	100	0.4392
Number of users	91.9	14.1	61	140	84.8	24.2	45	145	105	98.1	0.1206
Nurses per 100 users	12.7	2.0	8.9	16.2	12.0	2.1	7.9	17	105	98.1	0.1003
RN per 100 users	5.4	3.1	1	12.9	5.0	2.7	0.6	14	100	93.5	0.4761
CNA per 100 users	34.9	4.9	26.1	47.5	33.7	4.9	24.8	46	104	97.2	0.2493
PT per 100 users	2.0	1.4	0.2	6.6	2.1	1.0	0.1	4.8	94	87.9	0.6570
OT per 100 users	1.6	0.8	0.5	3.3	1.9	1.5	0.5	8.2	90	84.1	0.3553
Nurse Skill Mix	2.8	0.5	1.8	3.8	2.9	0.6	1.8	4.7	105	98.1	0.6443
Rehabilitation Staff per 100 users	0.8	0.4	0.2	1.5	1.4	1.1	0.1	5.5	34	31.8	0.1482
Nutritionist per 100 users	1.6	0.7	1	4.5	1.6	0.9	0.7	5.1	100	93.5	0.9570
Dietitians per 100 users	1.3	0.4	1	2.3	1.4	0.6	0.7	3.9	101	94.4	0.3731
Proportion of gait impaired users	94.3	7.0	75	100	93.5	9.2	50	100	107	100	0.6689
Proportion of bedridden users	23.0	18.6	0	60	17.1	15.5	0	60	107	100	0.0863
Proportion of brain disorder	47.9	17.9	0	80	51.3	17.6	0	80	107	100	0.3450
Proportion of heart disease	8.3	8.4	0	30	8.6	9.9	0	40	107	100	0.9077
Proportion of respiratory disease	2.1	4.8	0	20	2.4	4.3	0	11	107	100	0.7744
Proportion of renal urologic disease	1.2	3.3	0	10	1.8	4.2	0	20	107	100	0.4605
Proportion of endocrine metabolic disor	3.0	5.3	0	20	4.2	6.9	0	30	107	100	0.3803
Proportion of muscle bone dis	10.8	10.4	0	40	12.3	12.1	0	50	107	100	0.5275
Proportion of mental disorder	17.1	15.3	0	60	11.5	13.3	0	50	107	100	0.0581
Proportion of digestive disorders	1.8	4.6	0	20	2.2	4.9	0	20	107	100	0.6351

Chi Square for categorical Variables

T test for for Continuous Variables

*Fisher exact test

To build a multivariable model for the logistic regression we have particular interest in those variables with a significance equal or higher than 0.20. For falls, mental disorder fulfils this criterion and it is also supported by the evidence we collected in the review of the outcome indicators. Also according to our criterion of significance we find the variable "proportion of bedridden users". Coincidently, this variable is also suggested by our literature review. Rehabilitation staff also fulfils the criterion of significance, but a closer look at this variable reveals too many missing data. This missing data puts in risk the richness of the multivariable analysis. The next variable that satisfies our criterion of significance is "Nurses per 100 users" and finally the number of users, variable we use to adjust for the size of the institution.

Pressure Ulcers

Table 9. Bivariate Analisys Pressure Ulcers

	Very Good performers				Not so good performers				Total		
Categorical Variables	n	(%)			n	(%)			n	(%)	*p-value*
Non-Medical Ownership (ref)	7	6.73			15	14.42			22	21.2	
Medical Ownership	38	36.54			44	42.31			82	78.9	0.2221
No 24-hour Nursing care (ref)	11	10.38			8	7.55			19	17.9	
24-hour Nursing care	36	33.96			51	48.11			87	82.1	0.1892
Other Cooperating Institutions (ref)	17	16.35			26	25			43	41.4	
Cooperating Hospital	28	26.92			33	31.73			61	58.7	0.5187
Continuous Variables	Mean	SD	Min	Max	Mean	SD	Min	Max	n	(%)	*p-value*
Female Proportion	75.3	14.0	40	100	75.9	16.5	40	100	107	100	0.8616
Years of the Institution	12.0	5.1	2	21	11.7	3.9	4	20	104	97.2	0.7682
Average Age of the Users	84.0	3.1	77.6	91.3	84.6	3.0	77.3	90.1	107	100	0.3286
Number of users	91.6	24.8	45	145	83.7	18.6	49	144	105	98.1	0.0649
Nurses per 100 users	11.8	2.1	8.5	16.4	12.5	2.0	7.9	17.2	103	96.3	0.1122
RN per 100 users	4.3	2.4	0.6	9.8	5.8	3.0	1.3	14	100	93.5	0.0090
CNA per 100 users	34.0	4.9	25.3	45.7	34.2	4.9	24.8	47.5	104	97.2	0.8706
PT per 100 users	2.1	1.4	0.2	6.6	1.9	0.8	0.1	3.9	94	87.9	0.3717
OT per 100 users	1.5	0.9	0.5	3.9	2.0	1.5	0.5	8.2	90	84.1	0.0879
Nurse Skill Mix	2.9	0.5	1.8	4.3	2.8	0.6	1.8	4.7	105	98.1	0.4263
Rehabilitation Staff per 100 users	1.4	1.4	0.1	5.5	1.2	0.5	0.5	2.2	34	31.8	0.5427
Nutritionist per 100 users	1.4	0.7	0.7	4.5	1.7	0.9	0.7	5.1	100	93.5	0.1474
Dietitians per 100 users	1.2	0.4	0.7	2.2	1.4	0.6	0.7	3.9	101	94.4	0.0604
Proportion of gait impaired users	92.6	8.0	70	100	94.7	8.9	50	100	107	100	0.2081
Proportion of bedridden users	11.0	14.1	0	60	25.2	15.9	0	60	107	100	0.0001
Proportion of brain disorder	47.0	18.6	0	80	52.8	16.6	10	80	107	100	0.0950
Proportion of renal urologic disease	1.1	3.1	0	10	2.0	4.4	0	20	107	100	0.2220
Proportion of muscle bone disorder	14.4	12.8	0	50	9.9	10.2	0	40	107	100	0.0459
Proportion of mental disorder	14.1	15.7	0	60	12.6	12.9	0	40	107	100	0.5757

Chi Square for categorical Variables
T test for for Continuous Variables

For the bivariate analysis of pressure ulcers we find that the "proportion of muscle skeletal disorders comply with the significance criterion. Also, the proportion of brain disorders and bedridden status is significant under .20. In the limit, we also find the proportion of gait impaired users. Among the professional that are significant we find Nutritionists and Dietitians. Since dietitians are a highly specialized subgroup of nutritionist both variables cannot enter the same model. Dietitians would be preferred over nutritionist because of their stronger relationship. Another professional, the Occupational Therapist is also significant at the criterion level. OT is followed by the nursing staff. Among these, RNs have an especially strong relationship. To finish the number of users that we use to adjust for facility is also significant at .20.

Dehydration

Table 10. Bivariate Analisys Dehydration

	Very Good performers				Not so good performer				Total		
Categorical Variables	n	(%)			n	(%)			n	(%)	*p-value*
Non-Medical Ownership (ref)	12	11.5			10	9.62			22	21.2	
Medical Ownership	49	47.1			33	31.7			82	78.9	0.6594
No 24-hour Nursing care (ref)	11	10.4			8	7.55			19	17.9	
24-hour Nursing care	53	50			34	32.1			87	82.1	0.8071
Other Cooperating Institutions (ref)	27	26			16	15.4			43	41.4	
Cooperating Hospital	35	33.7			26	25			61	58.7	0.5795
Continuous Variables	Mean	SD	Min	Max	Mean	SD	Min	Max			*p-value*
Female Proportion	74.0	16.3	40	100	78.0	13.7	50	100	107	100	0.1945
Years of the Institution	11.6	4.2	3	21	12.2	4.8	2	21	104	97.2	0.5025
Average Age of the Users	83.8	3.1	77.3	91.3	85.2	2.8	78.4	90	107	100	0.0151
Number of users	86.4	20.6	45	145	88.0	23.5	46	144	105	98.1	0.7077
Nurses per 100 users	12.3	2.2	8.5	17.2	12.1	1.8	7.9	16	103	96.3	0.6940
RN per 100 users	4.9	2.6	0.6	12.9	5.4	3.1	1.3	14	100	93.5	0.3547
CNA per 100 users	33.8	4.6	25.8	41.9	34.6	5.3	24.8	48	104	97.2	0.3651
PT per 100 users	2.1	1.2	0.1	6.6	2.0	1.1	0.5	6.2	94	87.9	0.6469
OT per 100 users	1.6	0.9	0.5	3.9	1.9	1.7	0.5	8.2	90	84.1	0.2498
Nurse Skill Mix	2.8	0.6	1.8	4.3	2.9	0.6	1.9	4.7	105	98.1	0.2584
Rehabilitation Staff per 100 users	1.3	1.1	0.1	5.5	1.4	0.9	0.5	3.7	34	31.8	0.7422
Nutritionist per 100 users	1.5	0.7	0.7	4.5	1.7	1.0	0.7	5.1	100	93.5	0.1863
Dietitians per 100 users	1.3	0.4	0.7	3.2	1.4	0.6	0.7	3.9	101	94.4	0.2243
Proportion of gait impaired users	93.6	7.7	70	100	94.0	9.8	50	100	107	100	0.8363
Proportion of bedridden users	16.1	15.5	0	60	23.3	17.5	0	60	107	100	0.0283
Proportion of brain disorder	49.9	17.4	0	80	50.7	18.2	10	80	107	100	0.8314
Proportion of heart disease	8.4	8.7	0	30	8.7	10.4	0	40	107	100	0.8861
Proportion of respiratory disease	2.1	4.5	0	20	2.6	4.5	0	11	107	100	0.5590
Proportion of renal urologic disease	0.9	2.9	0	10	2.6	4.9	0	20	107	100	0.0354
Proportion of endoc. metabolic disor.	3.3	6.8	0	30	4.5	6.0	0	20	107	100	0.3667
Proportion of Muscle-skeletal disease	12.4	12.3	0	50	11.0	10.5	0	30	107	100	0.5308
Proportion of mental disorder	13.1	14.7	0	60	13.5	13.4	0	40	107	100	0.8945
Proportion of digestive disorders	2.1	4.8	0	20	2.1	4.7	0	20	107	100	0.9553

Chi Square for categorical Variables
T test for for Continuous Variables

For the bivariate analysis of dehydration we find that the "average age of the users" complies with the significance criterion. Also, the proportion of users with renal/urological disorders and bedridden status are significant. However, it must be noted that no structural characteristics, which are the focus of the present study, are found to be significant.

Logistic Regression

Table 4 Logistic Regression

Predictor	Falls			Pressure ulcers			Dehydration		
	OR	95% Wald Confidence Limits		OR	95% Wald Confidence Limits		OR	95% Wald Confidence Limit:	
Intercept	-								
Female Proportion (%)	0.98	0.948	1.011	0.999	0.965	1.033	1.011	0.987	1.037
Average Age of the Users	1.024	0.874	1.198	1.05	0.889	1.248	1.108	0.972	1.27
Number of users	0.974	0.95	0.996	0.966	0.94	0.99	1.002	0.983	1.022
Nurses per 100 users	0.77	0.593	0.979	—	—	—	—	—	—
Mental Disorders (%)	0.976	0.945	1.008	—	—	—	—	—	—
Bedridden users (%)	—	—	—	1.069	1.036	1.109	1.695	0.772	4.035
24-hour nursing staff (yes)	—	—	—	3.522	1.004	13.77	1.023	1.001	1.046
RN per 100 users	—	—	—	1.296	1.077	1.6	1.115	1.013	1.241

Falls

According to the results, two variables were found to be significant predictors of the institutions with higher falls: "number of users" and "nurses per 100 users" with odd ratios of 0.974 and 0.770 respectively with p-values of 0.0287 and 0.0389 respectively. In both cases the estimate was negative, meaning that the bigger the "number of users" and the higher the number of "nurses per 100 users" the lower the likelihood to be a facility with a higher prevalence of falls.

Pressure ulcers

According to the results, four variables were found to be significant predictors of the institutions with higher prevalence of pressure ulcers: "number of users", "proportion of bedridden users", "availability of 24-hour nursing staff", and "RN per 100 users with odd ratios of 0.966, 1.069, 3.522 and 1.296 respectively. Regarding their p-values, they were 0.0076, 0.0001, 0.0563 and 0.0096 respectively.

Dehydration

According to the results, no structural characteristics were found to be significant predictors of the institutions with higher prevalence of dehydration. However, two variables that are known risk factors for dehydration, "Proportion of bedridden users" and "Proportion of Renal Urologic Diseases" had the higher significance with Odd

Ratios of 1.023 and 1.115 respectively. However, their p-values, of 0.0845 and 0.0737 respectively, were not significant at an alpha value of .05. In both cases the estimate was positive, meaning that the bigger the "proportion of bedridden users" and "Proportion of Renal Urologic Diseases" the higher the likelihood to be a facility with a higher prevalence of dehydration.

Discussion

Our study showed that a significant preventive factor for falls was Nurses per 100 users, and that a significant inimical factor for pressure ulcers was RNs per 100 users. No significant relationship was found between structural characteristics and dehydration.

Falls

Our results showed that there was a negative significant relationship between the QI of falls and the structural characteristic of total nurses per 100 users with an OR of 0.791, meaning that per every additional nurse in the total nurse staffing per 100 users, the probability of the negative outcome of falling decreases to 79%.

a) Number of Nurses per 100 users: While, this relationship has been found in hospitals [21]. To the knowledge of the author, there are no previous studies on the analysis of the relationship between the total nursing staff ratio to residents and the outcome indicator of falls at Long Term care Facilities (LTCFs)[16, 17, 22].

We speculate that the negative relationship between Nurses per 100 Users (LPN and RNs) may be due to their clinical formation and role in the facility that enables them to create nursing plans according to the needs of the users, plans that in turn may affect the prevalence of falls. These plans may include, among others, fall prevention plans aimed at frail elderly at risk, control plans addressed at risk factors or predictor of falls found in the facility, or stability plans targeting medical conditions presented by the users that predispose them to suffer falls.

We also speculate that, in this study, falls as an unexpected phenomenon is not affected importantly by direct care, so the effect of NA, an eminently element of direct care, may be minimized,

Pressure Ulcers

In the present study, it was described a significant positive association between a higher number of RNs and the availability of 24-hour nurse staffing with a higher prevalence of pressure ulcers, meaning that the higher the number of RNs per 100 users the higher the prevalence.

a) RNs per 100 users: The kind of positive relationship shown in the present study for the RNs and pressure ulcers has been documented before, but along with other

contradictory results that show a negative association [17].

An opposing study found that LTCF with the highest levels of RN staffing showed greater improvement in preventing pressure ulcers[23]. The subjects of this study, divided into two groups: Best performers and Worst performers, showed that the group with the best average outcomes had more RN full-time employees (FTEs) per 60 beds and a greater percentage of RNs in the staff mix[23]. The authors state that the "findings strongly suggest that RN staffing is a major factor contributing to improvement of resident outcomes."[23] This is argued because to improve resident outcomes requires several problem-solving and cognitive activities that the RNs do have. "The difference is knowledge available to the home could explain why homes with more RNs also had greater improvements in resident outcomes."[23]

Another opposing study by Bostick et al also describes a significant association between more RN staff and fewer pressure ulcers[24]. Bostick argues that the beneficial effect of the RNs is given by their "staff time available for supervision and direction" of the care assistant staff[24]. So any increase in the RNs number is reflected actually in the service provided by less skilled groups of workers.

A third opposing study is a report to the congress of the USA, where Kramer et al[15] found that staffing numbers over the national average prevented pressure ulcers. This beneficial effect is speculated to come from the fact that a higher number of RNs would allow them to carry out more activities apart from Director of Nurses (DON)[15].

On the other hand, some studies support the positive direction of our study, in a similar way, reported back in 1999 by Dellefield using OSCAR data from California nursing homes[25]. Dellefield found that an increased ratio of total RN and LPN hours per resident day was associated with a higher than-expected prevalence rate of pressure sores. One explanation they gave for this fact is that licensed nursing staff may be increasingly involved in the documentation of care (administrative collection of data) and less available to be involved in direct clinical assessment of residents[22]. Later she adds: "Another possibility is that the clinical skill level related to pressure sore care of the individual licensed nurses is as important as the actual numbers of licensed nursing staff."[25].

This kind of mixed results in term of the direction of the association of RNs and pressure ulcers was reported by the review of Spilsbury et al[17]. In this review, up to a total of 11 original publications report mixed results. She suggests that this may be due to the cross-sectional design of the studies. The cross-sectional characteristics of this study are thought to preclude the possibility to determine if there is a causal relation between the higher number of RN and the higher prevalence of pressure ulcers, or if on the contrary, the higher presence of pressure ulcers makes necessary the presence of a higher specialized professional as the RN[17]. This phenomenon of a higher complex care

mix of users that affects the type and level of care and services required due to a higher prevalence of chronic diseases, over time has being addressed by some researchers[26-28]. Another hint for a possible explanation for this positive relationship may be found in "Quality of care in nursing home organizations: Establishing a health services research agenda" by Harrington[14] reminding that little evidence have been found of effective RN care probably because there were so few RNs on staff[29]. The same situation holds true in the Japanese context where the number of RNs is rather small compared to the rest of nurse staffing because the numbers of RN per number of residents are not fixed by law. It may be also argued that RNs have a higher clinical awareness that allows them to detect pressure ulcers at early stages of development. This early-stage pressure ulcers despite being able to recover after a few hours after halting the pressure on the affected zone are also counted as pressure ulcers. It may be speculated that this type of pressure ulcers are not normally detected by less trained personnel, but they are detected by the highly prepared RN, thus increasing the prevalence.

b) Availability of 24-hour nursing staff: The positive relationship shown in the present study for the availability of 24-hour nursing staff and pressure ulcers has not been documented before overseas and not in Japan at the HCFE level, due to the fact that apart from the Japan a long term care facility is defined as an institution with 24-hour nurse staffing. It is in Japan where there is the possibility to have or not this service all day long. This type of positive relationship may be related to the cross-sectional limitation of the study where it is impossible to determine if there is a causal relation between the availability of 24-hour nursing staff and the higher prevalence of pressure ulcers, or if on the contrary, the higher presence of pressure ulcers makes necessary the availability of 24-hour nursing staff. This later alternative seems more plausible to explain this phenomenon.

Dehydration

Regarding dehydration, we did not find any staffing characteristics related to this negative outcome.

On this outcome, we speculate that the role played by the under report of dehydration, being a medical condition hard to detect, commonly unrecognized[83], unlike falls and pressure ulcers which are easier to spot and diagnose. Since there is no official definition of dehydration in the world[30], not to mention at HCFE in Japan, the criteria to define a status of dehydration may vary from institution to institution, an even among the staff. This problem alone may hinder the correct magnitude of the phenomenon, leading to a rather low prevalence of this outcome and rather good performance across the facilities surveyed.

Regarding dehydration, we can also speculate about the influence of the season on

dehydration. Since the survey to measure outcomes was carried out in March, covering the six month before, we find that they were the coldest months of the year in Japan (Winter: December, January and February). Since dehydration decreases with colder weather, the effect of the characteristics of the facility may be diminished on dehydration as outcome.

Conclusion

We think the significance of the present results should prompt us to analyze more carefully the arrangement existing today for this kind of facilities in term of staff composition. Great advances has been made in terms of minimum requirements for staffing levels, but these results point to the necessity of paying more attention to the role of clinical awareness at the facility level and the conformation of team work in terms of its multidisciplinary characteristic.

In special, the importance of nursing staff on negative outcomes must be studied further, particularly while controlling covariates and related processes. As Dellefield points out, total nurse staffing levels are an important component of quality, however a deeper study is needed to grasp how the skill mix of nursing staff impact QIs such as the prevalence of pressure ulcers or falls in the LTCFs. To achieve this, Dellefield says that "we need a better understanding of the association of specific ratios of RNs, LPNs, and NAs with such outcomes will provide policy makers with empirical evidence upon which to make recommendations for minimum nurse staffing ratios and case mix."[31].

In the case of falls, the decrease of this prevalence by employing a higher number of total nurses seems hard to achieve due to the generalized lack of licensed nurses in the long term care facilities. This general lack of nurses may be due to a lack of interest of the nurses in performing at a setting were specialization and mobility is not generally achieved. Also, the higher costs associated to hiring and training more licensed nurses, especially under the increasing demand and financial constraints seems to hinder the implementation of staffing reforms on this aspect. Although, it must be noted that in the case of falls there is a highly associated cost due to the consequences of falling in terms of disability and mortality. The results that our study shows may suggest that policies to increase the number of nurses per 100 users should be considered in order to improve the prevalence of falls.

This first report about QIs in Japanese Health Care Facilities for the Elderly (HCFE) shows the importance of staffing levels on negative outcomes, but also the rather low prevalence of pressure ulcers and dehydration. This may account for good quality and quite homogenous performance of many of the facilities. However, in the case of dehydration, the under-reporting, different criteria and seasonal influence mentioned before must be taken into account.

Finally, analyzing only structural indicators have analytical disadvantages; while structural QIs as a standard can be achieved by HCFEs, not necessarily this means providing quality care[32]. In Japan the national structural standards are extensively fulfilled because the national regulations through funding are strongly influential. Thus, despite being indispensable, controlling institutional standards may not be enough to explain differences in quality of care[32]. So it seems necessary to go further into the description of not only staffing allocation and institutional characteristics, but also processes which are intrinsically linked to quality[18]. Thus, it should be discussed the necessity to take a deeper look on the staffing levels, paying attention not only to the numbers of personnel, but also to other staffing characteristics, such as turnover, work stability, motivation, among others[33].

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F．研究発表

1. 論文発表：投稿準備中

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G．知的財産権の出願・登録状況（予定を含む。）

1. 特許取得
2. 実用新案登録
3. その他

なし

平成23年度厚生労働科学研究費補助金（政策科学総合研究事業(政策科学推進研究事業)）
分担研究報告書

老人保健施設における転倒・転落記録、インシデントレポートを活用したＰＤＣＡサイクルシステムの構築に向けて

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介護老人保健施設　ごぎょうの里　施設長
連携研究組織　株式会社コンピュータシステム研究所（仙台市）
連携研究組織　社会福祉法人 青葉福祉会（仙台市）

【研究目的】各老人保健施設で、すでに多くの施設が記録として保持し、記録し続けている転倒・転落記録、インシデントレポートをもとに、ケアの質の向上に寄与しうるPDCAを可能にするシステム構築のための具体策を検討する。
【研究方法】上記の各種の記録を、クラウド上のソフトを用いて施設ごとに集計し、各種のニーズにあわせた集計結果としてフィードバックするシステムを作成している業者（株式会社コンピュータシステム研究所）と連携をとり、PDCAが可能なシステム構築の検討を行った。
具体的には、１）当業者が開発経緯において経験した問題点の整理と共有、および、２）そのシステムによって作成した資料によってリスク会議を開催し、ＰＤＣＡとして実際に活用している一施設を訪ね、ヒアリングを行った。
【結果】すにで、多くの老人保健施においては、転倒・転落記録、インシデントレポートをもとに、それをフィードバックするリスク会議が開催されている。しかし、これらの記録をもとにしたし発生率のようなアウトカムデータ指標を用いて、リアルタイムに評価と改善策の提案・実施、そして改善後の評価というＰＤＣＡサイクルを実現できている施設は少なかった。しかし、この部分を既存のソフトシステムを用いることにより、各施設においてＰＤＣＡサイクルに資する資料をリアルタイムに作成することが可能となることがわかった。まだ、実施にこのシステムを活用し、リスク会議を開催している施設は少なかったが、利活用している一施設の実例では、各種の統計を会議でスタッフと共有しており、実態に対応した改善策を議論し、改善につながっていることがわかった。
【考察】これまで、各種のインシデントレポートなどが記録・蓄積されていても、集計データをリスク会議でうまく活用できていないのは、施設現場の職員が、記録を整理し、統計として示すマンパワーを有していないためと考えられる。その点、このようなシステムを導入することにより、ＰＤＣＡが実施できる可能性は広がり、大変有用であることが考えられた。しかし、一方で、どのような基準・方法で指標化するのか一分母の設定、発生率の示し方、分子の基準など、一定のケアの指標（QI:Quality Indicator）として、各施設間の評価までに応用するには課題が多いことも明らかになった。米国のＨＣＦＡが実施しているような各施設間の評価にもつなげるためには、適切な指標作成のための学術的レビューに基づいた研究レベルの工夫と、さらに行政と共同した統一基準の作成と普及が必須であると考えた。
【結論】既存の記録を活用したＱＩの算出とＰＤＣＡサイクルシステムの構築に向けての具体的課題を把握することができた。この実現には、老人保健施設の職員、システム開発専門家（業者）、研究者、そして行政が協力することが必要である。

A. 研究目的

各老人保健施設で、すでに多くの施設が記録として保持し、記録し続けている転倒・転落記録、インシデントレポートをもとに、ケアの質の向上に寄与しうるPDCAを可能にするシステムを構

築するための、具体的検討を行う。

B. 研究方法

上記の各種の記録を、クラウド上のソフトを用いて施設ごとに集計し、各種のニーズにあわせた集計結果としてフィードバックするシステム（Care Saviour ケアセーバー:「医療・介護品質マネージメントシステム、その方法及びプログラム」として特許 4855091 取得）を作成している業者（株式会社コンピュータシステム研究所）と連携をとり、PDCA が可能なシステム構築の検討を行った。

具体的には、1）当業者が開発経緯において経験した問題点の整理と共有をし、さらに、2）そのシステムによって作成した資料によってリスク会議を開催しＰＤＣＡとして活用している一施設を訪ね、ヒアリングを行った。

C. 研究結果

1）システム開発事業者による開発の経緯とその過程で経験した問題点の整理と共有

連携研究組織として協力いただいた株式会社コンピュータシステム研究所によるまとめを以下に示す。

高齢化社会到来により高齢者施設の重要性と共に職員教育が課題となりました。時と共に進・変化する理論と技術への対応を目的に平成１８年にＷＥＢ活用による「介護技術習得ツール」の開発に着手しました。途中、教育には「心と技術の教育」が存在しており「心」への注力を求められました。

介護サービス事業者様との協議において施設内事故・トラブルの発生、職員不足とスキルの低下、職員教育手法・ツール不足、インシデント／アクシデント報告書の活用策等の課題認識に至りました。特に「施設等における事故防止および安全管理の徹底」の事務通達を受けるも対応手法は様々で、各所において課題となっておりました。多くの事業者様において必要性を認識されるも対応システムが無く、全国的に稀有なサービスとして企画段階より多くの皆様の参画により、下記４項をコンセプトに開発したのが「Care Saviour（ケアセーバー）」です。

① 事故防止体制の確立
② 教育ツール、手法の開発
③ サービスの質的向上
④ 利用者様と職員への『安心と安全』環境構築

商品化後も１年間にわたる試行・改善評価を経てサービス提供となりました。

ここにユーザー様の活用例を報告させていただきます。

１． システム化への期待
(1) 事故防止スキル習得と多くの情報確保を目的としたデータの集積と活用
(2) 業務体系のマニュアル化などの共有化
↓
必要な情報を必要な時に得られ、事故分析から導き出される確かな対策と教育の実施

２． 活用事例（効果）
簡単・瞬時に多次元分析可能となり、データを活用した対応実施
(1) 事故対策について「見守り／注意（事故の内容に注意を払い介入する）」の様な抽象的表現から状況推定を含め具体的対策の実施
(2) 多数ある統計パターンより、有効なものを選択し活用
(3) 業務標準化に基づいたＲＭ（Risk Management）実施により、定期的、体系的な教育・研修の遂行
(4) 蓄積データの全員への周知による情報の共有化

(5)　経験値、ＲＭ習得度を考慮したキャリア研修やフォローアップ研修への活用

事業者間における職員教育ならび事故対策に対する温度差を感じます。インシデント／アクシデント報告書件数も月間数件から１００件を超す施設まで極端なケースを生じております。そこには、サービス事業者における意識の相違を感じました。

今後の課題

1．　リスクアセスメントを含む事故対策、職員教育の啓蒙
　・導入事例発表等による効果の訴求
2．事故の分類方法やインシデントとアクシデントの境界があいまい
　・施設による判断基準の相違と判断に迷う事象への対応
3．介護現場における事故防止に対しての手法の未確立
　・具体的な統計・分析手法、対応策への指導／提案への要望
4．介護現場が抱える根本的問題の解決
　・人材不足、人材教育環境、情報不足
5．ＩＴ技術活用に対する認識
　・情報セキュリティーに対する情報不足による認識相違
　以上が挙げられます。

2）上記システムによって作成した資料によってリスク会議を開催し、ＰＤＣＡとして実際に活用している一施設における実践事例

ヒアリング調査結果、および資料（コンピュータシステム研究所および青葉福祉会の協力による）を次ページ以降に示す。

Care Saviour 利用施設における事故対応方法

調査報告

平成２３年２月２２日

株式会社コンピュータシステム研究所

社長室特販部