Neurourology and Urodynamics 34:362–367 (2015)

What Characteristics Predispose to Continence in Nursing Home Residents?: A Population-Based Cross-Sectional Study

Susan Saga,[1,2*] Anne Guttormsen Vinsnes,[1] Siv Mørkved,[2,3] Christine Norton,[1,4] and Arnfinn Seim[2]
[1]Faculty of Nursing, Sør-Trøndelag University College, Norway, Trondheim
[2]Department of Public Health and General Practice, Norwegian University of Science and Technology, Norway, Trondheim
[3]Clinical Service, St. Olavs Hospital, Trondheim University Hospital, Norway, Trondheim
[4]Florence Nightingale School of Nursing and Midwifery, King's College London, United Kingdom, London

Aims: To compare characteristics of both continent and incontinent residents in Nursing Homes (NHs) and to explore what predicts continence and severity of incontinence. **Methods:** A population-based cross-sectional study was performed in nursing homes in one Norwegian municipality. Registered nurses filled in a questionnaire on behalf of the patients. **Results:** We found that 25.4% of the NH residents were continent, 31.8% had urinary incontinence alone, 2.6% had fecal incontinence alone and 40.2% had double incontinence. Continent residents were characterized by being in short-term care, shorter stay in NH, less cognitive and physical impairment, less Parkinson's disease, stroke, constipation, and less diarrhea and more independence in activities of daily living (ADL). Residents with fecal incontinence alone were characterized by more diarrhea, less cognitive impairment and less dependency in ADL such as feeding and grooming. Residents with urinary incontinence alone were characterized by having some degree of ADL dependency, less diarrhea, and less diabetes. Residents with double incontinence were characterized by being in long-term care, a longer length of stay in NH, cognitive impairment, stroke, constipation, diarrhea, and dependency in ADL. Severity of incontinence was associated with dependency in ADL and cognitive impairment, diarrhea, length of stay in NH and lower age. **Conclusions:** About 25% of NH residents were continent. Double incontinence and urinary incontinence only were prevalent conditions in NHs, while FI alone was rarer. With the exception of diarrhea as a cause of FI, it appears that FI alone, UI alone, and DI may have common causes and development. *Neurourol. Urodynam. 34:362–367, 2015.* © 2014 The Authors. *Neurourology and Urodynamics* published by Wiley Periodicals, Inc.

Key words: characteristics; cross sectional study; epidemiologic study; fecal incontinence; homes for the aged; incontinence; nursing homes; prevalence studies; residential facilities; urinary incontinence

INTRODUCTION

Incontinence is a prevalent condition among nursing home (NH) residents.[1,2] Incontinence causes hygienic problems, skin problems[3], and leads to impairment in activities of daily living (ADL).[4] It also has implications for resident dignity, as well as being a professional challenge for the caregivers involved. A nursing home is a place of residence for people with health problems and significant deficiencies in ADL.[5] NH residents are "frail elderly with impaired physical activity, mobility, muscle strength, balance, motor processing, cognition, nutrition, and endurance."[6–8] After NH admission deterioration in health and ability to self-care will often continue.

Urinary incontinence (UI) is defined as "the complaint of any involuntary leakage of urine."[9] Fecal incontinence (FI) is "the involuntary loss of liquid or solid stool that is a social or hygienic problem."[10] Double incontinence (DI) refers to both conditions being present in the same resident. Previous studies of incontinence among NH residents have identified several risk factors and predictors: UI and FI in frail elderly are related to cognitive and physical decline, diabetes mellitus, depression, constipation, stroke[1,10] and non-white race.[11] In addition, UI is related to Parkinson's disease, chronic obstructive pulmonary disease (COPD), hip problems, congestive heart failure/extremity oedema, lower urinary tract symptoms (LUTS), urinary tract infection (UTI)[1] and malnutrition.[12] FI is related to diarrhea[10] and length of stay in NH.[13] In addition, incontinence is often double, with both UI and FI in the same patient, and these conditions are often interrelated.[14] Although incontinence is a common condition in NHs, there is also a sizable group of continent residents. There are few studies focused specifically on continent residents, but Chiang[14] identified 27% continent residents in NHs in an American retrospective chart study. Studying the group of continent residents will arguably enhance our understanding of incontinence. NH residents may have UI, FI, DI, or no incontinence. While some residents do not leak at all, others may experience severe leakage of one kind of incontinence or both. Thus, we chose an approach where incontinence in NHs was viewed both as the dichotomous variables of incontinent and continent, and as a continuous variable (severity) between continent and incontinent. Our aim was to compare characteristics of both incontinent and

Conflict of interest: none.
Christopher Chapple led the peer-review process as the Associate Editor responsible for the paper.
Grant sponsor: Norwegian Nurses Organisation
*Correspondence to: Susan Saga, M.Sc., Faculty of Nursing, Sør-Trøndelag University College, Norway, Trondheim.
E-mail: susan.saga@hist.no
Received 4 September 2013; Accepted 6 January 2014
Published online 28 January 2014 in Wiley Online Library (wileyonlinelibrary.com).
DOI 10.1002/nau.22563

continent residents in NHs and to explore what predicts continence and severity of incontinence.

MATERIALS AND METHODS

Norwegian NH's are mostly owned and run by the municipality, being financed by taxes and resident payment. But there are also some private non-profit and for-profit providers.[15] This population-based cross-sectional study was performed in all NHs in a Norwegian municipality in 2010; these are representative of the Norwegian NH population both in organization and resident characteristics. Residents who at the time of data collection were residents in a NH were included if they had been a resident for more than 3 weeks or had prior stays of more than 4 weeks during the last 6 months. Residents who were 64 years or less, as well as residents with a stoma or indwelling urinary catheter were excluded from the study. The local ethical committee for health and medical research approved the study 2009/1225. No consent from residents or their next of kin was required by the ethical committee because all the resident information gathered was de-identified and anonymous to the researcher. All 28 NHs in the municipality were invited to participate.

A questionnaire was designed for this study in order to obtain information about UI, FI, constipation, diarrhea, sex, age, diagnoses, type of care, and length of stay. The questionnaire had been pilot tested in one NH before the main data collection, and changes were made according to the feedback. Registered Nurses (RNs) with comprehensive oversight of each resident filled in the questionnaire for included residents.

Measures

FI and UI in this study were defined as "involuntary leakage of stool/urine at least a few times a month." The leakage frequency was based on a severity index for urinary incontinence (SIUI) which is created by a frequency score multiplied with a volume score.[16] If the resident had UI, the RNs were asked to answer the following question: "How often does the resident have involuntary leakage of urine?" The following answering options and score were available: [1] less than once a month,[2] a few times a month,[3] a few times a week and[4] every day and/or night. The same question and labeling were used to ask about fecal incontinence. The next question was: "How much urine does the resident lose each time?" with the following answering options and scores: [1] drops,[2] small splashes and[3] more. There were no questions about fecal volume. A dependent variable "severity of incontinence," was constructed from the severity index for urinary incontinence (SIUI)[16] and frequency of FI. In order to give UI and FI approximately the same weight, FI frequency was multiplied by two, which gives: (UI frequency × UI volume) + (FI frequency × 2) = severity of incontinence. The variable "cognitive impairment" is based on the question: "According to your assessment, is the resident aware of the current time, place and situation?" The registered nurses could answer "yes," "no" or "partly" to this question. Both "no" and "partly" are taken as cognitive impairment in this paper. Barthel's ADL index was used to obtain information about the residents' activities of daily living (ADL)-functioning, with the scores from 0 to 20 (20 is the best score).[17] To prevent confounding, ADL score was computed without the bowel- and urine domains when used in multivariable analysis with incontinence/continence as effect variable (scores from 0 to 16, where 16 is best score). In bivariate analysis separate domains from Barthel's ADL index were used.

Statistical Analyses

Statistical methods included estimating prevalence in percentages, and other descriptive statistics. Chi square-test and Fisher's exact test were used to explore the association between FI only, UI only, DI and continent residents and variables identified in previous studies, except from racial/ethnicity factors for which we did not collect data. Variables were considered significant if $P < 0.05$, but P-values between 0.01 and 0.05 were interpreted with caution because of the increased risk for type I error in multiple analyses. Multivariable linear regression was conducted to predict and understand the effect variable "severity of incontinence." Different multivariable regression models were explored using forward selection and the F-test to measure change. The independent variables were entered one by one. Variables significantly associated with the effect variable (severity of incontinence) in bivariate regression were considered as candidates for the multivariable regression model. Age and sex were entered into the model because of their clinical importance, despite not being significant in bivariate analyses. R^2 was used to assess how well the predictors in the chosen model explained the dependent variable. No replacements were made for missing data. Statistical calculations were performed using PASW® statistics 19 for Windows (SPSS Inc., Chicago, IL).

RESULTS

One NH and a single unit at another NH declined to participate in the study. The 27 participating NHs filled in a questionnaire for all the residents that fitted the inclusion criteria. This gave a response rate of 100% for the participating NH units and 90.3% for the whole NH population. The total number of NH residents in the municipality was at that point of time 1,322, and the total number of cases after exclusions was 930 (Fig. 1). Due to missing data the number of residents varies between 789 and 899 in the different analyses.

Mean age of the included residents was 85.5 years (SD 7.3), ranging from 65 to 107 years. Women constituted 75.9% and men 24.1% of the NH population. Of the residents, 92.7% were in long-term care, whereas the remaining 7.3% were in short-term care, including rehabilitation and respite stays. Mean duration of stay among residents in short-term care and long-term care were 53.2 days (SD 58.1) and 891.8 days (SD 878.7) respectively. Cognitive impairment was reported in 80.7% of the residents. Mean score on Barthel's ADL index was 9.59 (SD 5.6). Fifty of 980 residents (5.1%) had an indwelling urinary catheter and 52.0% of these had FI ($P = 0.002$; excluded from further analyses).

Bivariate Analyses

Figure 1 demonstrates the distribution of residents between the four groups: FI only; UI only; DI; and continent residents. We found that 25.4% of the residents were continent, 31.8% had UI only, 2.6% had FI only and 40.2% had DI. This gave an overall UI prevalence of 72%, ranging from 50.0% to 94.1% between NHs ($P = 0.002$). The overall FI prevalence was 42.8%, with a range from 11.8% to 62.5% between NHs ($P = 0.003$).

Tables I and II demonstrates that continence was significantly associated with less cognitive impairment, less stroke, less Parkinson's disease, less constipation, less diarrhea, short-term care stay in NH, short length of stay, and independence in ADL's such as feeding, grooming, dressing, transfer between bed and chair, toileting, mobility, walking in stairs, and bathing. FI only was significantly associated with less cognitive impairment,

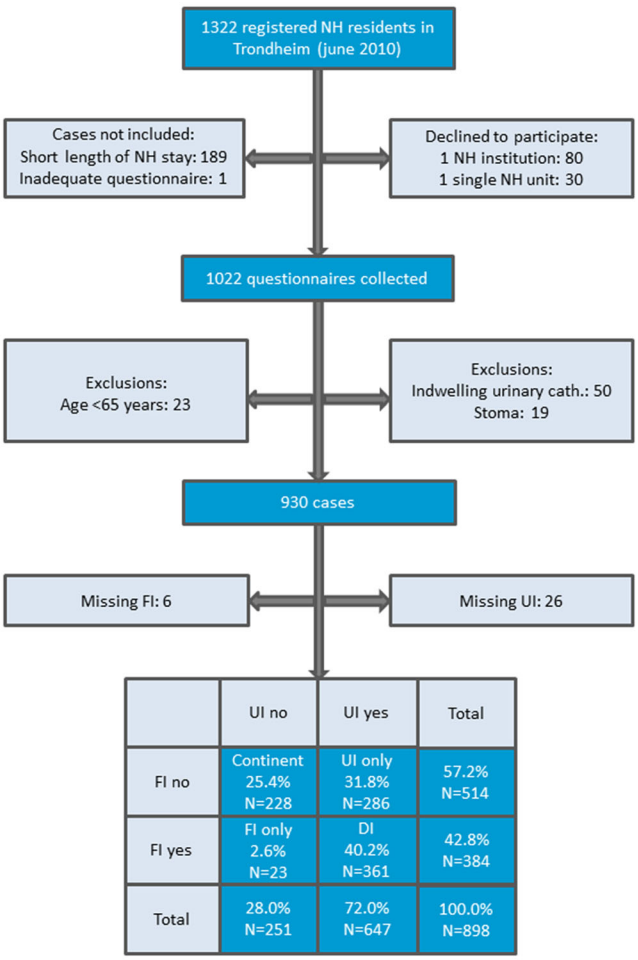

Fig. 1. Flow chart of included and excluded cases.

diarrhea, and ADL independence in feeding and grooming. UI alone was significantly associated with less diabetes, less diarrhea and some ADL dependency in feeding, grooming, dressing, transfer, toileting, mobility, walking in stairs and bathing. Double incontinence was significantly associated with cognitive impairment, stroke, constipation, diarrhea, long-term care stay in NH, longer stay in NH, and ADL dependency in feeding, grooming, dressing, transfer from bed to chair, toileting, mobility, walking in stairs, and bathing.

Multivariable Analysis

Table III demonstrates that the model predicts 0.06 less units in overall severity of incontinence (on the severity index scale) for each year of increasing age, when adjusted for the other factors (CI −0.11, −0.01). For each month residents had resided in a NH, the model predicts 0.03 units higher severity of incontinence (CI 0.02, 0.04). Residents with cognitive impairment had on average 3.40 units higher predicted severity of incontinence compared to residents without cognitive impairment, when the other variables were constant (CI 2.51, 4.28). Residents with diarrhea had 1.96 unit higher severity of incontinence compared to residents without diarrhea (CI 1.04, 2.88). These findings are statistically significant. Each unit improvement in ADL score gave a significant lower severity of incontinence of 0.97 units (CI −1.05, −0.89). The multivariable regression model of age, sex, length of stay in NH, cognitive impairment, constipation, diarrhea, and ADL score explained 54.4% of variance ($F = 135.30$, $P < 0.001$). Figure 2 demonstrates the results from both bivariate and multivariate analyses.

TABLE I. Prevalence of Continent Residents, Residents With FI Only, UI Only, and DI by Age Groups, Sex and Comorbidity in Bivariate Analyses (Chi-Square Test)

Variable (n)	Continent (228)	FI only (23)	UI only (287)	DI (n = 358)
Age groups (895)	$P = 0.06$	$P = 0.69$[a]	$P = 0.32$	$P = 0.87$
65–74 years (81)	34.6%	2.5%	27.2%	35.8%
75–84 years (263)	22.4%	1.9%	35.4%	40.3%
85–94 years (474)	26.8%	2.7%	30.4%	40.3%
>95 years (77)	18.2%	3.9%	36.4%	41.6%
Sex (892)	$P = 0.23$	$P = 0.20$	$P = 0.49$	$P = 0.18$
Men (218)	28.4%	1.4%	33.9%	36.2%
Women (674)	24.3%	3.0%	31.5%	41.4%
Cognitive impairment (890)	$P < 0.001$	$P = 0.02$[a]	$P = 0.45$	$P < 0.001$
Yes	19.4%	1.8%	32.6%	46.3%
No	50.9%	5.3%	29.6%	14.2%
Depression (893)	$P = 0.32$	$P = 0.45$[a]	$P = 0.70$	$P = 0.45$
Yes	30.0%	3.8%	30.0%	36.2%
No	25.0%	2.5%	32.1%	40.6%
Stroke (893)	$P = 0.001$	$P = 0.55$[a]	$P = 0.62$	$P = 0.009$
Yes	12.9%	3.2%	33.9%	50.8%
No	27.4%	2.5%	31.6%	38.5%
Parkinson's disease (893)	$P = 0.03$	$P = 0.39$	$P = 0.05$	$P = 0.59$
Yes	12.7%	0.0%	43.6%	43.6%
No	26.3%	2.7%	31.1%	40.0%
Hip problems (893)	$P = 0.13$	$P = 0.31$[a]	$P = 0.75$	$P = 0.36$
Yes	19.2%	4.0%	33.3%	44.4%
No	26.2%	2.4%	31.7%	39.7%
Diabetes (893)	$P = 0.36$	$P = 1.00$[a]	$P = 0.03$	$P = 0.18$
Yes	29.3%	2.2%	21.7%	46.7%
No	25.0%	2.6%	33.1%	39.5%
Chronic obstructive pulmonary disease (893)	$P = 0.37$	$P = 0.25$[a]	$P = 0.35$	$P = 0.58$
Yes	29.7%	0.0%	27.0%	43.2%
No	25.0%	2.8%	32.4%	39.9%
Urinary tract infections (899)	$P = 0.08$	$P = 0.58$[a]	$P = 0.87$	$P = 0.18$
Yes	12.1%	3.0%	33.3%	51.5%
No	25.9%	2.5%	32.0%	39.7%
Congestive heart failure and extremity oedema (899)	$P = 0.96$	$P = 0.26$[a]	$P = 0.57$	$P = 0.23$
Yes	25.6%	0.0%	29.3%	46.3%
No	25.3%	2.8%	32.3%	39.5%
Lower urinary tract symptoms (899)	$P = 0.15$	$P = 1.00$[a]	$P = 0.96$	$P = 0.17$
Yes	18.8%	2.4%	31.8%	47.1%
No	26.0%	2.6%	32.1%	39.4%
Constipation (889)	$P < 0.001$	$P = 0.33$	$P = 0.77$	$P < 0.001$
Yes	17.3%	2.0%	33.0%	47.8%
No	29.9%	3.0%	32.0%	35.2%
Diarrhea (871)	$P < 0.001$	$P < 0.001$[a]	$P < 0.001$	$P < 0.001$
Yes	9.7%	9.0%	12.5%	68.8%
No	26.8%	1.4%	36.0%	35.9%

P-values are given for each variable in the vertical cells and demonstrate the level of significance for the differences in prevalence (Continent, FI only, UI only, and DI) for the variable alternatives vertically.

[a]Fisher's exact test.

DISCUSSION

NH populations are heterogeneous. In this study, the residents were frail elderly with high age, several diagnoses,

TABLE II. Prevalence of Continent Residents, Residents With FI Only, UI Only, and DI by Type and Length of Stay in NH and Activities of Daily Living (ADL) in Bivariate Analyses (Chi-Square Test)

Variable (n)	Continent (228)	FI only (23)	UI only (287)	DI (n = 358)
Type of stay (869)	$P < 0.001$	$P = 1.00$[a]	$P = 0.82$	$P < 0.001$
Long-term care stay (805)	23.2%	2.7%	32.7%	41.5%
Short-term care stay (64)	50.0%	1.6%	31.2%	17.2%
Length of stay total (864)	$P < 0.001$	$P = 0.32$[a]	$P = 0.61$	$P < 0.001$
<1 year (313)	38.7%	2.9%	33.2%	25.2%
1–2-year (186)	25.8%	4.3%	31.2%	38.7%
2–3-year (117)	21.4%	1.7%	31.6%	45.3%
3–4-year (88)	10.2%	2.3%	34.1%	53.4%
4–5-year (53)	7.5%	1.9%	20.8%	69.8%
>5-year (107)	15.9%	0.0%	30.8%	54.2%
Feeding (896)	$P < 0.001$	$P = 0.04$	$P < 0.001$	$P < 0.001$
Dependent (194)	6.2%	0.0%	20.6%	73.2%
Some help needed (205)	10.7%	2.9%	39.5%	46.8%
Independent (497)	39.0%	3.4%	33.4%	24.3%
Grooming (895)	$P < 0.001$	$P = 0.03$[a]	$P < 0.001$	$P < 0.001$
Needs help (770)	17.3%	2.1%	34.8%	46.0%
Independent (125)	73.6%	5.6%	16.0%	4.8%
Dressing (897)	$P < 0.001$	$P = 0.26$	$P = 0.008$	$P < 0.001$
Dependent (500)	6.0%	1.8%	31.6%	60.8%
Some help needed (235)	36.2%	3.4%	38.7%	21.7%
Independent (162)	68.5%	3.7%	24.1%	3.7%
Transfer (896)	$P < 0.001$	$P = 0.47$[a]	$P = 0.001$	$P < 0.001$
Cannot sit, lift used (143)	0.7%	2.1%	21.0%	76.2%
Can sit, but in need of lot of help (207)	4.3%	1.4%	33.3%	60.9%
Some help needed (192)	22.4%	2.1%	42.2%	33.9%
Independent (354)	48.9%	3.7%	30.5%	16.9%
Toileting (894)	$P < 0.001$)	$P = 0.09$	$P < 0.001$	$P < 0.001$
Cannot use toilet (88)	0.0%	0.0%	14.8%	85.2%
Help needed for dressing and transfer (502)	9.8%	2.2%	36.3%	51.8%
Independent (304)	57.9%	3.9%	29.9%	8.6%
Mobility (896)	$P < 0.001$	$P = 0.10$	$P = 0.001$	$P < 0.001$
Cannot move wheelchair (222)	0.9%	1.4%	21.6%	76.1%
Cannot walk, but able to move wheelchair (56)	17.9%	3.6%	39.3%	39.3%
Walking support (378)	28.8%	4.0%	36.2%	31.2%
Walks (240)	43.8%	1.2%	33.3%	21.7%
Stairwalking (884)	$P < 0.001$	$P = 0.17$	$P = 0.03$	$P < 0.001$
Cannot walk in stairs (510)	11.4%	2.4%	30.4%	56.1%
Needs help (251)	33.1%	4.0%	38.2%	24.7%
Walks without help (123)	64.2%	0.8%	26.0%	8.9%
Bathing (897)	$P < 0.001$	$P = 0.18$[a]	$P = 0.002$	$P < 0.001$
Dependent (867)	23.2%	2.4%	33.0%	41.5%
Independent (30)	83.3%	6.7%	6.7%	3.3%

P-values are given for each variable in the vertical cells and demonstrate the level of significance for the differences in prevalence (Continent, FI only, UI only, and DI) for the variable alternatives vertically.
[a]Fisher's exact test.

and impaired ADL. Incontinence was prevalent in this population, and also associated with a number of medical conditions. Our study had a large sample size, high response rate, and it is reasonable to assume that the results from this study are representative for frail elders in NHs in western countries.

Of the residents included in our study, 25.4% were continent. This corresponds well with the 27% reported in an American study with a similar design.[14] Continent residents were characterized by being in short-term care, shorter stays in NH, less cognitive and physical impairment, less Parkinson's disease and stroke, as well as less constipation and diarrhea.

TABLE III. Multiple Regression of Severity of Incontinence* as Dependent Variable (N = 789)

Independent variable	Estimated coefficient	95% CI	*P*-value
Age	−0.06	−0.11, −0.01	0.01
Women	−0.26	−1.07, 0.56	0.54
Length of stay (month)	0.03	0.02, 0.04	<0.001
Cognitive impairment	3.40	2.51, 4.28	<0.001
Constipation	0.16	−0.55, 0.87	0.66
Diarrhea	1.96	1.04, 2.88	<0.001
ADL[a]	−0.97	−1.05, −0.89	<0.001
Overall regression statistics:			
R^2	54.8		
Adjusted R^2	54.4		
F (7,782)	135.30, $P < 0.001$		

*The effect variable "severity of incontinence" is made by a Severity Index for Urinary Incontinence[16] and frequency of FI × 2. This means that (UI frequency × UI volume) + (FI frequency × 2) = severity of incontinence.
[a]Barthel's ADL score excluding the bowel and urine items.

Further, continent residents were more independent in ADL activities. Hence, the characteristics of continent residents were different from the cognitively and physically impaired incontinent residents in our study. However, these results were not unexpected. Being a resident in a NH is usually characterized by frailty, ADL dependency, high co-morbidity, and cognitive impairment. Still, some residents seemed to be less impaired. Who are these residents without somatic and cognitive impairment? The answer lies perhaps in age. Age is no reason for NH admission, but frailty and comorbidity is. Hence, NH residents are a selected group. However, considerable age may outweigh other criteria for NH admission, due to an assumption that high age implicates frailty. The frailest residents will pass away, leaving a persistent group of very old men and women in the NH, a group of survivors. Despite very high age, deteriorating health, institutionalization and changes in life,

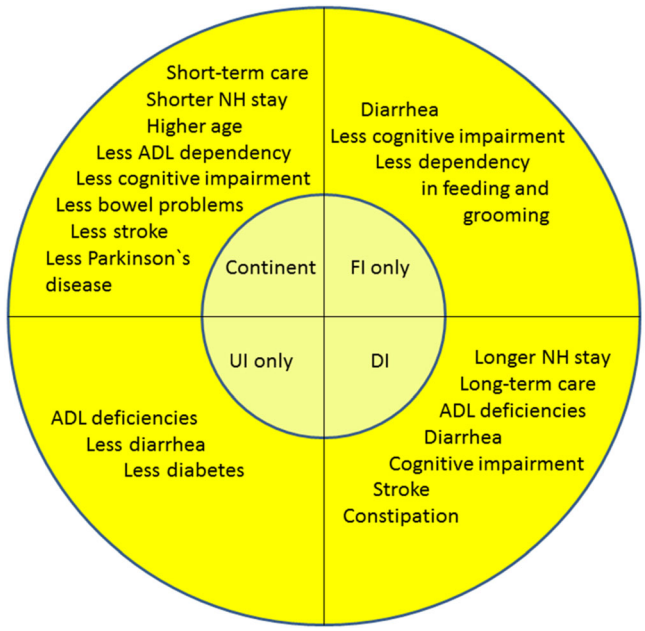

Fig. 2. Characteristics of continent residents and residents with FI only, UI only, and DI in NH.

they maintain their bodily and cognitive functions, including continence. Research is needed to establish more knowledge about this group of residents and how to maintain continence.

The overall prevalence of FI in our study was 42.8%, whereas the prevalence of FI alone was only 2.6%. The number of cases was 23, which was a surprisingly small group of residents. Chiang et al.[14] reported a prevalence of 6.0% among NH residents with FI only in an American cross-sectional study, when residents with indwelling urinary catheter were included. We found a similar FI prevalence of 5.6% before excluding catheterized residents. Fifty residents had an indwelling urinary catheter and 52.0% of these had FI ($P = 0.002$), indicating a possible association of indwelling urinary catheter to FI. Residents with indwelling catheters are perhaps not being toileted the same way as other residents, thereby becoming fecally incontinent. Alternatively, indwelling urinary catheters are used by the most impaired patients. Residents with FI alone were characterized by diarrhea, but were otherwise less impaired. Diarrhea or loose stool has been shown to be a significant predictor of FI in NH residents.[13,18–20] However, our conclusions are based upon bivariate analysis not controlled for other variables, and the number of cases is very low. The results must therefore be interpreted with caution.

Despite the overall UI prevalence of 72%, the prevalence of UI only in our study was 31.8%, while Chiang et al.[14] reported a prevalence of 13% of residents with UI only. Residents with UI only were characterized by ADL dependency and less diarrhea and diabetes. However, diabetes is regarded as a common risk factor for UI,[1] and due to the *P*-value of 0.03 this result must be interpreted with caution.

The prevalence of DI in our study was 40.2%. Chiang et al.[14] reported the prevalence of NH residents with DI to be 54%, whereas between 20.5% and 52% was reported in a cross-national comparison of seven European countries.[21] Residents with DI were in our study characterized by long-term care, a longer length of stay in NH, cognitive impairment, stroke, constipation, diarrhea, and ADL dependency. When controlled for other predictor variables there was no significant association between medical diagnoses such as stroke and Parkinson's disease and severity of incontinence. However, we found that a lower ADL score and cognitive impairment were significant predictors for severity of incontinence, underlining the importance of frailty as a predictor variable. Also, length of stay in NH was a predictor for the severity of incontinence. This may be viewed according to increasing frailty and deteriorating health in this population, but also as an indicator for the quality of care given. The statistical significant variation in prevalence of UI and FI between NHs enhances this perspective, as there were no obvious reasons for the variation; there were "ordinary" long-term care units among the NHs with both the highest and lowest prevalence. However, there was a small preponderance towards institutions with more short-term care patients among the institutions with lowest UI prevalence. It seems obvious that care practices and quality of care may explain some of the variations in prevalence, in addition to population characteristics. In this group of frail elderly, length of stay in NH was significantly associated with increasing severity of incontinence, while age was not. Age is a recognized risk factor for both UI and FI, but we found the opposite when residents were admitted to a NH; increasing age predicted slightly less severe incontinence. Diarrhea was also a significant predictor for severity of incontinence and is probably associated with FI.

Based on these findings, it seems that FI only is associated with diarrhea; UI only is associated with physical impairment; and DI develops when residents are getting frailer and more cognitively impaired. Hence, DI may be seen as a more severe incontinence than UI or FI alone. UI and FI among NH residents are multifaceted conditions linked to a combination of co-morbidity, ADL deficiency, and consequences of institutionalization. However, diarrhea is linked to FI, not UI.[10,18,22] Caring for residents with incontinence in NH should therefore address the underlying causes of UI and FI, such as diarrhea treatment and ADL maintenance. The aim for continence care among NH residents should be to maintain continence or at least prevent further deterioration after NH admission; for some it may even be possible to improve continence.

Study Limitations and Strengths

In this study the RNs filled in the questionnaires instead of the residents themselves. Approximately, 80% of NH residents suffer from cognitive impairment and this makes NH residents a very difficult population in which to do research.[13]

The strength of this study is the high response rate; 90.3% within the NH population and 100% in the participating NH units. The NH that chose not to participate in the study (80 residents) is representative compared with the included cases, both in the distribution of long-term care/short-term care, and also in resident characteristics. The single unit that declined at another NH had 30 residents and many of them, probably more than within the included cases, were short-term care residents. In this study, residents in short-term care stays have been included. As this is not always done in NH studies in other countries, this may make international comparisons more difficult. It has been documented that international comparisons of NHs are difficult to make.[23] Nevertheless, cross-national similarities are present: NH residents are frail elderly in need of professional care. In this regard, this study is representative of NH in other countries, especially in the western world. Hence, our results can provide knowledge about incontinent and continent residents in NH, which is of importance in the planning of resident care.

CONCLUSIONS

Continent residents constituted about 25% of NH residents. Double incontinence and urinary incontinence only were prevalent conditions in NHs, while fecal incontinence alone was rarer. FI alone was related to diarrhea, UI alone was related to ADL deficiency, while DI in addition to diarrhea and ADL deficiency was related to cognitive impairment, stroke, constipation, long-term care stay, longer NH residency, and slightly younger residents. With the exception of diarrhea as a cause of FI, it seemed that FI alone, UI alone, and DI had common causes and development.

ACKNOWLEDGMENT

The authors wish to thank Trondheim municipality and the registered nurses who kindly filled in the questionnaires, thus making the study possible. A special thank goes to Signe Nyrønning at Søbstad community hospital and teaching nursing home for administering the pilot-test. We also thank our colleague Lene Elisabeth Blekken who was involved in the data collection.

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