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Effects of the implementation of the Resident Assessment Instrument on gaps between perceived needs and nursing care supply for nursing home residents in the Netherlands

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ABSTRACT

This study evaluated the effects of the implementation of the Resident Assessment Instrument (RAI) on gaps perceived between residents' needs and nursing care received in Dutch nursing homes. In a controlled group design residents were interviewed before and after the implementation. Most gaps were perceived in the psycho-social area rather than physical or needs with aids and facilities. In general, perceived gaps decreased more strongly in the experimental group. The results give an indication that assessment using RAI leads to a better meeting of the residents' perceived needs. More research is needed to investigate the quality of the assessment using RAI in more detail.

1. INTRODUCTION

Nursing is about meeting human needs, when they are sick or disabled. For this reason, caring theories are often based on need theories (Maslow, 1954) and modified in accordance with nursing situations (Yura and Walhs, 1978). Meeting patient needs has been identified as the fundamental determinant for quality of care (Mattiasson and Andersson, 1997). Quality of care can, therefore, be defined as the extent to which needs are actually met. In order to identify the needs of patients, it is important that the health care approach is holistic and patient focussed. The importance of patient tailored care is increasingly being recognized by health care institutions. In the health care system, patients no longer want to be treated as "objects" but demand to be involved in the decision making in respect of their disease or handicap. This is especially true for chronic patients living in nursing homes. In consequence, the care received affects the quality of daily life (Grant et al., 1996). Donnabedian (1988) argues that the highest level of quality is the care which best corresponds to the wishes and valuations of the informed patient. Patients who have achieved fulfilment of their expectations are more likely to be satisfied with the care provided and treatment. Assessment, as the first part of the nursing process, may help the staff in identifying needs, problems and resources which could be a basis for nursing care and facilitate and improve the quality of care. Assessment should form the basis for any planned nursing intervention. This article describes a study in which the

implementation of the Resident Assessment Instrument (RAI) in Dutch nursing homes was evaluated in respect of the perceived gaps between residents' needs and the received care.

Assessment is arguably the most important stage in nursing. However, it is often poorly carried out (Walsh, 1991). Other researchers have recognized the importance of assessment. Davies et al. (1997) noted that nursing staff needed to be more aware of the importance of making more specific, individualized assessments as a basis for nursing care. Björvell and Emlen (1994) have shown that nursing documentation in nursing homes is incomplete and impossible to use as a basis for individualized care or in a nursing audit. In 1986, the Institute of Medicine in the United States carried out a study on the quality of life and quality of care in nursing homes. The key component of their report was the need for a uniform assessment instrument (Institute of Medicine, 1986). In response to this, an assessment instrument, the RAI was developed. The RAI is an assessment instrument especially developed for the care of elderly people (Morris et al., 1990). The main purpose of the instrument is in assessing individualized care. It gives a comprehensive and standardized assessment of the patient's physical, psychological and social status. At the moment, the RAI is a widely used instrument in the US. Since 1997, European countries started introducing the RAI. The instrument comprises a structured screening questionnaire, the Minimum Data Set (MDS), in which the majority of the items on the form are completed by nurses. Using an algorithm with MDS, the computer spots potential problems in 18 different areas (see the appendix). Special Resident Assessment Protocols (RAPs) have been designed for these problem areas. These RAPs provide directional aids for the analysis and optimal management of each problem. The assessment of the residents leads to individual care plans formulated on the basis of the structured assessment (Morris et al., 1991, 1995).

Since the start of RAI, several studies conducted in the US, Sweden and Japan, have evaluated its effects on process and outcome measures. In a literature study on the effects of the RAI, nine US studies and one Japanese study have been reported (Achterberg et al., 1999). As regards the process measures, in the US, the most positive effect of the RAI reported was an improvement of the comprehensiveness and the accuracy of the care plans (Hawes et al., 1997). In Japan, improvements were found in the quality of care too (Ikegami et al., 1998). Negative judgements of RAI were found in interviews with American nursing staff, who objected to the mandatory introduction of the RAI (Philips et al., 1997). The most recent study on the effects of RAI, conducted in Sweden found that the nursing staff developed an increased understanding of the patient's abilities by using the RAI. Most of the staff also thought that the instrument improved the documentation in nursing records (Hansebo et al., 1998, 1999). With regard to outcome quality, in a study conducted in the US, the RAI method showed most positive effects on the health condition, particularly on the prevalence of dehydration and static ulcers). On the other hand, more daily pain was registered (Fries et al., 1997). In a study of Mor et al. (1997), RAI showed positive effects on hospitalization rates. With regard to psychosocial outcomes, fewer positive effects were found. In respect of "understanding others", "sad moods" and "unsettling behaviour", less decline was observed but also less improvement (Philips et al., 1997). However, all the effects found were based on non-controlled experimental designs, usually before and after designs.

Although some studies are available about the effects of the RAI, there is a lack of information about effects of the RAI on residents' experience and well-being. The expectation that an accurate assessment using RAI will really lead to residents' needs being better met has not been investigated before. For these reasons, we conducted a study to investigate the effects of RAI in Dutch nursing homes. Dutch nursing homes are multifunctional institutions for patients with chronic disorders, physical and/or mental disabilities and handicaps. The type of care can be characterized as continuous, long-term, systematic and multi-disciplinary (Ribbe, 1993). The effects of the implementation of the RAI on the needs for nursing care as perceived by the residents in relation to the care supplied by the nursing staff were investigated. The research question was: What is the effect of the implementation of the RAI on the level of perceived gaps between residents' needs and nursing care received?

The forecast was that the assessment using RAI would provide more accurate information about the residents' needs. Individual care plans would be formulated on the basis of this information. In this way, the RAI would facilitate and improve the coordination of nursing care in making up care plans and in communication with other disciplines. Consequently, proper assessment, good quality of care and care supplied would lessen the gap between the residents' needs and nursing care supply.

There does not appear to be much research about the extent to which the needs of patients are met. Most of the studies investigated the agreement in perceived needs as judged by nurses and residents. For instance, a study conducted in a psychiatric ward in England investigated the accuracy of nurses' perceptions of patients' needs. It was found that nurses' inability to perceive patients' needs on an individual basis was consistent with other studies which suggest that nurses use stereotypes when perceiving patients' needs (Farrell, 1991). The present study investigated the number and type of gaps between needs and care supply from the perspective of the residents.

2. METHOD

2.1. Design

The study was conducted in a non-randomized controlled design. An experimental group and a control group, recruited from six experimental and eight control wards in 10 different nursing homes were compared during a pre- and a post-test. After the pre-measurements, the experimental wards started to implement the RAI. Data collection took place 1 month before and 8 months after RAI implementation.

2.2. Sample

Nursing homes which planned to implement the RAI were asked to participate. Controls were recruited from the same nursing home when the RAI implementation was not conducted in all wards simultaneously, or from comparable other nursing homes. Four nursing homes included an experimental as well as a control ward, two nursing homes could only include experimental wards. Four additional nursing homes were selected for the recruitment of matched controls to achieve the requested sample size of 300 subjects. Matching took place on several ward characteristics such as the nursing system and ward policy concerning admission criteria, attitude towards deviant behaviour of residents, social-recreation activities, family involvement and the health services of other disciplines, using a checklist of 46 items. The sample size was based on detection (at $\alpha=0.05$) of a medium intervention effect at a power of 0.80 (Cohen, 1988). A generous 10% over sampling was designed to assure the requested sample size, taking attrition of residents into account.

The inclusion criteria for the residents were:

1. admitted for long-term care at a somatic ward with an expected remaining length of stay of longer than 9 months;
2. able to understand simple questions and to answer yes or no verbally or by pointing at the intended answer or via a family member permitted and able to answer the questions;
3. able to give informed consent in the judgement of the investigator.

Psychogeriatric, terminal and rehabilitation patients were excluded by these criteria.

During the pre-measurements 311 residents were interviewed. Interviews were held with residents (88.5%) or with family members of (11.5%) residents, because those residents could not be interviewed. In the end 175 elderly people, 61 men and 114 women participated in both the pre- and post-measurements. The flow chart (Fig. 1) shows the response and drop out of the residents during the trial. A relatively large number of participants dropped out during the study, because they died or were too ill to answer the questions. After the pre-measurements, one nursing home could not implement the RAI because of severe problems in staffing. As a consequence, 33 residents dropped out of the study. The characteristics of the residents who participated in the study are shown in Table 1. The average age was 78.9 years. Some differences in background characteristics were found between the two groups, using *t*-tests. The control group was significantly older than the experimental group and the experimental group had a significantly longer length of stay ($p \leq 0,05$). Furthermore, the diagnoses were not equally distributed over both groups. Significant differences were found, using chi-square tests, in the distributions of the diagnoses. In the experimental group, more residents had a neurological diagnosis, while in the control group more residents had a hip surgery diagnosis ($p \leq 0,05$).

[FIGURE 1]

[TABLE 1]

Analysis of the non-response on the measurements showed a difference in diagnosis for the control group. Within the control group, more dropouts were diagnosed for neurological diseases.

2.3. Measuring instruments

A questionnaire was developed to measure the unmet needs of the residents, that is, the existence of a gap between the resident's care needs and the care received. The questionnaire was administered during a face-to-face interview with the residents. The residents were first asked whether or not they needed help with a certain activity or problem, and next whether or not they received this help.

The needs were divided into three categories (see Table 3):

1. Physical needs, that is, the need for help with activities of daily living (ADL), such as bathing, dressing and walking (10 items).
2. Needs in using aids and facilities, such as hearing and visual aids, use of telephone or a taxi (13 items).
3. Psycho-social needs, such as help needed in coping with feelings of sadness and depression, family problems and acceptance of physical deterioration (11 items).

[TABLE 3]

When the resident expressed the need for help in a certain area and did not receive this care, it was accounted as a gap. An index (number of gaps divided by total number of answered items, multiplied by hundred) was computed for each category and for the total questionnaire, ranging from a minimum of 0% (no gap) to a maximum of 100% (maximum gap between needs and care supply).

The effects of the RAI are influenced by the success of the implementation. To gain insight into the process of the implementation of the RAI, interviews were held with the nursing managers of the experimental and control wards during the post measurements. These were semi-structured interviews. The nursing managers of the experimental wards were interviewed about factors that hindered or facilitated the implementation of the RAI. Further, they were questioned about changes in the care resulting from the RAI implementation. Finally, the managers of both the experimental and control wards were asked about other changes that could possibly have influenced the residents' perceived gaps in needs and care supply.

2.4. Intervention and procedure

The participating nursing homes, which planned the RAI implementation, all followed the same procedure for the implementation. All nursing homes started with a workshop about RAI. Then, in each nursing home a project group was formed and trained on a 4-day course in the use of RAI. The principles of assessment were taught and practice sessions were used to assess patients on this course. The RAI manual was used as an educational tool for the staff. The project group was responsible for further education and implementation in the nursing home. The way this training and implementation was carried out was basically the same for each nursing home, but could differ in detail. In a course of 16–24 h, depending on the program of each nursing home, the caregivers were trained in the use of the RAI. Directly after the implementation program, the residents were assessed with the Minimum Data Set (MDS) after the pre-measurements and 3 months later as a follow-up. Data collection took place in a fixed order, starting before the implementation program, before the residents on the experimental wards were assessed using RAI for the first time. First, the residents who signed the informed consent were approached for a face-to-face interview. During this interview, the questionnaire on the perceived gaps in needs and nursing care supply was used. The research assistants administering the questionnaires did not know whether the residents were from the experimental or control group. The duration of the interview was, on average, 20 min. After 8 months, the same data collection procedure was used during post measurement. One nursing home, one experimental ward and one control ward, did not participate in the post measurements because they had dropped out of the study as RAI implementation did not take place in the designated period. Participation of these groups would have

led to biased results; inclusion of the experimental ward would also diminish a possible effect of the implementation. Inclusion of the control group exclusively would lead to incomparable groups.

2.5. Analysis

The analyses evaluated the 175 residents who participated in both the pre- and post-test. To gain insight into the extent to which the residents perceived care needs, indices were calculated for perceived needs (number of perceived needs divided by the total number of items answered on care needs, multiplied by 100). The indices were computed for each separate category and for the total number of care needs, ranging from a minimum of 0% (no care needs) to a maximum of 100% (maximum perceived care needs). Next, the indices of perceived gaps between perceived needs and received nursing care were calculated.

Variations between the experimental and control group in changes in perceived gaps, found between the pre- and post-measurements were tested using regression analysis. Difference scores, the dependent variables in the regression analysis, were calculated by subtracting the percentage of perceived gaps during the post-test from the percentage of gaps perceived during the pre-test. Difference scores were calculated for the total score of perceived gaps as well as for the separate categories. Logistic regression was used for the separate categories because the residuals were not normally distributed. The difference scores were dichotomized as score 1 when a decrease was found in the percentage of care gaps and score 0 when there was no change or an increase in perceived care gaps. The residuals were normally distributed on the total score of change in gaps. Accordingly, linear regression was used to test the effect of the RAI implementation.

One background variable, length of stay, was included in the analysis, to correct for the differences between the control and experimental group, because there could be a relation between the change in perceived care gaps and length of stay. The expectation was that a longer length of stay would make a change in perceived gaps more difficult. No relations with the dependent variable were expected for age and diagnosis. For this reason these variables were not included as co-variables in the analysis. The analysis was completed on an intention-to-treat basis. All residents who participated in the pre- and post-test were included in the analysis, regardless of the extent to which the RAI implementation and application had been completed as planned (first assessment and 3 months follow-up), on the experimental wards.

3. RESULTS

3.1. Perceived needs and perceived gaps

Before answering the main research question, the distribution of percentages on care needs are given, to provide more insight into the extent to which residents perceived care needs at the pre- and post-test for both groups (Table 2). The residents' needs were most frequent for physical needs and the needs relating to aids and facilities. The least need for help was perceived in psychosocial aspects. Comparing the pre- and post measurements, it was found that the experimental group had an increased need for help (during the post measurements) while the need for help in the control group decreased.

[TABLE 2]

Care discrepancies were expressed in the difference between the recognized need for help in relation to the care received. A gap means that the need for help was perceived but the care was not received. In Table 3, the presence of perceived gaps are presented. The number of patients who perceived a gap between the need for help and the care supplied was low for the physical needs in particular, with the consequence that a lot of residents had a score of 0%. Consequently, the extent of perceived care gaps was dichotomized. As regards physical needs, most gaps were perceived in respect of walking.

The number of residents with perceived gaps were larger in the area of aids and facilities. As regards the perceived gaps of needs with aids and facilities, most discrepancies were found in visual and hearing problems. Most gaps were perceived in the psycho-social area. The items where most gaps were perceived involved help with feelings of sadness and depression, contact with other residents and in striking up conversations.

3.2. Effect of the RAI on perceived gaps

To test the hypothesis that the implementation of the RAI would lead to a decrease in perceived gaps, regression analysis was executed. The results are shown in Table 4. Logistic regression was executed to separate sub-scales, because of the skewness in the distribution of the residuals.

[TABLE 4]

No significant differences were found in changes between pre- and post-test in the experimental and the control groups on the sub-scales. As regards the odds ratios, the odds were the highest in the psycho-social area. This means that the chance of a decrease in the experimental group was twice as high as in the control group. A lot of residents had missing values in this area. It was the last part of the interview and a lot of residents did not finish it. Linear regression was executed for the total changes in perceived gaps. The decrease in gaps was significantly larger in the experimental group.

3.3. Process of the implementation of the RAI

To gain insight into the process of the implementation, semi-structured interviews were held with the care managers of each participating ward during the post measurements. The experimental wards implemented RAI. During the 8 months between the pre- and post measurements, the residents were planned for assessment at three points in time; at the beginning, after 3 and after 6 months. Three wards completed the first assessments, the other three completed it partially. The follow-up after 3 and 6 months was partially done by three wards and three wards did not. One nursing home used RAI on a computer network, three wards used a stand-alone PC to enter the data. The other two wards did not use RAI on computer because there were problems with the installation of the software. They had to complete the RAI manually. From the interviews, three main factors can be distinguished that influenced the implementation of the RAI. First, almost all the wards noted that implementation was delayed because of understaffing. Due to a high level of absence as a result of sickness, there was not enough qualified staff to manage implementation. Two wards also indicated a high turnover of staff. Second, all the wards had problems with the computerized use of the RAI as described above. Last, the implementation of the RAI cost more time than had been expected. Since the RAI could not be entirely computerized, manual use cost too much time. Some wards planned for extra staff during the implementation, but could not always get it.

Problems with staffing were not only noted in the experimental wards. The control wards also noted staffing problems and a high level of absence through sickness. One nursing home which included an experimental and a control ward moved between the pre- and post-test. This could have influenced the change in residents' perceived care gaps in a negative way. They needed time to get used to their new environment. However, no difference was found in changes compared to the other nursing homes. In answer to the question of whether there were changes in the care due to RAI implementation, two wards noted that multi-disciplinary consultation was more structured following the MDS and the RAPs. One ward noted that after the implementation, the nurses started to participate in the multidisciplinary consultation. They presented the resident using the MDS, they have a specific task in the consultation. Three wards indicated that the administrative work of the nursing staff increased as a result of the RAI implementation.

4. DISCUSSION

4.1. Conclusions

The goal of this study was to determine the effects of the implementation of the RAI on the perceived gaps between residents' needs and nursing care received. It was expected that the implementation of the RAI would lead to a more accurate assessment of residents' individual needs and consequently to better meeting these needs. The main finding of the study was that the change in total score on perceived gaps between residents' needs and received care varied significantly between the experimental and control group. The experimental group decreased more strongly in their perceived gaps than the control group. This finding supports the hypothesis that, by the nature of the instrument, assessment using RAI leads to better meeting residents' needs. However, no significant differences

were found between the experimental and control group as regards the separate categories of perceived gaps.

The perceived gaps were seen most in the psychosocial area. This is similar to findings of other studies. In a study of the quality of nursing home care, Mattiasson and Andersson (1997) found most discrepancies between importance of social relations and contact with the staff, as perceived by the residents, and the perceived options of having contact with staff and other residents. The results pointed out a lack of intimacy in daily living. In a study into the description of patients' problems by nurses on two medical wards of a general hospital, the problems identified predominantly were bio-physical needs with scant attention given to psycho-social needs (Griffiths, 1998). In this study, the perceived gaps in the psycho-social area were fewer during the post-measurements both for the experimental and for the control group. The least gaps were perceived in the physical care although the perceived need for help was greatest in this area. It seems that needs for help, which arise frequently, are also better recognized by nurses. Physical needs seemed to be more perceptible to nurses too. The perceived gaps in the need for help with visual and hearing problems are notable. The question is how accurately nurses re-assess the residents in the presence of visual and hearing problems. This study was the first study to investigate the effects of the RAI in a controlled group design. Since little attention was given to the residents' perspective in previous RAI evaluation studies, it is difficult to compare the outcomes of this study with those of former ones. In another part of this study, improvements were found in the quality of coordination of care. Specifically, taking case history improved after the RAI compared with the control group (Achterberg et al., 1999). This also supports the expectations that a better assessment will lead to better meeting residents' needs. During the most recent study on the effects of the RAI in nursing home wards in Sweden, improvements after the RAI implementation were found in the formulation of the care plans. However, the notes within the medical treatment theme tended to show the greatest improvement (Hansebo et al., 1999). Though psychosocial wellbeing was represented in the RAI/MDS in the study, the documentation did not verify it as a priority in delivered nursing care.

4.2. Methodological reflections

Although the study was conducted in a controlled trial, it was not possible to carry out a randomization procedure. The nursing homes that planned the RAI implementation had to be included in the study. When it was not possible to include a control group from the same nursing home, comparable nursing homes were selected as matched controls. Despite the checklist used to find comparable nursing homes, the nursing homes were not homogeneous in terms of population. A randomization procedure at the level of nursing home wards could have prevented differences between background characteristics between the experimental and control group. The residuals in the regression analysis of difference scores in the perceived gaps among the separate categories were not normally distributed. The change in perceived gaps therefore was dichotomized. The disadvantage of dichotomizing is the loss of information. This could have led to an underestimate of possible effects of the RAI on the separate categories of perceived gaps, considering the odds ratios.

The experimental group showed an increase in perceived needs while they perceived fewer gaps during the post-measurements in relation to the perceived care needs. Regardless of their increase in care needs, the nurses seemed to meet the needs of the residents better. The control group scarcely increased in terms of perceived care needs while the decrease in perceived gaps was smaller. On the other hand, the control group had a lower score on the perceived gaps than the control group during the pre-measurements. Therefore, the possibility of a decrease in perceived gaps might have been smaller for the control group. However, the scores did not differ significantly between the experimental and control group.

Another problem was the large number of drop-outs; only 175 residents participated in both, the pre- and post-test. A lot of residents died during the study or were too ill to answer the questions during the post-measurements. The dilemma in this study to choose the right time span between pre- and post-test was the time needed for the implementation of the RAI on the one hand and the large drop out of the long stay nursing home residents on the other hand. The time span between the pre- and post-measurements was too short to complete a labour intensive implementation of the RAI; an 8 months follow up. In this period, 2 or 3 RAI assessments for each resident were planned, following the implementation scheme. By the nature of the RAI instrument we expected higher results in the

experimental group (less gaps) than we actually found in this study. The RAI implementation in Dutch nursing homes, however, has not been unproblematic and frequently did not proceed according to the implementation plan in the wards we studied. A longer follow-up, however, would lead to an even greater longitudinal attrition.

Difficulties in obtaining qualified staff and operational RAI-software resulted in delayed and adjusted implementation. All the participating wards viewed this problem as the major possible single factor influencing the perceived gaps of the residents.

4.3. Future research and practical implications

Patient assessment is the first step in the nursing process. The results of this study give an indication that better assessment leads to better meeting residents' needs. Despite the methodological problems, i.e., the large drop out, the differences in background characteristics, etc., there is still a positive effect. It is not known to what extent nurses integrated the findings of the assessment in the rest of the nursing process.

In future, research attention should be paid to the way nurses can use the information obtained with the MDS effectively throughout the nursing process. It seems that the training and instruction concerning the RAI method focussed on the use of the MDS, and less on the use of the RAPs and how to incorporate the comprehensive information on a resident in everyday care for that resident. This prompts adjustment training and implementation programs, at least in the Netherlands. Future training could concentrate on the use of the RAPs, specifically the psychosocial items such as psychosocial wellbeing, behaviour problem and mood state. Further, the availability of practical software, with the possibility of giving feedback to nursing homes on their process and outcome quality, needs further attention. Finally, psychosocial care gaps experienced by nursing home residents should be explored in more detail. Future research is needed to determine the quality of the RAI in the assessment of the psycho-social needs of nursing home residents.

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APPENDIX. THE RESIDENT ASSESSMENT INSTRUMENT

The RAI is a method for comprehensive functional assessment of nursing home residents, with the object to guide the development of individualized care plans.

RAI consists of:

- a Minimum Data Set (MDS),
- an identification of problem areas,
- specific Resident Assessment Protocols (RAPs),
- a users manual.

The MDS is a core of assessment items that provides a comprehensive picture of each resident's functional, cognitive and emotional status and a variety of other areas, including resident's strengths, preferences and needs (see MDS sections in the following table). The full MDS assessment is repeated yearly. In addition, a quarterly review is done with a subset of MDS assessment items. This review is intended to monitor the resident's response to the care plan and determine whether sufficient change has occurred to trigger a more comprehensive assessment.

Problem areas are identified by applying a set of algorithms to a resident's MDS data, that will suggest problems, risks for development of a problem, or potentials for improved function.

The 18 condition-focussed RAPs (see the following table) specify additional assessment of identified problem areas in the resident's status. The protocols are intended to more directly link the MDS information to care plan decisions. Facility staff then use the more specialized assessment guidelines found in the RAPs to identify potentially treatable causes and focus decisions about the resident's plan of care and services.

The user's manual provides detailed specifications about how to complete the MDS and RAP assessment process (e.g., interviewing staff, residents and family members, reviewing records) and

contains item definitions, examples of coding options and clinical guidelines for using the RAPs to develop care plans.

Minimum data set items (MDS)	Resident assessment protocols (RAPs)
Background and customary routines	Delirium
Communication/hearing patterns	Visual function
Physical functioning and structural problems	ADL functional/rehabilitative potential
Mood and behaviour patterns	Psychosocial well being
Disease diagnoses	Behaviour problem
Oral/nutritional status	Falls
Skin condition	Feeding tubes
Special treatments and procedures	Dental care
Cognitive patterns	Psychotropic drugs
Vision patterns	Cognitive loss/dementia
Continence	Communication
Activity pursuit patterns	Urinary incontinence and indwelling catheter
Health conditions	Mood state
Oral/dental status	Activities
Medication use	Nutritional status
	Dehydration/fluid maintenance
	Pressure ulcers
	Physical restraints

TABLES AND FIGURES

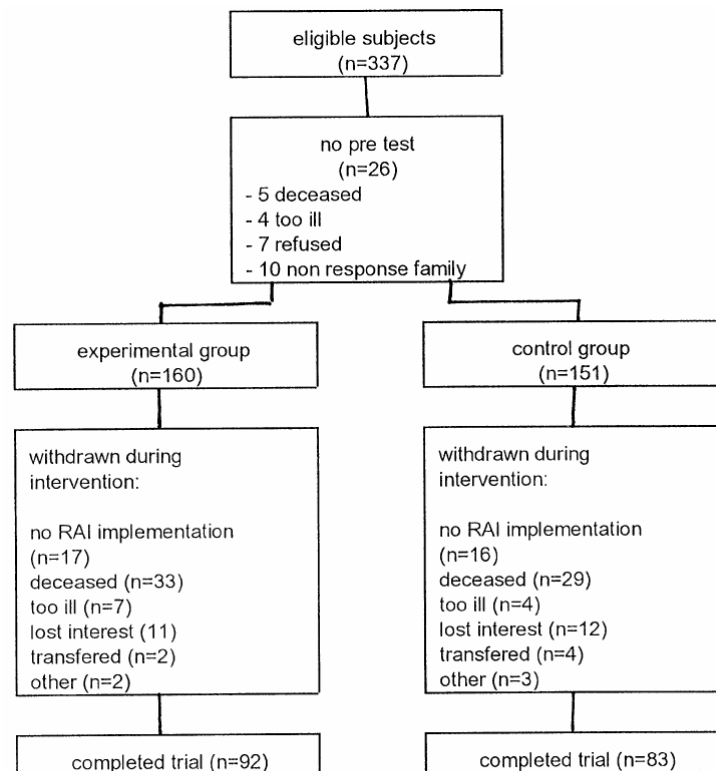


Fig. 1. Flow chart of the trial.

Table 1

Characteristics of the residents who participated in the pre- as well as the post-test in the experimental and control group and those who only participated in pre-test

	Pre and post		Only pre	
	Exp	Control	Exp	Control
<i>n</i>	92	83	68	68
Sex/female (%)	64.1	66.3	66.2	60.3
Age	76.1	83.4	80.6	79.3
Length of stay (Yr)	6.6	3.4	4.4	3.5
Diagnosis				
CVA (%)	41.2	37.1	33.3	37.8
Parkinson (%)	4.6	10.0	6.1	1.9
Multiple sclerosis (%)	11.5	0.0	6.1	1.9
Other neurological disease (%)	14.9	4.3	12.1	15.9
Hip surgery	1.1	8.6	4.5	3.8
Other (%)	26.7	40.3	37.9	38.7

Table 2

Distributions of perceived needs by the nursing home residents during the pre- and post-test (*n* = 175)

Perceived needs in:	Experimental group (<i>n</i> = 92)				Control group (<i>n</i> = 83)			
	Pre-mean	(SD)	Post-mean	(SD)	Pre-mean	(SD)	Post-mean	(SD)
Physical needs	68.0	(27.5)	68.8	(26.7)	64.1	(29.5)	63.9	(31.9)
Needs with aids and facilities	58.5	(27.8)	78.3	(20.9)	67.7	(30.7)	67.7	(26.7)
Psychosocial needs	34.2	(23.3)	37.5	(37.0)	39.7	(36.2)	33.9	(37.7)
Perceived needs total	53.6	(19.8)	62.0	(20.6)	58.1	(24.9)	57.8	(23.2)

Table 3

Number of residents with perceived gaps between needs and received care during the pre- and post-test (*n* = 175)

Perceived gaps in	Experimental group (<i>n</i> = 92)		Control group (<i>n</i> = 83)	
	Pre <i>n</i> (%)	Post <i>n</i> (%)	Pre <i>n</i> (%)	Post <i>n</i> (%)
Physical needs	8 (9.3)	3 (3.4)	7 (9.1)	4 (5.5)
Needs with aids/facilities	25 (29.4)	20 (23.0)	13 (16.5)	16 (20.5)
Psychosocial needs	47 (62.7)	30 (50.0)	31 (54.4)	22 (45.8)
Perceived gaps total	53 (58.9)	43 (48.3)	38 (46.9)	33 (40.7)

Table 4

Effect of RAI implementation on gaps between needs and received care (*n* = 175)

	Effect on change in gaps (β)	Confidence interval	Odds ratio
Logistic regression:			
Physical needs	0.64	(-0.64, 2.12)	1.9
Aids and facilities	0.37	(-0.50, 1.24)	1.45
Psychosocial needs ^a	0.7	(-0.32, 1.73)	2.02
Linear regression:			
Perceived gaps total	5.14 ^b	(0.11, 10.18)	—

^a Data on only 83 residents were available.

^b Effect of RAI implementation on change in gaps was significant on the $p \leq 0.05$ level.

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