Factors to Make the VIPS Practice Model More Effective in the Treatment of Neuropsychiatric Symptoms in Nursing Home Residents with Dementia

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Key Words
Dementia · Depression · Non-pharmacological treatment · Neuropsychiatric symptoms in dementia

Abstract
Background/Aims: A recent cluster-randomized controlled study showed that the VIPS practice model (VPM) for person-centred care had a significant effect on neuropsychiatric symptoms in nursing home residents with dementia. The randomized controlled trial (RCT) indicated that a substantial proportion of the total variance of the effects was related to conditions in the particular unit (ward). We have explored which factors explain the variance of the effect of the VPM. Methods: The VPM subset of data from the RCT was explored using multilevel linear regression. The dependent variables were the change in scores on the Neuropsychiatric Inventory Questionnaire (NPI-Q) and the Cornell Scale for Depression in Dementia (CSDD). Results: The unit in which the resident was living explained 22% of the VPM’s total variance of the effect on the NPI-Q and 13% of that on the CSDD. The intraclass correlation coefficient at the unit level was explained mainly by unit size on both scales and was considerably higher than at the institutional level. Conclusion: The unit is the most influential level when implementing person-centred dementia care by use of the VPM. The unit size explains most of the variance of the effect of the VPM, and the effects were best in the small units.

Introduction
Treatment of neuropsychiatric symptoms (NPSs) in persons with dementia living in nursing homes is important mainly because these symptoms are distressing for the residents [1], but also because they are stressful for those who care for the residents [2–5]. Depression is one of the most frequent NPSs in dementia, and the highest rates are found in nursing home
studies [3, 6–9]. As psychotropic drugs have only a modest effect on NPSs and may cause severe side effects [10], non-pharmacological treatment is recommended as the initial treatment approach [11, 12] for NPSs, including depression. Person-centred dementia care (PCC), introduced by Kitwood [13], has been widely accepted and recommended as good quality care that has the potential to prevent and reduce NPSs [14, 15]. The elements in PCC have been summed up and described by Brooker [16] in the ‘VIPS framework’ as valuing people with dementia (V), individualized care (I), understanding the world from the resident’s perspective (P) and providing a social environment that supports the needs of the resident (S). The VIPS practice model (VPM) has recently been developed to implement person-centred care in nursing home units by the systematic use of the VIPS framework [17, 18].

A multilevel randomized controlled trial (RCT) conducted in 2011 in Oslo, Norway [19] tested the effect of two interventions based on PCC, the VPM and Dementia Care Mapping (DCM), on NPSs among residents in nursing homes compared to lectures about dementia on DVD delivered to the staff for free use as the control condition. It was hypothesized that DCM and VPM would be more effective in reducing agitation and other NPSs in nursing home residents than giving the staff lectures about dementia on DVD. Furthermore, it was hypothesized that the interventions would improve the residents’ quality of life. The RCT showed that the implementation of both PCC methods had a significant effect on NPSs, as measured by the 10-item version of the Neuropsychiatric Inventory Questionnaire (NPI-Q) [20], compared to the control group. In addition, DCM had a significant effect on quality of life measured by the Quality of Life in Late-Stage Dementia scale [21], compared to the control group, whereas the VPM had a significant effect on depression, as measured by the Cornell Scale for Depression in Dementia (CSDD) [22], compared to the control group. The effects of the two methods implied not only a reduction in NPSs, but also the prevention of exacerbation of these symptoms.

Two other studies on the effect of PCC in nursing home populations have found reduction in the use of antipsychotic drugs [23] and decreased agitation in residents [24], respectively.

However, the RCT carried out in Oslo, Norway, indicated a great variation in the effect between the units (wards) taking part in the study. The intraclass correlation coefficient (ICC) at the unit level was relatively high, 16% for both the NPI-Q and CSDD, indicating that a substantial proportion of the total variance of the effects was related to conditions in the particular unit. In other words, the unit constituted a contextual variable that influenced the effects of the VPM. The ICC represents a measure of dependency in the data. It is defined as the proportion of the total variance of the outcome that is attributable to a contextual variable [25, 26], e.g. that the conditions in a unit have an influence on the behaviour of the residents.

To optimize the effect of the VPM, we need to know more about which variables contribute to the successful implementation of the VPM. Thus, we designed a study aiming to explore the variance of the effects of the VPM intervention separately.

**Methods**

**Study Design**

The present study is a substudy of the RCT carried out in Oslo in 2011, which was an intervention used with the staff (group level), with outcomes measured on the residents (individual level) at baseline and 10 months later.

The nursing homes in the RCT were randomized into three groups. To avoid contamination between units, the staff of all the units in each nursing home received the same intervention. One group of nursing homes was given an intervention with DCM, the next group had an intervention with the VPM and the last group constituted a common control group for both intervention groups. All three groups received 5 DVDs with lectures (30 min each) about dementia. However, the staff of the control group received only this intervention.
Randomization was done by drawing lots (2 small, 2 medium and 1 large nursing home in each group). The assessors were independent as they were not part of the research group. The trial was registered in Clinical Trial (http://clinicaltrials.gov/) in January 2011 (study ID number: NCT 01280890) and approved by the regional ethics committee for medical research in eastern Norway (REK-east).

The VIPS Practice Model

The main element of the VPM is a weekly structured meeting in a nursing home unit lasting for 45–60 min with set roles using the VIPS framework to analyse an interaction between a resident and a nurse in a situation where the resident has been exhibiting NPSs. The leading registered unit nurse (RN), an auxiliary nurse from each unit and an RN appointed as the VIPS coach in each nursing home that took part in the study attended a 3-day basic course, conducted by the researchers, focusing on PCC and functions in the VPM. The directors of the nursing homes were also invited. The VIPS coach then conducted a 3-hour introduction to PCC and the VPM for the rest of the staff in their nursing home. External VIPS experts did not visit the nursing homes during the implementation process, so the VPM relied entirely on internal facilitators (the staff who had attended the 3-day basic course).

Participants

In Norway, domiciliary nursing and nursing home care are within the jurisdiction of the local authorities. The public health care system is the main provider of nursing home services, although private care providers are playing a growing but still modest role. The nursing home population mainly comprises people of Nordic ethnic origin. The traditional way of organizing nursing homes in Norway is to run units of 20–25 residents with an RN as the administrative leader. The main types of units are regular units (RUs) and special care units (SCUs) for persons with dementia. RUs are sometimes divided into smaller subunits with fewer residents; the SCUs may have separate strengthened subunits (SSSCUs) for residents with severe NPSs. A nurse may have a limited leading function in these smaller subunits, but is not perceived as the authoritative leader by the staff group. How the work and cooperation between the smaller subunits inside a unit is organized differs considerably. In some units, the smaller subunits are distinctively separated while in others they cooperate closely. The mean number of beds in an SCU is 7.9 [27]. The mean staffing ratio is 0.30 for RUs and 0.35 for SCUs. The proportion of unskilled staff is 11.9% in RUs and 12.6% in SCUs [28].

All 51 nursing homes with more than 30 beds located in the city of Oslo, Norway, were invited to participate in the RCT. After receiving information about the study, 15 nursing homes accepted the invitation, but one of them withdrew after randomization.

Criteria excluding residents from taking part in the study were a severe physical disease or a short life expectancy. If competent, the residents gave written informed consent. The next of kin of residents lacking the capacity to give informed consent were given the opportunity to decline participation on behalf of the resident, basing their decision on written information. For more details of the RCT, see Rokstad et al. [19]. Eventually, 14 nursing homes with a total of 40 units housing 624 residents with a diagnosis of dementia were included in the RCT.

Of the 624 residents, 189 in 13 units in 4 nursing homes were allocated to the VPM intervention group at baseline. The mean size of the units was 21 residents (min 12, max 29), but the effects of the intervention were not evaluated in all the residents in all units. Of the 189 included residents, 49 died and 2 moved out of the nursing home (51, 27%) before the 10-month follow-up measurement. Thus, a total of 138 residents with dementia in 13 units were analysed 10 months later in the VPM intervention group with a mean number of 10.7 residents (min 3, max 21) in each unit.

Dementia Diagnosis

The dementia diagnoses were made by two experienced geriatric psychiatrists in our research group using all the available information from the residents’ nursing home records and the information obtained in the RCT.

Outcome Variables

The dependent variables in the present study were changes in score on the NPI-Q and the CSDD from baseline to the 10-month follow-up. These changes were statistically significant after implementation of the VPM in the RCT.

The NPI-Q contains the items delusions, hallucinations, agitation, depression, anxiety, apathy, irritability, euphoria, disinhibition and aberrant motor behaviour. The symptoms were recorded as present or not
The severity of the symptom was scored from 1 to 3 giving an item score ranging from 0 to 3 and a sum score ranging from 0 to 30. A higher score indicates more severe NPSs [20].

The CSDD is a commonly used scale for measuring depression in dementia. The scale has 19 items evaluating various symptoms of depression. Each symptom is rated on how often it occurs (0 = never, 1 = periodically and 2 = often). The scale also provides the option for scoring ‘not possible to evaluate’. The minimum score is 0 and the maximum score is 38. A higher score indicates more severe depression [22].

**Explanatory Variables**

The degree of dementia was assessed by the Clinical Dementia Rating scale [29], a 6-item questionnaire that records information about the resident’s cognitive and functional capacity. Using an algorithm, the severity of dementia is staged as none, possible, mild, moderate or severe. Adding the scores of each item generates the ‘sum of boxes’ (0–18), which is highly correlated with the Clinical Dementia Rating scale score [30].

General physical health was assessed using a modified version of the General Medical Health Rating scale categorizing the residents’ physical health as very good, fairly good, bad or very bad [31]. The residents’ characteristics such as age and gender were obtained from the nursing home records.

Information on characteristics of the units was acquired by interviewing the RN in charge, using a questionnaire asking for type of unit, number of residents per unit and resident-staff ratio on day shifts.

**Statistical Analysis**

The subset of the data from the RCT with the focus on the residents, units and nursing homes allocated to the VPM intervention group was analysed.

We used a multilevel linear regression model with changes in score on the NPI-Q and the CSDD from baseline to the 10-month follow-up as the dependent variables. Multilevel analysis is an extended logistic regression analysis which can be used when data are structured in levels (e.g. resident level and unit level). It provides an estimation of the variance at for instance the unit level (difference between units) that corrects for dependency in the data (e.g. conditions in a unit influencing the residents) [25, 26].

The data were treated in a hierarchical manner with the residents’ data on level 1 and the unit data on level 2, because the residents constitute the first level in a hierarchy of data where the units could be seen as the second-level variable and the nursing home as the third-level contextual variable.

The analysis has three stages. First, we calculated the ICC without any predictor variable in the model (the ‘null’ model; fig. 1). In the second stage, we tested each of the possible variables. Lastly, as a result of the findings, the institution was treated as level 2 (cluster) and the residents as level 1.

**Fig. 1.** Details of the statistical procedures.
To analyse the effect of the unit as a contextual variable, we built a hierarchical multilevel linear regression model. As such models take possible correlations between members of the same cluster into account, it helps prevent false significant findings. The software package MLWIN 2.25 (Bristol, UK) was used.

We first calculated the ICC as described above. To find the model that best explained the variance of the ICC, we then performed a univariate linear regression for each of the explanatory variables with the NPI-Q and CSDD as dependent variables. We used the results to construct the multivariate linear regression model with a resident level and a unit level as described by Hox [26]. The model was built stepwise adding the variables that explained most of the variance in the univariate analysis first. The variables that did not explain any of the variance were not included in the model.

Table 1 shows the characteristics of the residents by type of units. We found significant differences between the units with respect to the residents’ age, the severity of dementia and the resident-staff ratio on a day shift.

There were no significant differences between the residents that dropped out of the study and those who completed the follow-up period regarding the scores on the CSDD and the NPI-Q or any of the resident and unit characteristics, except for the general physical health status. Those who dropped out before the 10-month follow-up measurement had poorer general physical health (p = 0.02).

On the NPI-Q and the CSDD, we found mean changes in scores between baseline and the follow-up at 10 months of −0.70 (SD 6.1) and −0.86 (SD 6.0), respectively. The changes were fairly normally distributed (fig. 2, 3). Thus, these mean values of change could be used as outcome variables in the linear regression models. A negative change should be interpreted as a reduction in symptoms; a positive change represents an increase in symptoms.

Table 2 shows the unadjusted mean changes in scores on the CSDD and NPI-Q after 10 months as a measure of the effect of the VPM on depression and NPSs at the unit and nursing home level. ANOVA showed a significant difference on the NPI-Q (p = 0.002) but not on the CSDD (p = 0.065) at the nursing home level. A post hoc analysis showed that the mean change on the CSDD was significant (p = 0.047) between institutions 1 and 2.
Fig. 2. Mean change in score for the NPI-Q between baseline and follow-up.

Fig. 3. Mean change in score for the CSDD between baseline and follow-up.
The ICC was higher for the unit level (13.3% for CSDD and 21.5% for NPI-Q) than for the institutional level (2.9% for CSDD and 7.8% for NPI-Q). The residents in institution number 2 exhibited an increase in symptoms as measured on both scales for both units.

Table 3 shows the extent to which the variance of a change in NPI-Q score and CSDD score was explained at the resident level (R₁²) and the unit level (R₂²) by the multivariate regression model. Regarding the ICC for the CSDD at the unit level, the model explained 51.3%, which is 6.6% (0.13 × 0.51) of the total variance of the CSDD. Of the remaining 86.7% variance of the CSDD (among the residents), 15.8% can be illustrated by the model, which is 13.9% (0.16 × 0.87) of the total variance of the CSDD.

Regarding the ICC for the NPI-Q at the unit level, the model explained 45%, which is 9.9% (0.22 × 0.45) of the total variance of the NPI-Q. Considering the remaining 78.5% variance of the NPI-Q (among the residents), 11.9% can be shown by the model, which is 9.5% (0.12 × 0.79) of the total variance of the NPI-Q. In total, the model explained 6.6 + 13.9 = 20.5% of the variance for CSDD and 9.9 + 9.5 = 19.4% of the variance for NPI-Q.

At the unit level, smaller units were associated with a better effect than larger units. The only StSCU was associated with less effect of the VPM compared with the SCUs and RUs. Other organizational characteristics like resident-staff ratio, use of temporary workers and characteristics of SCUs and RUs were included as factors in the analyses but did not have an impact on the effect. At the resident level, being a woman and being older were both associated with a better effect of the VPM.

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Table 2. Unadjusted mean change (SD) in score on the CSDD and NPI-Q from baseline to the 10-month follow-up measurements at the unit level and nursing home (NH) level

| Unit level | Institutional level (NH) |
|------------|--------------------------|
| Unit n/N   | CSDD | NPI-Q | NH n | CSDD | NPI-Q | p value ANOVA |
| 1<sup>a</sup> | 9/17 | 3.76 (2.26) | 1.00 (3.28) | 1 | 43 |
| 2<sup>a</sup> | 6/17 | –1.00 (4.00) | –3.33 (5.24) | 2 | –2.51 (7.38) | –1.67 (5.67) | CSDD 0.065<sup>d</sup> |
| 3<sup>a</sup> | 8/17 | –1.86 (9.34) | 0.38 (3.50) | 5 | 0.00 (1.44) | 7.67 (5.86) |
| 4<sup>b</sup> | 7/12 | –4.43 (5.71) | –2.00 (3.70) | 6 | –8.00 (5.55) | –7.00 (4.69) |
| 5<sup>a</sup> | 10/14 | –0.78 (3.83) | –3.70 (4.64) | 7<sup>b</sup> | 21/29 | 0.43 (3.74) | 1.29 (5.77) |
| 6<sup>a</sup> | 3/14 | 0.00 (1.44) | 7.67 (5.86) | 8<sup>c</sup> | 18/27 | 2.06 (3.84) | 3.00 (6.91) |
| 7<sup>b</sup> | 12/23 | –1.42 (5.48) | –2.67 (4.66) | 9<sup>a</sup> | 8/24 | 1.00 (5.97) | 3.50 (4.44) |
| 8<sup>c</sup> | 8/25 | –3.75 (5.99) | –1.00 (7.56) | 10<sup>a</sup> | 18/18 | 0.00 (6.54) | –3.11 (5.72) |
| 10<sup>a</sup> | 10/12 | –0.78 (3.83) | –3.70 (4.64) | 11<sup>a</sup> | 28 |
| 11<sup>a</sup> | 28 |
| Total | 138 | 138 |

n/N = Number of residents with data on effect/number of beds in the unit.
<sup>a</sup> RU. <sup>b</sup> SCU. <sup>c</sup> StSCU. <sup>d</sup> Post hoc analysis showed that mean change on the CSDD was significant at p = 0.047 between institution 1 and 2. <sup>e</sup> Post hoc analysis showed that mean change on the NPI-Q was significant at p = 0.022 between institution 1 and 2, and at p = 0.002 between institution 2 and 4. <sup>f</sup> Here the institution is treated as level 2 (cluster) and residents as level 1.
Discussion

Difference between Units

The already published RCT showed that the VPM had a positive effect on residents’ NPSs and depression compared with a control group. The present study, which explores the ICC, shows that there is a substantial difference in the effect between the nursing home units. The difference between the units explained considerably more of the effects (22% for the NPI-Q and 13% for the CSDD) than the nursing home of the residents did (3 and 8%, respectively).

As shown in Table 2, two RUs in the same nursing home could differ substantially. For instance, in unit number 1 in nursing home number 1, the CSDD score increased by 3.76 (SD 2.26) after 10 months, whereas it decreased in unit number 5 by –8.00 (SD 5.55). As a rule, the units showed either an increase or a decrease in both CSDD depression and NPI scores after 10 months. Only 1 of the 13 units had an increase in score on one of the scales and a decrease in the other; 2 units had no change in scores on one of the scales. This indicates that when the VPM had an effect in a unit, the effect was ubiquitous.

The influence of the environment in the unit on the residents’ behaviour and mood was also evident in the study of Zuidema et al. [32], which revealed differences in the prevalence of NPSs between SCUs that could not be explained by resident-related factors like cognition and psychoactive medication.

Impact of Conditions in the Unit

Few studies have examined whether nursing home characteristics or unit characteristics have the most influence on the effects of educational programmes for staff. The results of such studies are in line with our finding that the unit, not the nursing home, is of most importance. The study that evaluated the Wellspring model, which has PCC at the core of its philosophy [33], observed stronger variation in implementation at the unit level than at the institutional level [34]. It should be noted that the Wellspring evaluation had a limited quasi-experimental design [33, 34]. A study implementing resident-oriented care, which has much in common with PCC, found that the success factors appeared to be related to the ward (unit) level and not to the organizational or project level. Especially the supervisors’ role was crucial for a successful implementation. The study had a one-group pre-test versus post-test design [35]. A study into residents’ sedative drug utilization showed that the use of pro re nata medications

Table 3. The extent to which the variance of change in the NPI-Q score and CSDD score is explained by the multivariate regression model

| Variable    | $R_1^2$ | $R_2^2$ |
|-------------|---------|---------|
| NPI-Q score |         |         |
| By adding number of beds in unit to the model | 6.8     | 28.2    |
| By adding unit type to the model | 9.3   | 38.9    |
| By adding gender to the model | 11.7   | 45.0    |
| By adding age to the model | 11.9   | 45.0    |
| CSDD score  |         |         |
| By adding number of beds in unit to the model | 6.0   | 32.9    |
| By adding age to the model | 14.7   | 44.0    |
| By adding unit type to the model | 15.6  | 49.5    |
| By adding gender to the model | 15.8  | 51.3    |

$R_1^2$ = The proportion of variance at the resident level that was explained by the model; $R_2^2$ = The proportion of ICC (unit level) explained by the model.
was strongly determined by the characteristics of the ward (unit) the patients lived in, not so much by institutional characteristics [36].

What Organizational Characteristics at the Unit Level Influence the Implementation of PCC?

In our study, the unit characteristic that explained most of the variance of the effect was the number of beds in the unit. We have not found any other studies focusing on the impact of unit size or another unit characteristic on the variation in the effect of the implementation of PCC. We did find studies focusing on the association between unit size and residents’ NPSs, which may have an impact on the implementation of PCC. The findings of these studies diverge. Zuidema et al. [32] found no association between unit size for SCUs and the prevalence of residents’ NPSs. The study by Sloane et al. [37] found an association between small unit size of SCUs and a low level of resident agitation.

The type of unit was the second strongest explanatory variable of the ICC. This finding needs to be interpreted cautiously as our model has limited statistical power and external validity. The only StSCU taking part in this study was associated with a lesser effect of the VPM compared with SCUs and RUs. However, if the StSCU had been excluded, the type of unit would have had no impact on the result. Just 13% (18) of the residents lived in this StSCU. The unit consisted of two subunits and belonged to nursing home number 2, which was the only institution with an increase in symptoms on both scales on both participating units indicating that some institutional factors may have affected the results.

Other organizational characteristics like staffing levels and use of temporary workers did not have an impact on the effect. It has generally been concluded that higher staffing levels are associated with improved care outcomes [38]. The resident-staff ratio explained very little of the total variance of our model. The reason for this was that the ratio was almost the same in all the units due to the equal staffing strategy of the local authorities in Oslo where the intervention took place. As we do not know of any studies on the impact of the unit staffing ratio on the implementation of PCC, we have looked at studies with outcome measures that might have a bearing on the variance of the effect of the VPM. In a study on quality of care using data from nursing homes in the whole of Norway, the staffing ratio differed and the units (wards) were divided into high and low ratio groups. In that study, the staffing ratio had a clear effect [39]. However, in a review of the literature on the effect of staffing characteristics on quality of care in nursing homes, Collier and Harrington [38] concluded that the limitations of the methodology used had hindered the ability to draw definitive conclusions concerning the staffing ratio. Still, several studies published since 2001 indicate that staffing levels and quality are not linearly related. Improvement did not continue to increase nor did it increase at a constant rate after the staffing had reached a certain threshold [38]. This supports our interpretation that unit size explains most of the variance of the effect of the VPM, provided the resident-staff ratio is the same and above a minimum level.

It is maintained that the culture or climate in the team influences the implementation of innovations and changes [40, 41]. Data on the culture of care of the 13 units in our study might have provided more knowledge about the reason for the differences in effect between the units. However, both culture of care and performance of care are concepts that are extremely difficult to define and operationalize, making the basis for the assessment complicated [42]. The study of Abdelhadi and Drach-Zahavy [43] on residential homes in Israel found that the service climate in the unit was a link to PCC behaviour. This study had a cross-sectional design which precludes inferences to be drawn. The results of a study including 17 nurses and 222 patients in 5 hospital wards in Sweden indicated that care climates valuing stability and control are beneficial for PCC, but that in the implementation phase a temporary transformation into a climate of flexibility was favourable [44].
Leadership is also held to be of great importance in the implementation of innovations [40, 41, 45]. The impact of unit size on variation in the effect of the VPM may be related to the implied distance between the staff and the leader. Anderson et al. [46] found that relation-oriented leadership was related to a lower prevalence of resident behaviour problems. The VPM requires the presence of a leader with authority in a regular forum where decisions about provision of care are made to provide professional supervision and support. This secures proximity between the leader with authority and the staff. Scott-Cawiezell et al. [47] found that staff from nursing homes with low scores on quality of care complained of a lack of cohesion or team spirit. They also felt underappreciated and unheard by the leadership, in contrast to staff in high-scoring nursing homes. The study recommends that smaller neighbourhoods with an intimate environment for both staff and residents should be organized, and that the ability of nursing home leaders to empathize with the staff and facilitate communication and teamwork should be improved. A Norwegian study concluded that leaders have a central role in being continuously supportive to the care staff and taking an active part in the care practice as role models [19]. The VPM may have harnessed the potential of smaller units as it empowers the staff by giving them central roles in the decision-making process regarding daily care. The presence of the leader in this regular forum provides a natural opportunity for the leader to give feedback and recognition on the staff’s work.

Impact of Resident Characteristics

Older residents were associated with a positive effect of the VPM on the CSDD at both the resident and unit level. The fact that age explains so much of the cluster effect on the CSDD indicates an uneven distribution of residents’ age between the units. The same was the case for gender. As being female was an advantage for the effect of the VPM at both the resident and unit level, the gender cluster effect might be the result of an accumulation of women in some units.

Limitations

Most of the variance of the effect of the VPM, 78.5% of the NPI-Q and 86.7% of the CSDD, remains unexplained. Several probable explanatory variables have not been investigated in this study, for instance, the type of leadership, job satisfaction and the physical environment. The culture of care, which is not a variable in this study, is a factor that is considered influential when it comes to implementation [41].

The findings in this study are not necessarily generalizable to other settings even though the units were randomly included. Nursing homes in Oslo may differ significantly from nursing homes in Norwegian rural areas, as well as from those in other countries. However, the distribution of gender and age is quite similar to the mean regarding persons with dementia in nursing homes in Norway [39, 48].

A further limitation is that the results do not assess the quality of care as such, just changes in score after the implementation of the VPM, which might disguise a ceiling effect in some units. Neither were differences in the form of organization, special circumstances like change of leadership nor long-term sick leave among key personnel taken into account.

Conclusion

This study explored the variance of the effect of the implementation of the VPM in nursing homes. The previously published RCT showed that the VPM had an effect on NPSs and depression. The exploration of these effects showed that the ICC for the unit level was considerably higher than that for the institutional level, and that the size of the unit implying prox-
imity to the unit leader was the variable with the strongest impact. Thus, we hypothesize that organizational factors inside the unit have a stronger impact on the implementation of the VPM than institution-wide factors. As valuing the staff and their needs as well as the needs of the residents is one of the main elements of PCC, this hypothesis may apply to PCC interventions in general. We recommend that this hypothesis is subjected to further research.

Clinical Implications

The following structural and psychosocial conditions are recommended for institutions implementing PCC by the use of the VPM:

- units small enough for the leader to fulfil the leadership function described in the VPM;
- proximity between the staff and the leader with administrative, professional and perceived authority;
- staffing above the minimum level.

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