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A person-centred team approach targeting agitated and aggressive behaviour amongst nursing home residents with dementia using the Senses Framework

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A PERSON-CENTRED TEAM APPROACH TARGETING AGITATED AND AGGRESSIVE BEHAVIOUR AMONGST NURSING HOME RESIDENTS WITH DEMENTIA USING THE SENSES FRAMEWORK

I ABSTRACT

Purpose: The increase in agitated or aggressive behaviour amongst nursing home residents with dementia is a challenging problem. Such behaviour causes stress for both resident and caregiver. Many non-pharmacological interventions have been studied, but these interventions disregard the resident's unfulfilled needs and are executed by a single, designated caregiver. This study tests a non-pharmacological intervention, applied by the entire team and based on the resident's underlying needs.

Design: A pre-test and post-test, interventional study design was used, in which 65 residents with dementia that expressed agitated or aggressive behaviour. Data was collected from December 2016 until March 2017.

Method: The ABC-method and the Senses Framework were used to assign residents to either therapeutic touch, group music sessions or a meaningful individual activity. All staff members applied the interventions. Data was collected by use of the Neuropsychiatric Inventory-Nursing Home version (NPI-NH) and the Cohen-Mansfield Agitation Inventory (CMAI).

Results: The frequency of aggression, loss of decorum, depression, as well as the severity of aggression decreased for all three interventions. However, the overall severity of fear also increased. The overall prevalence of agitated of residents decreased for the therapeutic touch, group music sessions, and individual activities.

Conclusions: This study shows the possibilities of designing individualized interventions on the Senses Framework and the ABC-method for addressing agitated and aggressive behaviour amongst nursing home residents with dementia. The framework presented in this study should be further explored.

Key words: dementia, person-centred practice, behavioural change, long-term care, nursing care, older people nursing, residential care

II SUMMARY STATEMENT OF IMPLICATIONS FOR PRACTICE

What does this research add to existing knowledge in gerontology?

- A person-centred intervention to decrease agitated or aggressive behaviour could be developed by using the ABC-method and the Senses Framework.
- Person-centred interventions to decrease agitated or aggressive behaviour could also be effective when applied by the entire team.

What are the implications of this new knowledge for nursing care with older people?

- Interventions on team-level have the advantage not to be healthcare worker-dependent, meaning that the presence or absence of one specific team-member does not affect the use of the interventions.
- Because the entire staff applies the intervention, randomness in application could be avoided which upholds the daily structure of residents.

How could the findings be used to influence policy or practice or research or education?

- The Senses Framework and ABC-method should be applied when choosing interventions to address agitated or aggressive behaviour.
- Future, larger studies should provide more hands-on evidence on this approach.

III MAIN TEXT

Introduction

Agitated or aggressive behaviour is the inappropriate verbal, vocal, or motor activity that is socially inappropriate. It is manifested in three ways: abusive or aggressive toward self or others (i.e. aggression); appropriate behaviour performed with inappropriate frequency (i.e. agitation); be inappropriate according to social standards for the specific situation (i.e. agitation) (Cohen-Mansfield, Marx, & Rosenthal, 1989). International research shows that the number of nursing home residents with agitated or aggressive behaviour is rising (Stewart et al., 2014). The origin for this increase in nursing homes is twofold. On one hand, the growing population of older people in western society does not only cause an increase in the prevalence of chronic and age-related physical conditions (Jin, Simpkins, Ji, Leis, & Stambler, 2015), but also an increase in age-related neurodegenerative diseases like dementia (Aalten, De Vugt, Jaspers, Jolles, & Verhey, 2005). On the other hand persons with cognitive impairment, like dementia, are more likely to be institutionalized early in comparison to other groups of older people (Lyketsos et al., 2002). Residents with dementia, who are an increasing population group in nursing homes, are in turn more likely to show behavioural problems (Aalten et al., 2005).

Such behaviour of residents may put severe pressure on caregivers and challenge the day-to-day operations of nursing homes (Lai, Yeung, Mok, & Chi, 2009). Next to increased psychological distress, this behaviour causes professional uncertainty, a decrease in quality of care, and even a detached interpersonal relation with the residents (Edberg et al., 2008). As a consequence, searching for effective interventions to decrease this behaviour is of great importance for the nursing profession within nursing homes (Schwarzbach, Förstl, Nocon, & Mittendorf, 2012). Interventions to adress this behaviour are divided into three groups: pharmacological interventions, psychological interventions, and non-pharmacological interventions.

While pharmacological interventions are most often used due to their cost-effectiveness and low increase in workload, pharmcological interventions also severely decrease the quality of life of nursing home residents (Azermi et al., 2012). So, although they can be adminstered by nurses and are easy to apply, they are not a constructive solution for the residents and should be regarded as the last resort (Buhr & White, 2007). According to National Collaborating Centre for Mental Health (2007), psychological interventions have the downside that they are only proven to work for emotional disorders (e.g. depression or anxiety) and require advanced psychotherapeutic competencies. This makes them less accesible for nurses. Whilst the group of non-pharmacological interventions seems most applicable for nursing staff and allied caregivers on nursing home wards, there are two issues that decrease their applicability in practice.

Studies concerning non-pharmacological interventions by nurses are often decreased in value due to a lack of theory on which these are based and due to plausible bias (Liu, Cheon, & Thomas, 2014). The

lack of theory-based interventions is translated in the fact that interventions are often chosen on behaviour and not on the underlying causes and the history of the agitation (Millán-Calenti et al., 2016). By ignoring the uniqueness of a person and mutual understanding, these interventions can therefore not be considered person-centred (Dewing, 2008; McCormack & McCance, 2016). The other issue concerning the plausible bias, is that many interventions are not being applied by the entire nursing staff or allied caregivers, and could therefore be very dependent on who is delivering the intervention, leading to very plausible bias (Livingston et al., 2014b).

To address both issues above, and thus create more useful knowledge for nursing practice, two adaptations to the current approach should be made. First, the assignment of interventions should not be purely based on behaviour, but on its underlying causes (Fazio, Pace, Flinner, & Kallmyer, 2018; Fazio, Pace, Maslow, Zimmerman, & Kallmyer, 2018). The Senses Framework (Nolan, Brown, Davies, Nolan, & Keady, 2006) could prove useful in this perspective. The framework describes six essential needs that require fulfilment in order to acquire excellent care environments. When residents experience an unfulfilment of these needs, they could show aggressive or agitated behaviour. Therefore, identifying which of these needs is unmet per resident, indicates which intervention has to be taken. Second, the impact of the intervention should be controlled insofar as it is the intervention and not the individual nurse that is the focus. This can be reduced by enabling a whole team approach to delivering the intervention. It is therefore hypothesized that team-based interventions that are assigned to residents based on their underlying needs, could be equally or more effective for addressing agitated or aggressive behaviour in residents with dementia in comparison to previously tested non-pharmacological interventions.

Aim

To test a person-centred team approach for addressing agitated or aggressive behaviour amongst nursing home residents with dementia. The person-centred approach consists of assigning the resident to sessions of therapeutic touch, group music sessions or individual sessions with a meaningful activity based the Senses Framework and the ABC-method.

Methodology

Type of study

A multicentred, quantitative, pre-and test post-test interventional study.

Setting

The study was performed in three Flemish nursing homes, on six different wards. The wards' sizes differed (20-44 beds), but full-time equivalents per bed were similar (i.e. between 0.41-0.5). Five of the wards were secluded (i.e., residents cannot leave the ward).

Sample

No previous, similar research was available to perform a power analyses and determine sample size. Therefore, a purposive sample of 60 nursing homes residents was determined beforehand, based on study feasibility. Residents were recruited from December 2016 until February 2017 in three nursing homes. To be included in the study, residents had: (1) to be diagnosed with dementia according to the DSM-V (2013); (2) to score a Mini-Mental State Examination (MMSE) below 25 (Folstein et al., 1975), and (3) to score agitation or aggression on the Neuropsychiatric Inventory-Nursing Home version (Kat et al., 2002).

Data collection and questionnaires

Outcomes in the study were measured using two validated scales: the Neuropsychiatric Inventory-Nursing Home version (NPI-NH) (Kat et al., 2002) and the Cohen-Mansfield Agitation Inventory (CMAI) (Zuidema, de Jonghe, Verhey, & Koopmans, 2007). Demographic characteristics of the residents were also collected.

The Dutch version of the NPI-NH (Kat et al., 2002) was used to measure and rate behavioural and psychological symptoms of dementia. The NPI-NH evaluates 12 neuropsychiatric symptoms that are common in persons with dementia: delusions, hallucinations, agitation (or aggression), depression (or dysphoria), fear, euphoria (or elation), apathy (or indifference), loss of decorum, irritability (or liability), repetitive behaviour, nocturnal unrest (or sleep disorder), and loss of appetite (or change in eating behaviour). The Dutch NPI-NH shows high psychometric validity and has the advantage not to be associated to the MMSE (Kat et al., 2002). The presence of a symptom was scored dichotomously (i.e., yes/no). If the symptom was present, the frequency was scored on a four point-Likert scale (1=sometimes-4=very often) and the severity on a three point-Likert scale (1=mild-3=severe). Subscores were calculated by multiplying severity and frequency. Sumscore was calculated by adding up all the subscores, and could therefore range between 0 and 144.

To measure the prevalence of agitation in the behaviour of the residents, the Dutch version of the CMAI was used (Zuidema, de Jonghe, Verhey, & Koopmans, 2007). The CMAI is a 29-item nurse-based rating scale. The Dutch version shows strong factor structure and construct validity. Each of the items was scored on a seven point-Likert scale (1=never-7=multiple times per hour) and sum scores ranged between 29 and 203.

In order to evaluate the degree to which the intervention was applied as an influencing factor, characteristics of the intervention were collected as well: the compliance to the intervention, the duration of the sessions, the moment on which the interventions were applied (i.e., morning, afternoon, evening), and which healthcare worker executed the intervention (i.e., nurse, physiotherapist, nurse assistant, or other).

A standardized protocol was used for data collection. Only recent collected MMSE scores were included (i.e. not older than 3 months). If the test results were older, the researcher administered the test again. For some residents, testing the MMSE was no longer possible due to severe cognitive impairment, meaning that the resident scored lower than 10 anyway. Data for the NPI-NH and CMAI were collected three to five days before the first session of the intervention. Data were again collected one to three days after the last session. All data were collected from December 2016 until March 2017 by the nursing staff in supervision of the researcher.

The intervention

The intervention included three non-pharmacological interventions that were not part of routinized care. Residents who met the inclusion criteria were allocated one of the three interventions, based on one of the six needs in the Senses Framework (Nolan et al., 2006). The ABC-method (Cohn, Smyer, & Horgas, 1994) was used by the caregivers to determine the resident's need. The acronym ABC refers to the systematic identification, analysis and quantification of persisting or challenging behaviour by residents. By looking at antecedent events (A), target behaviours (B), and consequent events (C), the method provides caregivers a framework to choose an appropriate intervention, which is in accordance with certain behaviour. Residents with a need for sense of security were given therapeutic touch (Livingston et al., 2014b; Van Bogaert et al., 2013). Residents with an increased need for a sense of belonging or a sense of purpose were given group music sessions (Istvandy, 2017). Residents with a need for more sense for continuity, fulfilment, or significance were given an individualized meaningful activity (Van Bogaert et al., 2013). Each resident received sessions of the allocated intervention during two weeks. A visual overview on how the ABC-method and the senses framework fit together and interlock to assign an intervention to each resident, can be found in Figure 1.

The therapeutic touch consisted of a daily, five minutes hand massage combined with a fragrance oil of the resident's choice. The group music session was a daily session in which the included residents listened to nostalgic songs during 20 minutes. Staff stimulated the residents to participate and sing along. The session always started and ended with the same song to provide structure to the residents. The individualized meaningful activity consisted of reintroducing activities from the resident's past into their daily routine (e.g., drawing, knitting, walking, individual music therapy ...).

Before implementing the intervention, a two-hour training session was provided to the staff of each nursing home. Interventions were applied by all members of the team during the study period between February and March 2017...

Statistical analysis

All data were analysed using SPSS 24.0 (2016), with a α -level of 0.05. The normal distribution of variables was tested with the Kolmogorov-Smirnov and Shapiro-Wilk test. To determine the differences in demographic characteristics of the included residents between the nursing homes, Pearson Chi² (for

nominal variables), Fischer's exact test (if the conditions for the Pearson Chi² were not met) and Kruskal-Wallis H test (for non-normally distributed continuous variables) were used. McNemar's test was used to determine the difference in the presence of type behaviour on the NPI-NH test between the pre-test and post-test. To determine the differences on the NPI-NH before and after the intervention, mean differences (MD) were calculated and analysed by use of paired t-tests (for normally distributed variables) and the Wilcoxon signed rank test (for non-normally distributed variables). For calculating the difference for the CMAI, the Wilcoxon signed rank test (for non-normally distributed variables) was used. Confidence intervals (95%) were calculated for mean differences of normally distributed variables.

Ethical approval

Ethical approval for the study was granted by the Central Ethics Committee of the University Hospital of Antwerp (B300201630149). Both verbal and written informed consent was given by the resident's legal representative. The attending physician and the other members of the multidisciplinary team were also consulted.

Results

The residents

Seventy-one residents were initially included in the study, of which two residents were transferred to a general hospital and four residents died during the study period. Consequentially, analyses were performed on 65 residents, divided over six nursing home wards. Table 1 shows no differences between the residents for demographic characteristics, the treatment they received, and their neuropsychiatric symptoms before receiving the interventions.

Compliance to the intervention

Average compliance to the interventions was 86%, and differed across wards (range: 69%-95%; $p < 0.001$). Compliance decreased largely during the weekends. Sessions lasted 14 minutes on average, and differed between wards (range: 12.3 minutes-15.4 minutes; $p < 0.001$). Sessions were mostly given in the morning (57%), followed by the afternoon (41%), and a limited number of sessions were given in the evening (2%). The moment of appliance was different across wards ($p < 0.001$). Nurses most often applied the intervention (63%). Nurse assistant (17%), physiotherapist (12%) and others (8%) applied less than half of the interventions. Differences across wards were found ($p < 0.001$).

NPI-NH-scores

A decrease of 26% in prevalence of aggression/agitation ($p < 0.001$), a 15% decrease in the prevalence of loss of decorum ($p = 0.006$), and a 12% decrease in the prevalence of depression ($p = 0.008$) between pre-test and post test were found. No other significant decreases in the prevalence of neuropsychiatric symptoms were found (figure 2).

The average severity of all the neuropsychiatric symptoms decreased from 17.5 to 13.6 (mean difference: 3.9; $p = 0.009$). A decrease of neuropsychiatric symptoms was identified in residents who

received the therapeutic touch (MD=4.7; $p=0.041$), group music sessions (MD=7.3; $p=0.040$), but no differences were found in residents who received individual activities (MD=0.5; $p=0.817$).

When looking at the individual neuropsychiatric symptoms (Table 2), aggression and loss of decorum, and depression decreased overall and fear increased overall. Of these neuropsychiatric symptoms agitation/aggressions decreased amongst all three interventions. Fear increased amongst all three interventions.

CMAI

The prevalence of agitation and/or aggression in the behaviour of the residents showed an average decrease of 6.6 points ($p<0.001$; Figure 2). Sub analyses showed decreases for the therapeutic touch (MD=5.1; $p=0.005$), group music sessions (MD=5.8; $p=0.004$), and individual therapy (MD=8.9; $p<0.001$).

Discussion

Reflection on the results

As mentioned in the introduction, studies concerning non-pharmacological interventions often decrease in value due to a lack of theory-based interventions and the presence of plausible bias (Liu et al., 2014). This study differed in design from previous studies on these two elements. First, the nursing home residents were assigned to a person-centred intervention by use of the ABC-method and the application of the Senses Framework. This method was used in order to address underlying needs of residents with a person-centred approach. This contrasts with previous studies in which residents were assigned to an intervention purely on their behaviour and not on the underlying dynamics of this behaviour. Therefore, a theory-based allocation of the intervention was provided, which shows strong indications of being more effective than previous strategies.

This study shows results that are in line with, positively contradicted with, or surpassed results from previous studies that focused solely on one of the interventions used in this study (Istvandity, 2017; Livingston et al., 2014a; Oliveira et al., 2015; van der Steen et al., 2018). This study has therefore confirmed the initial hypothesis and has shown the possibilities of looking at agitated or aggressive behaviour from the perspective of Nolan's Senses Framework (2006). This is especially relevant because the results concerning the compliance to and the appliance of the intervention showed differences in how, when and who applied the interventions. Cohen-Mansfield, Thein, Marx, Dakheel-Ali, & Freedman (2012) suggest that these differences actually make results even more powerful, because such differences are more likely to occur in actual clinical practice due to the lack of highly trained research assistant that normally would provide the intervention. Also, research has shown that due to lower staffing levels in the weekend, compliance to quality standards like targeted interventions decreases (Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002). Our approach, in which the use of highly trained caregivers and continuous high staffing levels was avoided, makes the results presented here more relatable for clinical practice. Still, research suggest that such person-centred and individualized

interventions for older people with behavioural problems are insufficient on their own (Van Bogaert et al., 2016). These and similar interventions should be embedded in a person-centred care approach and framework, stimulated by a supportive nursing home culture.

However, one major drawback in the study was the increase of fear amongst all residents. It is needless to say that this is a side-affect with negative implications for the resident's quality of life. We do however see two possible explanations for this effect, both implying possible disappearance of this side effect over time. First, the intervention was applied regularly and with high intensity. Such changes in daily routine have been proven to disrupt residents in the first weeks (McCloskey, 2004). Second, the interventions are very likely to interact with the amygdala, which is found to be oversensitive in people with dementia. The emotion of fear is highly related to this part of the brain, making it very likely that several emotions were unintentionally awoken (Poulin et al., 2011). Both explanations are in turn closely connected. Also, evidence shows that non-pharmacological interventions should be applied in the long-term, as that makes them more effective (Livingston et al., 2014a). Therefore, future research should investigate whether the emotion of fear is disappearing in the long-term.

Limitations

The major limitation of this study is the absence of a power calculation and small sample size, meaning that the results of this study should be addressed with caution (Liu et al., 2014) and merely be regarded as a partial proof that this approach could be consistent. In no way, these results can be viewed as definitive. Next to the drawback of low power, due to the small sample sizes, no multicentred data-analysis method (i.e. linear mixed-models) could be used. Such models are essential as they rule out any ward- or hospital-specific effects due to clustering (Jaeger, 2008). Although bias on individual level was ruled out, bias on ward or hospital-level could be possible.

Also, a researcher supervised the appliance of the ABC-method in this study. In real-life situation, such supervision will not always be present. It is therefore important that nurses are trained in order to be able to use the ABC-Framework (Cohn et al., 1994) and the Senses Framework (Nolan et al., 2006) independent without external help.

Finally, two interventions were combined in this study: a team-level approach and the assigning of interventions based on the unfulfilled needs of residents. It is therefore unclear if one of the interventions or both of the interventions were effective. Future research should clear this issue out.

Future research

The main limitation is, as mentioned above, the sample size of this study which places restrictions on the generalizability of the results. The choice to test this framework with a small sample first was ethically the most sound. Residents with dementia are a frail and vulnerable group in which the necessary caution has to be applied when committing to research (Whitehouse, 2000). It would be therefore questionable to test new hypotheses directly on a large scale. Although there are limitations,

this study has cleared the way for similar, larger and longitudinal study by positively endorsing the research hypotheses. Small studies should always be the first step when developing- interventions. They provide data to calculate sample size, provide theoretical fundamentals, identify possible pitfalls and lead to more cost-effective larger studies (Van Teijlingen & Hundley, 2001). We therefore invite researchers that are looking for new ways to address aggressive or agitated behaviour amongst nursing home residents with dementia, to implement our research design on a larger scale and provide hands-on evidence to inform nursing practice.

Conclusions

The aim of this study was to test the hypotheses that non-pharmacological interventions to decrease agitated or aggressive behaviour amongst nursing home residents were more efficient if executed on team level and if chosen on the underlying needs of the residents, based on the Senses Framework along with the ABC-method. Residents were assigned to therapeutic touch, group music sessions, and individual activities. The results showed a decrease in both the frequency and prevalence, as well as severity of aggression for all three interventions. However, the severity of fear also increased. Taking into account the sample size in this study, our results were in accordance with, positively contradicted with, or surpassed results from previous studies that focused solely on one intervention. By conforming our hypotheses, the path is open for future, larger studies to provide more hands-on evidence to address agitated or aggressive behaviour effectively and correctly.

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Figure 1: procedure to assign the intervention to each resident

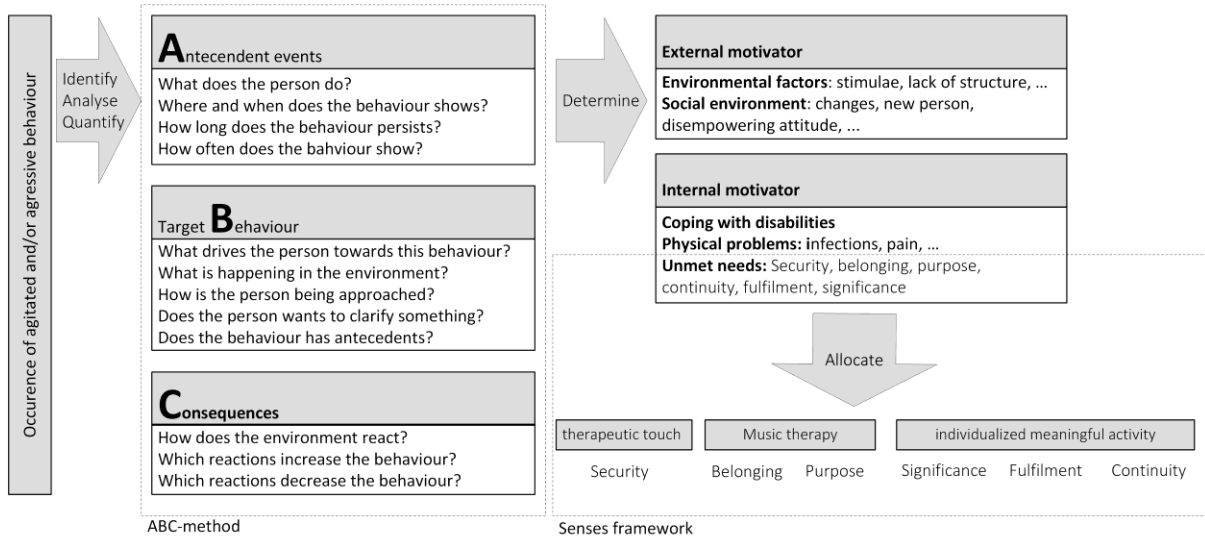


Figure 2: the comparison of the prevalence of neuropsychiatric symptoms before and after the intervention.

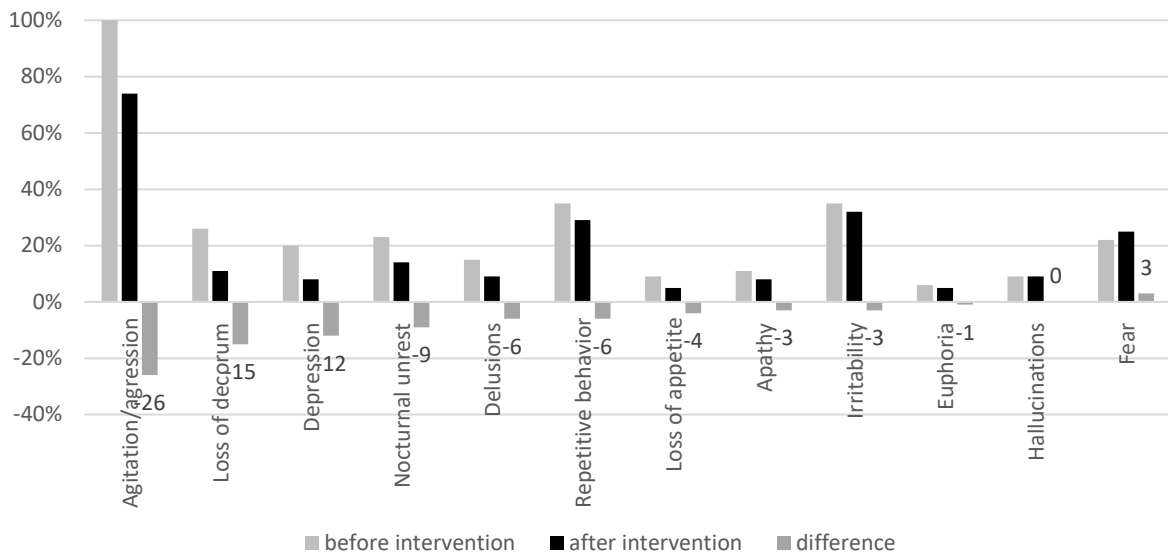


Table 1: characteristics of the included nursing home residents, received treatment and neuropsychiatric symptoms before intervention.

| | All residents (n=65) | Therapeutic touch (n=25) | Music therapy (n=17) | Individualized activity (n=23) | p-value |
|----------------------|--------------------------|--------------------------|-------------------------|-----------------------------------|-------------------|
| Gender (♀) | 68% | 68% | 82% | 57% | .225 [†] |
| Age (mean) | 86 years (range: 62-100) | 87 years (range: 74-97) | 84 years (range:62-94) | 88 years (range: 78-100) | .591 [‡] |
| Length of stay | 30 months (range: 1-130) | 37 months (range 3-91) | 22 months (range 1-50) | 28 months (range 3-130) | .167 [‡] |
| Delusions | 15% | 12% | 18% | 17% | .836 [†] |
| Hallucinations | 9% | 20% | 6% | 0% | .051 [¥] |
| Agitation/aggression | 100% | 100% | 100% | 100% | N/A |
| Depression | 20% | 12% | 29% | 22% | .371 [†] |
| Fear | 22% | 28% | 18% | 17% | .605 [†] |
| Euphoria | 6% | 0% | 18% | 4% | .058 [¥] |
| Apathy | 11% | 8% | 18% | 9% | .566 [†] |
| Loss of decorum | 26% | 24% | 41% | 17% | .228 [†] |
| Irritability | 35% | 32% | 35% | 39% | .875 [†] |
| Repetitive behaviour | 35% | 36% | 47% | 26% | .389 [†] |
| Nocturnal unrest | 23% | 16% | 29% | 26% | .547 [†] |
| Loss of appetite | 9% | 12% | 18% | 0% | .135 [†] |

†=Chi²-test; ‡=Kruskall-Wallis Test; ¥=Fischer's exact test

Table2: the difference in neuropsychiatric symptoms before and after the intervention

| | All residents (n=65) | | | | Therapeutic touch (n=27) | | | | Music therapy (n=17) | | | | Individualized activity (n=23) | | | |
|-----------------------------------|----------------------|--------------------------|------|-----------------|--------------------------|--------------------------|------|-----------------|----------------------|---------------------------|------|-------------|--------------------------------|--------------------------|------|-----------------|
| | Pre | Post | MD | p | Pre | Post | MD | p | Pre | Post | MD | p | Pre | Post | MD | p |
| Delusions [†] | 0.7 | 0.5 | -0.2 | .206 | 0.6 | 0.7 | 0.1 | .317 | 0.7 | 0.5 | -0.2 | .593 | 0.9 | 0.3 | -0.6 | .063 |
| Hallucinations [†] | 0.2 | 0.3 | 0.1 | 1 | 7.4 | 4.0 | 3.4 | .041 | 0.4 | 1 | 0.6 | .336 | 0 | 0.1 | 0.1 | .317 |
| Agitation [‡] | 6.9 | 3.8 | -3.1 | <.001 | 7.4 | 4.0 | -3.4 | <.001 | 6.1 | 2.4 | -3.7 | .004 | 7.1 | 4.7 | -2.4 | .005 |
| | | (95% CI = -4.08 / -2.13) | | | | (95% CI = -4.94 / -1.85) | | | | (95% CI = -6.08 / -1.30) | | | | (95% CI = -3.91 / -0.78) | | |
| Depression [†] | 0.9 | 0.4 | -0.5 | .005 | 0.9 | 0.4 | -0.5 | .109 | 1.2 | 0.6 | -0.6 | .109 | 0.7 | 0.2 | -0.5 | .066 |
| Fear [‡] | 1.1 | 3.8 | 2.7 | <.001 | 1.8 | 4 | 2.2 | .029 | 0.5 | 2.4 | 1.9 | .039 | 0.7 | 4.7 | 4.0 | <.001 |
| | | (95% CI = 1.70 / 3.70) | | | | (95% CI = 0.24 / 3.99) | | | | (95% CI = 0.11 / 3.65) | | | | (95% CI = 2.28 / 5.71) | | |
| Euphoria [†] | 0.2 | 0.1 | -0.1 | .461 | 0.0 | 0.0 | 0.0 | 1 | 0.8 | 0.3 | -0.5 | .285 | 0.1 | 0.1 | 0 | 1 |
| Apathy [†] | 0.7 | 0.5 | -0.2 | .677 | 1.0 | 0.7 | -0.3 | .593 | 0.5 | 0.7 | 0.2 | .581 | 0.4 | 0.1 | -0.3 | .180 |
| Loss of decorum [†] | 1.6 | 0.3 | -1.2 | .002 | 1.4 | 0.1 | -1.3 | .026 | 2.5 | 0.5 | -2.0 | .079 | 1.1 | 0.4 | -0.7 | .109 |
| Irritability [†] | 1.8 | 1.4 | -0.4 | .245 | 1.5 | 1.4 | -0.1 | 1 | 1.8 | 1.1 | -0.7 | .246 | 2.1 | 1.6 | -0.5 | .398 |
| Repetitive behaviour [†] | 2.2 | 1.5 | -0.7 | .081 | 2.1 | 1.2 | -0.9 | .113 | 3 | 1.2 | -1.8 | .042 | -1.6 | 2 | 0.4 | .673 |
| Nocturnal unrest [†] | 0.6 | 0.6 | 0.0 | 1 | 0.2 | 0.2 | 0.0 | 1 | 0.6 | 0.6 | 0.0 | 1 | 1.0 | 1.0 | 0.0 | 1 |
| Loss of appetite [†] | 0.6 | 0.5 | -0.1 | .523 | 1.0 | 1.0 | 0.0 | 1 | 0.9 | 0.4 | -0.5 | .450 | 0.0 | 0.0 | 0.0 | 1 |
| Total NPI-NH [‡] | 13.6 | 17.5 | -3.9 | .009 | 13.5 | 18.2 | -4.7 | .041 | 11.8 | 19.1 | -7.3 | .042 | 15.1 | 15.6 | -0.5 | .817 |
| | | (95% CI = -6.81 / -1.00) | | | | (95% CI = -9.23 / -0.21) | | | | (95% CI = -14.28 / -0.30) | | | | (95% CI = -5.13 / 4.10) | | |
| Total CMAI [†] | 42.1 | 48.7 | -6.6 | <.001 | 42.9 | 48 | -5.1 | .005 | 42 | 47.8 | -5.8 | .004 | 41.4 | 50.3 | -8.9 | <.001 |

†=Wilcoxon related samples test; ‡=Paired t-test; MD=mean difference; *Significant at the 0.05-level*