RESEARCH PAPER

# PAINT I: the effect of art therapy in preventing and managing delirium among hospitalized older adults in the PAINT I study—a proof-of-concept trial

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## Key Summary Points

**Aim**  The aim of the study was to determine the effectiveness of art therapy as prevention and therapeutical approach in geriatric patients with high risk for delirium.

**Findings**  The study was not able to prove the hypothesis that a specific art therapy intervention was able to prevent delirium in patients of an acute geriatric ward, but it seemed to have a positive effect on the duration of delirium. No adverse events were registered in relation to art therapy.

**Message**  Art therapy might be an innovative additional non-pharmacological approach in the management of delirium.

## Abstract

**Background**  Delirium is common among older hospitalized patients and is regarded as a negative outcome parameter. Non-pharmacological strategies have been shown to be effective in the prevention and management of delirium. This study aimed to determine the effectiveness of art therapy as part of a multicomponent intervention in preventing and managing delirium in hospitalized older patients.

**Methods**  138 patients at risk of developing delirium were included and received art therapy twice daily for 25 min using a mobile atelier. 107 participants were included in the final analysis ($N=53$ intervention, $N=54$ control). The primary outcome was the effectiveness of art therapy in preventing delirium. The secondary outcome was to determine its impact on duration of delirium in patients with existing delirium. Delirium was assessed using the Nursing delirium Screening Scale (Nu-DESC).

**Results**  8 patients (7.5%) developed new onset delirium after admission, equally distributed among control and intervention group. Therefore, no valid statistical analysis could be performed. There was a statistically non-significant decrease in the duration of delirium in the intervention group (4 days, IQR 2.25–8.75) compared to the control group (7 days, IQR 5-10), Mann-Whitney-U-Test $p$-value = 0.26. After stratifying by dementia diagnosis on admission, the non-significant decrease in duration of delirium in the intervention group was more apparent in patients without dementia.

**Conclusion**  Findings from this study showed that the integration of art therapy as part of a multicomponent intervention in delirium management is feasible, and can reduce duration of delirium among hospitalized older adults.

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# Introduction

Delirium is one of the most common complications in hospitalized older patients. Its consequences are far-reaching with an increased risk of long-term cognitive and functional decline, as well as a 1-year mortality of up to 30% [1]. Non-pharmacological and individually tailored approaches are widely accepted to be effective in delirium prevention [2]. Contrary to pharmacological prevention strategies, which currently lack robust evidence, there is strong research evidence to support the promotion and further evaluation of non-pharmacological interventions to prevent delirium in hospital [3, 4]. In clinical practice, NICE guidance recommends the provision of multicomponent interventions tailored to individual patient's needs and care setting [5]. Recommended interventions include careful evaluation of daily medication, provision of vision and hearing adaptations, hydration, nutrition, maintenance of a structured sleep rhythm, as well as stimulation, reorientation, and therapeutic activities.

Many of the studies evaluating non-pharmacological delirium interventions focus on the prevention of delirium and do not address patients with delirium on admission [6, 7]. In addition, many of the proposed interventions require professional expertise and, therefore, increased staff resources. Therefore, the development of new innovative non-pharmacological delirium interventions is highly relevant to ensure age-friendly hospital care.

The WHO-report "Health Evidence Synthesis report: what is the evidence for the role of the arts in improving health and well-being in the WHO European region" emphasizes the role of arts including visual arts as effective, safe, and cost-effective in healthcare settings [8]. Nonetheless, the integration of this multifaceted therapy in European health systems is still lacking.

Currently, there is a lack of evidence regarding the effectiveness of art therapy, particularly in managing delirium [9, 10]. Art therapy is facilitated by professional therapists and can be tailored to the individual patient's needs, with a low risk of adverse events. It offers a potential therapeutic option in the management of patients at high risk of delirium. This proof-of-concept trial is part of the PAINT-study (Preventive Art INtervention Therapy), a large-scale research project evaluating the effectiveness of art therapy for older adults in different care settings (PAINT I on an acute geriatric ward / PAINT II in a geriatric day clinic). The following study description only refers to PAINT I.

The aim of this study was to determine the preventive effect of a newly developed concept of art therapy on the incidence of delirium among older patients hospitalized on an acute geriatric ward. The secondary goal was to evaluate its impact on the duration of delirium in patients with existing delirium.

# Patients and methods

## Study design

This single-center controlled trial was designed to determine the effectiveness of an adapted art therapy intervention in patients ≥ 70 years old admitted to an acute geriatric ward. The duration of the study was two years (09/2017–08/2019). We used a sequential assignation of the study participants: 3 months recruitment of the intervention group followed by 3 months recruitment of the control group. While the study nurses recruited the control group our art therapists did an intervention for another trial (PAINT II) that took place in a geriatric day clinic with a different study population using a different intervention (Fig. supplementary material). After obtaining informed consent, patients in the intervention group received twice-daily individually tailored art therapy intervention in addition to usual care (control group) during weekdays. The intervention followed a newly developed therapy concept, which comprised structure giving templates, theme-centered work, reduced choice of material, orientation on individual needs, and facilitation of non-verbal expression. All patients were screened daily for delirium using the German version of the Nu-DESC (Nursing delirium screening scale) [11].

The study was approved by the local Institutional Review Board and the ethical committee (Freiburger Ethikkomission International, Nr.017/1504) and registered in the German Clinical Trials Register (DRKS00012417).

## Setting and selection of participants

The study was conducted in a 60-bed acute geriatric ward of a German urban university hospital. During a pilot phase, which included 10 patients, the assessments and intervention concept were tested for feasibility. All patients admitted during the given time period were screened for eligibility. Inclusion criteria were age ≥ 70 years, given informed consent, and at least one of the following three conditions: pre-existing dementia according to the patient's records or medical history including information given by relatives and caregivers, delirium in the past medical history, or any formal care or dependency in activities of daily living. An initial positive screening for delirium either conducted in the Emergency department 4-AT, cut-off ≥ 4) or on the geriatric ward (Nu-DESC, cut-off ≥ 2) was not a contraindication for participation. Patients were excluded from the study if informed consent could not be obtained, the patient did not speak German, was isolated for infection control reasons, required end of life care, was admitted from other hospital wards than A&E department, or if art therapy was not

feasible—for example, during an acute psychotic episode. Poor vision or blindness were no exclusion criteria.

## Interventions

Following a comprehensive geriatric assessment conducted by a trained multidisciplinary team, participant baseline characteristics including sociodemographic data, comorbidities (CIRS-G), frailty (Clinical Frailty Scale), mobility before admission (Parker mobility score), ability to perform basic activities of daily living (Barthel index) and cognitive status (Mini Mental State Examination (MMSE) were recorded. Presence of delirium on admission was screened with the 4-AT (Emergency Department) and the Nu-DESC (geriatric ward, study nurses and geriatric nurses) [11, 12]. In case of dissent or doubt, a geriatrician re-evaluated the diagnosis using the DSM-IV criteria. All participants were screened daily for delirium by a trained study nurse using the Nu-Desc (Monday–Friday). Nu-Desc was conducted as an evaluation of the last 24 h by consulting patients as well as nurses of different shifts to obtain the relevant information. On weekends, the Nu-Desc was conducted by trained ward staff and retrospectively verified by a geriatrician (KS) following a review of patients´ medical records. Neither the study nurses nor the ward staff were blinded as many patients addressed the interventions in their communication with the ward staff. Both the control and the intervention groups received usual care, which included delirium preventive elements such as avoidance of dehydration, nutritional support, regular mobilization, and cognitive stimulation. These care aspects were delivered by geriatric nurses, physiotherapists and occupational therapists.

In the intervention group, additional individual art therapy took place twice daily for 25 min using a mobile studio. The intervention followed a study-specific adapted concept of art therapy as described above. To facilitate orientation, enable creative work, and serve as a recognition factor, the patient chose from two templates (circle or square) at the beginning of each intervention. The therapeutic approach was tailored individually to patients' medical condition and resources (stimulating, stabilizing, reducing anxiety and relaxing), but followed an underlying structure of: (1) description of patients' mood, (2) creative activity, and (3) discussion of the artwork including patients choosing a title for it. Observations made by the art therapists as well as feelings and thoughts expressed by the participants were recorded throughout every intervention.

The intervention took place at the bedside using a mobile studio and a defined set of material (Fig. 1). Art therapy intervention was suspended if the patient declined to participate, the present medical condition did not allow participation, or if the patient required urgent medical intervention that could not be delayed. The art therapy intervention ended at time of patients' discharge.

## Outcomes and data analysis

The primary outcome measure was the incidence of delirium. The secondary outcome measure was the duration of delirium in patients with delirium during hospitalization. Statistical analysis was conducted by statisticians not involved in the data collection process.

Due to the lack of similar estimates in literature (exclusion of patients transferred from another ward, infectious patients), we mainly considered the feasibility of the project when deciding on the sample size. We aimed to include 360 patients, 180 in the intervention group and 180 controls.

Data were excluded from final analysis if endpoints were not reported due to transfer to another ward and the length of hospitalization was exceptionally short or long ($\leq 4$ days or $\geq 21$ days; Fig. 2) as it was deemed that during short-term stays the art therapy interventions were too few to influence the outcome. On the other hand, patients with longer stays are associated with severe illness and complications, which may affect both outcome and intervention. Hence patients with exceptionally short



**Fig.1** Mobile art therapy at the patient's bedside—PAINT I
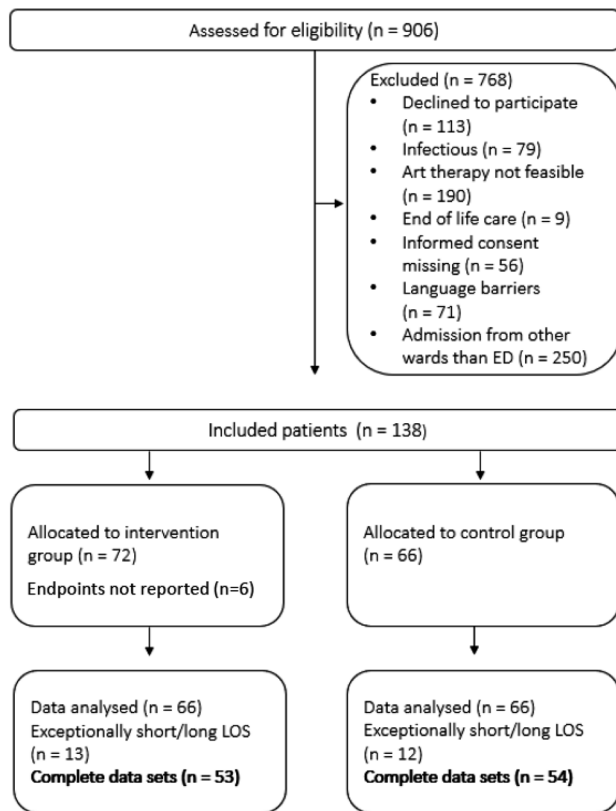
**Fig. 2** PAINT I flow diagram

or long hospitalization were included in the sensitivity analysis (Intention-To-Treat).

Continuous variables are presented as means or medians and categorical variables as numbers and percentages. A Mann–Whitney $U$ test was performed to determine the effect of art therapy on the numbers of days spent with delirium. In a later step, we implemented Mann–Whitney $U$ test after stratifying by dementia diagnoses.

We performed our analysis in R (version 4.0.2; R Core Team, 2020) [15].

## Results

During the study period, 906 patients aged $\geq 70$ years were admitted to the acute geriatric ward and were screened for eligibility. 655 did not meet the inclusion criteria and 113 declined to participate in the study. 138 patients were enrolled in the study, with 72 patients in the intervention group and 66 in the control group. 6 patients in the intervention group had to be excluded as the endpoints were not reported due to unplanned transfers to other departments or new onset of an infectious disease and isolation due to

infection control. An additional 25 patients were excluded as they had an exceptionally short or long length of stay (13 patients in the intervention and 12 patients in the control group). Therefore, 53 patients in the intervention and 54 patients in the control group were included in the main analysis (Fig. 2).

The median age of the study cohort was 86 years (Interquartile range (IQR 81–90) years. 75 participants (70.1%) were female. During the initial comprehensive assessment, the median clinical frailty scale was 6.0 (IQR 5.0–6.0), the median Barthel Index was 65 (IQR 45–75) and the median Parker Mobility Score was 4.0 (IQR 3.0–6.0). Patients in the intervention group participated on average in 9.8 (SD 4.8) art therapy sessions. Participants' characteristics as displayed in Table 1 were well balanced between the intervention and the control group.

## Incidence of delirium and length of delirium (days with delirium)

Of the 107 included in the final analysis, 17 participants (15.9%) had delirium during first screening. Of the 90 participants who did not have delirium on admission, 8 (7.5%) participants subsequently developed delirium during their hospital stay. Those were equally distributed between the intervention ($n = 4$, 7.5%) and the control group ($n = 4$, 7.4%). Most of our study population ($n = 82$, 77%) did not spend any days with delirium. Due to the very low incidence of delirium in both groups, statistical analysis for the incidence of delirium was not performed.

We were able to see a statistically non-significant reduction in the number of days patients spent with delirium among the intervention group compared with the control group. Among patients with delirium, the median duration of delirium was 7 days (IQR 5–10, $n = 11$) in the control group vs. 4 days (IQR 2.25–8.75, $n = 14$) in the intervention group (Mann–Whitney U Test, p value = 0.26, (rank biserial) = − 0.27; see Fig. 3).

After stratifying by dementia diagnosis on admission, in patients with dementia the median duration of delirium was 7 days (IQR 4.5–9; $n = 7$) in the control group compared to 5 (IQR 3.5–10; $n = 7$) in the intervention group (p value = 1, r (rank biserial) = − 0.02). On the other hand, in patients without dementia, the median duration of delirium was 8.5 days (IQR 6.5–10.25, $n = 4$) in the control group compared to 3 days (IQR 2–6.5; $n = 7$) in the intervention group (p value = 0.129, r (rank biserial) = −0.61; see Fig. 4).

In the sensitivity analyses, there was no significant difference in the number of days with delirium in the intervention group compared to the control group (see supplementary material).

**Table 1** Baseline characteristics

|  | Intervention ($n=53$) | Control ($n=54$) | $p$ value |
|---|---|---|---|
| Gender |  |  |  |
| Female | 36.0 (67.9%) | 39.0 (72.2%) | 0.784[a] |
| Male | 17.0 (32.1%) | 15.0 (27.8%) |  |
| Age |  |  |  |
| Mean (SD) | 85.4 (6.62) | 85.0 (5.88) | 0.733[b] |
| Median [Q1, Q3] | 87.0 [81, 90] | 86.0 [80, 90] |  |
| CIRS-G |  |  |  |
| Mean (SD) | 20.6 (4.72) | 21.0 (5.11) | 0.859[c] |
| Median [Q1, Q3] | 21 [17, 24] | 21 [17, 24] |  |
| LOS |  |  |  |
| Mean (SD) | 11.4 (4.79) | 11.6 (4.94) | 0.846[c] |
| Median [Q1, Q3] | 10.0 [7.0, 16.0] | 10.5 [7.0, 16.8] |  |
| Clinical Frailty Index |  |  |  |
| Mean (SD) | 5.79 (0.948) | 5.49 (0.973) | 0.143[c] |
| Median [Q1, Q3] | 6 [5, 7] | 5 [5, 6] |  |
| Missing | 0 (0%) | 1.00 (1.9%) |  |
| Barthel |  |  |  |
| Mean (SD) | 56.6 (22.0) | 61.4 (23.2) | 0.208[c] |
| Median [Q1, Q3] | 60.0 [45.0, 70.0] | 67.5 [46.3, 80.0] |  |
| Parker Mobility |  |  |  |
| Mean (SD) | 4.12 (2.24) | 4.41 (2.41) | 0.4[c] |
| Median [Q1, Q3] | 4 [3, 6] | 4 [3, 6] |  |
| Missing | 1.00 (1.9%) | 0 (0%) |  |

Characteristics of participants

*SD* standard deviation, *CIRS-G* Cumulative Illness Rating Scale—Geriatric, *LOS* Length of stay

[a]chi square test, [b]*t* test, [c]Mann–Whitney *U* test

## Discussion

Delirium is a common neuropsychiatric syndrome among hospitalized older people and is associated with adverse outcomes including prolonged hospital admission and increased risk of mortality [16].

Non-pharmacologic strategies, frequently implemented by nursing staff, have been proven to be effective in the primary prevention of delirium and typically comprised of multicomponent interventions [17]. To our knowledge, no data exist on the effectiveness of art therapy as part of a tailored multicomponent intervention on delirium prevention. Our proof-of-concept trial addresses this research gap by determining the preventive effect of art therapy on the development of delirium among hospitalized older adults on an acute geriatric ward, who are a high-risk group, and on the incidence and duration of delirium.

Our key study findings are as follows: (1) The study was not able to provide evidence on hypothesis that the art therapy intervention was able to lower the incidence of delirium in patients of an acute geriatric ward. (2) The adapted art therapy intervention seems to have a positive effect on the duration of delirium and (3) No adverse events could be registered in relation to art therapy in this patient group.

Despite the statistically non-significant results (most likely due to the small number of patients with delirium), our study suggests that supplementing usual care in the acute geriatric setting with art therapy may have a positive effect on the duration of delirium in patients. This association was more present in patients without dementia.

Multicomponent interventions have been proposed to be included in delirium management strategies and its implementation has been recommended in several practice guidelines [5, 18]. Our study adhered to the NICE recommendations of assessing for risk of delirium within 24 h of admission and administration of individually adapted multicomponent interventions. Both the control and the intervention group received comprehensive geriatric care that included delirium preventive elements. The additional intervention of art therapy as a psychotherapeutic treatment enabled an individually tailored intervention, which focuses on stimulation, (re)focusing, as well as relaxation and reducing anxiety. Art therapy forms part of the arts therapies together with music-, dance- and dramatherapy, but scientific research on art therapy for older people is scarce.

Although delirium research has exponentially increased over the last decade, RCTs on non-pharmacological delirium interventions are still lacking, with many of the studies showing moderate quality evidence. Several of the studies randomized less than 100 participants [3, 19]. In our trial, 907 patients were assessed for eligibility, but only 107 complete data sets could be analyzed. This high exclusion rate can be explained by the applied exclusion criteria such as missing consent, prior hospital admission and secondary transfer to the geriatric ward, or an acute infectious disease that ruled out art therapy intervention due to infection control reasons. The high exclusion rate also illustrates one of the main challenges of our study, the inclusion of participants. So, we failed to reach the expected sample size.

Incidence of delirium during the study period was observed in only 7.5% ($n=8$) of patients, so we were not able to show a primary preventive effect of art therapy in this patient group. The finding of low new onset delirium in both groups (control group $n=4$ and intervention group $n=4$) can additionally be explained by the comprehensive usual care, which included other elements of delirium prevention measures received by participants in both groups. Our study was conducted on an acute geriatric ward with skilled nurses, doctors, and therapists. Usual care included multicomponent intervention such as hydration, regular mobilization, nutritional support, and basic cognitive stimulation. Art therapy was implemented as an additional intervention. Various of the interventions that reported

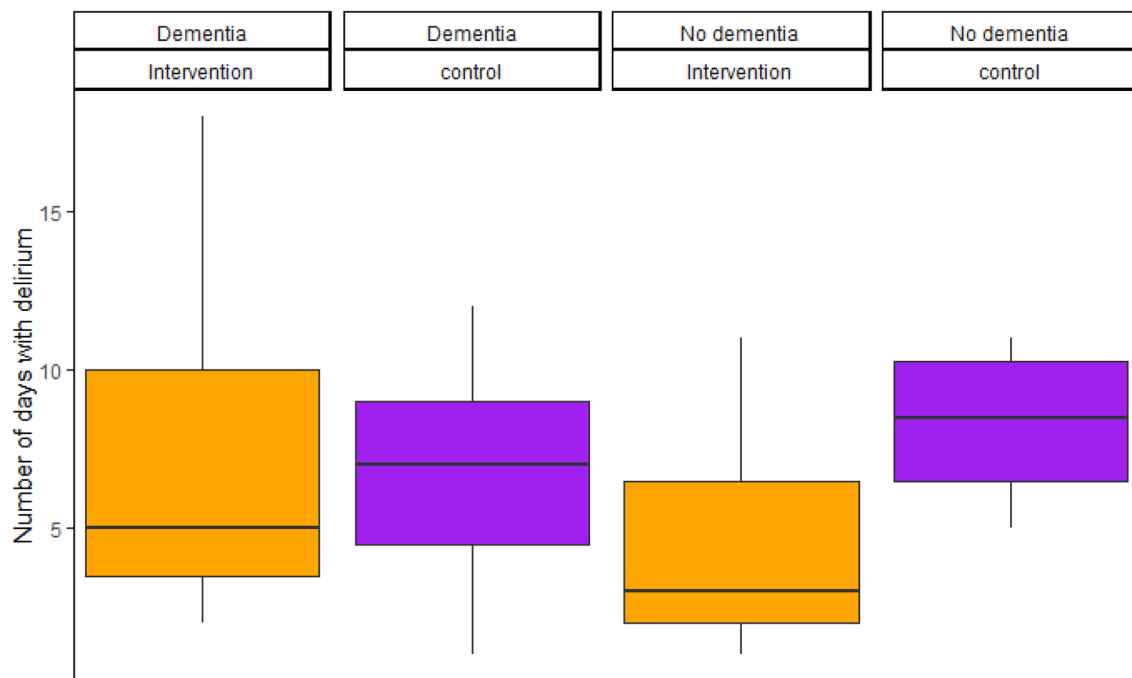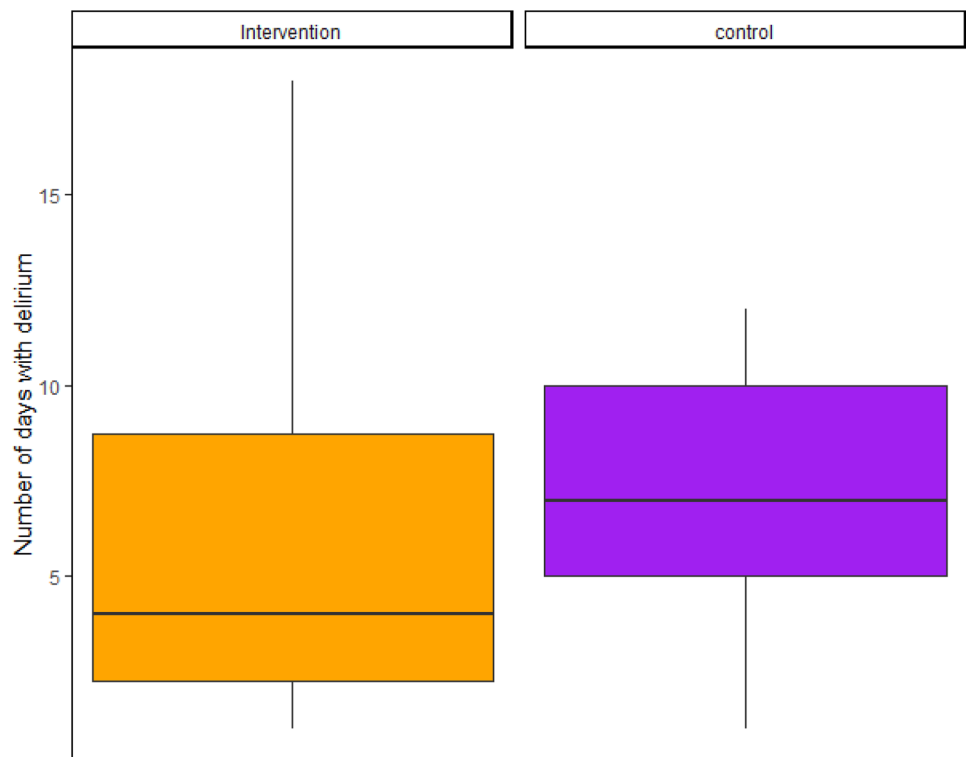**Fig. 3** Boxplot Days with Delirium, comparison of control and intervention study group





**Fig. 4** Boxplot Days with Delirium, comparison of control and intervention study group, stratified by dementia diagnosis

a decrease in delirium incidence were conducted in orthopedic/orthogeriatric settings and only a few in general medical or geriatric medical hospital environment [17]. Furthermore, most of the interventions were compared to usual care that did not include any evidence-based approach targeted to delirium risk factors. Nevertheless, the overall occurrence rate of delirium among our study group was 23% ($n = 25$), which corresponds with existing literature [3].

Among other variables such as comorbidities and severity of the underlying disease, the duration of delirium is associated with adverse consequences [22–22]. Morandi et al. described a 10% increase in in-hospital mortality among older SARS-CoV2 patients with each day with delirium [21]. Therefore, non-pharmacological delirium interventions play a vital role in delirium management. Only few interventional studies in delirium focused on length of delirium, most of which were pharmacological interventions. Among studies investigating multicomponent non-pharmacological interventions, Jeffs et al. were not able to show a positive effect on incidence and length of delirium after implementing an enhanced exercise and cognitive program [22].

Another non-pharmacological intervention study on delirium that included the provision of clocks, calendars, glasses, hearing aids, familiar objects, and reorientation provided by family members in acute medical wards, did not shorten duration of delirium [7].

In our study cognitive stimulation, reorientation and assistance in concentration were important elements of art therapy intervention. The median duration of delirium was 7 days (IQR 5–10) in the control group and 4 days (IQR 2.25–8.75) in the intervention group. Length of delirium varies considerably in the few studies addressing this topic [7]. Assessment methods and frequency of assessment application have an influence on this parameter. In our study we assessed days of delirium using the Nu-DESC as an evaluation of the last 24 h prior to the assessment. This might be the reason that duration of delirium was longer than in other studies. The median length of stay (LOS) of our study population was 10 (IQR 7–16) days in the intervention as well as 10.5 (IQR 7–16.8) in the control group. This might appear quite long, but is in accordance with the mean LOS on the ward including early rehabilitation programs for severely ill patients.

Art therapy focusses on the process and not the finished art product. The underlying emotional experience during the intervention, influenced by the individual patients´ background, is at the center of the therapeutic approach. Whilst the provision of therapeutic interventions, such as art therapy, for hospitalized older people is often logistically a challenge, we have shown that the provision of art therapy for older inpatients at the bedside is feasible. Art therapy enables patients to expand their communication options and express their experiences during delirium, which is essential for people with delirium [23]. Furthermore, the documentation of the art therapists registered no adverse events caused by the intervention.

## Limitations of the study

Our study shows many limitations that have to be considered. Due to the underestimated number of participants in our study and therefore included in the final analysis, we failed to make a statement on the effect of our intervention on the incidence of delirium.

Nonetheless, findings from this study will help to inform a future multicentre study to determine the effectiveness of the intervention and increase the generalizability of the findings. Another limitation of the study was the exclusion of infectious patients due to infection control reasons. Infection is one of the major triggers of delirium. Excluding this patient group ($n = 79$) may have impacted on the results for both incidence and duration of delirium. Only medical geriatric patients were included in the study. Postoperative older patients are also at a high risk of developing delirium and would benefit from the intervention.

Diagnosis of dementia was taken from the patient's records, but often is not verified by a proper assessment. An assessment at the moment of admission on our ward was not possible due to the underlying acute illness. So, there is a possibility that patients without dementia or a former diagnosis of delirium have a diagnosis of dementia in their records.

Furthermore, art therapy is a resource that is not widely available and will be limited to places where interprofessional co-management is available.

## Conclusion

Although the study was not able to allow a statement on the preventive effect of art therapy in this acute geriatric setting, findings from this study showed that art therapy as part of a multicomponent intervention in delirium management can help to reduce duration of delirium among hospitalized older adults. The intervention was feasible and showed no adverse events, but gave additional insight into delirium experiences and enabled patients to communicate non-verbally. Future studies evaluating the effectiveness of art therapy in different clinical settings are needed (e.g., postoperatively).

## Declarations

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