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Using Simulated Family Presence to Decrease Agitation in Older Hospitalized Delirious Patients: A Randomized Controlled Trial

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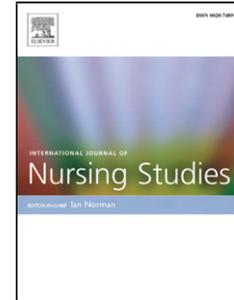
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Title: Using Simulated Family Presence to Decrease Agitation in Older Hospitalized Delirious

Patients:

A Randomized Trial

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Abstract

Background: Simulated family presence has been shown to be an effective nonpharmacological intervention to reduce agitation in persons with dementia in nursing homes. Hyperactive or mixed delirium is a common and serious complication experienced by hospitalized patients, a

key feature of which is agitation. Effective nonpharmacological interventions to manage delirium are needed.

Objectives: To examine the effect of simulated family presence through pre-recorded video messages on the agitation level of hospitalized, delirious, acutely agitated patients.

Design: Single site randomized control trial, 3 groups x 4 time points mixed factorial design conducted from July 2015 to March 2016.

Setting: Acute care level one trauma center in an inner city of the state of Connecticut, USA.

Participants: Hospitalized patients experiencing hyperactive or mixed delirium and receiving continuous observation were consecutively enrolled (n=126), with 111 participants completing the study. Most were older, male, Caucasian, spouseless, with a pre-existing dementia.

Methods: Participants were randomized to one of the following study arms: view a one minute family video message, view a one minute nature video, or usual care. Participants in experimental groups also received usual care. The Agitated Behavior Scale was used to measure the level of agitation prior to, during, immediately following, and 30 minutes following the intervention.

Results: Both the family video and nature video groups displayed a significant change in median agitation scores over the four time periods ($p<.001$), whereas the control group did not. The family video group had significantly lower median agitation scores during the intervention period ($p<.001$) and a significantly greater proportion (94%) of participants experiencing a reduction in agitation from the pre-intervention to during intervention ($p<.001$) than those viewing the nature video (70%) or those in usual care only (30%). The median agitation scores for the three groups were not significantly different at either of the post intervention time measurements. When comparing the proportion of participants experiencing a reduction in

agitation from baseline to post intervention, there remained a statistically significant difference ($p = .001$) between family video (60%) and usual care (35.1%) immediately following the intervention

Conclusion: This work provides preliminary support for the use of family video messaging as a nonpharmacological intervention that may decrease agitation in selected hospitalized delirious patients. Further studies are necessary to determine the efficacy of the intervention as part of a multi-component intervention as well as among younger delirious patients without baseline dementia.

Key Words

Agitation; hospitalized patient; hyperactive delirium; mixed delirium; nature video; nonpharmacological intervention; simulated family presence, video messages

What is known:

- Delirium is recognized as a global issue, affecting many hospitalized patients and putting them at risk for adverse short and long term outcomes.
- ~~Both the American Geriatric Society Expert Panel on Postoperative Delirium in Older Adults (2014) and the members of the American Geriatric Society/National Institute on Aging bedside-to-bench conference: Research agenda on delirium in older adults (2015) have~~
 - Exploration of the use of nonpharmacological interventions to prevent and manage delirium has been encouraged.

- Family presence has been found to be of benefit to hospitalized delirious patients.
- There is a dated body of literature supporting simulated family presence to decrease agitation in nursing home residents with dementia, but this has not been studied in hospitalized patients with hyperactive or mixed delirium.

What this research adds:

- The findings of this study support the use of family video messaging as an effective patient centered and nonpharmacological, ~~cost efficient~~ intervention to decrease agitation in **older** hospitalized ~~delirious~~ patients **experiencing hyperactive or mixed delirium.**
- This novel work can lay the ground work for more research using family simulated presence for patients with or at risk for delirium as an intervention to decrease harm and other negative consequences.

Text

Introduction: Delirium is a serious medical problem affecting one in five hospitalized patients¹ with rates in the ICU setting exceeding 75%.^{2,3} Once thought to be an inevitable, transient, and innocuous phenomenon, there is evidence linking in-hospital delirium to negative clinical outcomes both during hospitalization and after discharge. These include increased risk for death during and up to two years following hospitalization, iatrogenic complications, increased length of stay in hospital and in extended care facilities, and hospital readmission.⁴⁻⁹ Recent work has focused on the persistent and, in some cases, permanent cognitive failure associated with

prolonged in hospital delirium episodes¹⁰⁻¹³ as well as an association with delirium and the development of dementia in the future.¹⁴ Persons with dementia have a high risk of developing delirium during a hospitalization, which worsens the trajectory of their cognitive decline.⁷

Behaviors displayed by patients experiencing hyperactive or mixed delirium can be challenging and distressing to the patient, family, and staff. These behaviors include restlessness, agitation, combativeness, loud speech, anger, persistent thoughts, and wandering, which often lead to the patient resisting care.^{15,16} Patient safety can be threatened when restlessness leads to treatment disruption, resistance to care, and unsupervised mobilization. Pharmacological therapy is often ordered to decrease agitation. However, these medications can lead to adverse reactions including over-sedation, falls, dysphagia, pneumonia, or paradoxically to increased agitation.¹⁷⁻²¹ A recent systematic review and meta-analysis confirmed a lack of evidence to support the use of antipsychotics for the prevention or treatment of delirium.²² Physical restraints used to restrict the patient's ability to disrupt treatments or move freely may increase agitation and risk of injury.²³ Continuous observers placed with agitated patients to prevent falls and treatment disruption are often unsuccessful and are not cost effective.^{24,25}

Patients with hyperactive or mixed delirium may experience distress in the moment, as demonstrated by their agitated and restless behavior, but also as a persistent or lingering suffering in the form of post delirium distress or Post Traumatic Stress Disorder.²⁶ There are few effective options available to nurses to relieve the patient's distress that do not create additional negative consequences for the patient. Nurses can feel frustrated and torn by their perceived duty to keep their delirious patient safe while also attending to the needs of the other patients under their care.²⁷ The provision of an effective, practical, and low cost intervention to calm an agitated patient can be a significant contribution to delirium management.

Nonpharmacological approaches to prevent and manage delirium have been reported in the literature. A systematic review found multi-component nonpharmacological interventions as well as some single-component interventions to be effective in the prevention but not treatment of delirium.²⁸ Clinical practice guidelines recommend a variety of nonpharmacological interventions for both the prevention and management of delirious patients, as they pose little harm and have the potential to offset the significant harm caused by the delirium.²⁹ Using a person-centered approach by incorporating familiar items, individualized preferred music, and family contact are examples of suggested nonpharmacological interventions for persons with delirium.³⁰

A recent literature review on family involvement with hospitalized delirious patients revealed only a few studies on this subject, examining several aspects of family participation. These included family education on delirium, delirium screening by family, and family caregiver interventions for the patient. The author reported that there were inconclusive findings to support that family involvement improves delirium outcomes, but acknowledged that family involvement should be studied further.³¹

~~The author of this manuscript anecdotally observed that many delirious patients were calm and cooperative when family was present, but agitated and restless when family was not.~~ Family members can provide a sense of calm and familiarity to a delirious patient.³² Families should be encouraged to visit as much and as often as possible.³³ Since most families cannot remain with the patient around the clock during a hospitalization, an intervention to simulate family presence was explored.

Simulated presence therapy attempts to reproduce a family member's presence through a technological medium in order to bring comfort to the patient.³⁴ Pleasant memories and

meaningful information is presented to the individual in a caring way by a close family member via an audio or video device. Simulated family presence (SFP) through the use of pre-recorded audio or videotapes has been shown to be an effective strategy to calm agitated persons with dementia in nursing facilities³⁵⁻³⁷ A systematic review and meta-analysis concluded that SFP significantly reduced agitation in persons with dementia.³⁸

To date, there have been no studies evaluating the effect of SFP on persons displaying agitated behaviors related to delirium. Many older hospitalized patients who develop delirium during hospitalization have dementia at baseline.⁷ Although delirium and dementia have different features, there are enough similarities and a strong association to justify a trial of SFP with delirious hospitalized patients displaying features consistent with the hyperactive or mixed subtype.

Pilot work was conducted on five hospitalized patients experiencing hyperactive delirium. These individuals (age range 18-90) viewed a one minute pre-recorded family video message on a DVD player during an episode of agitation. The DVD was shown to each patient by the nursing staff who then gave feedback as to the effect of the intervention on the patient's behavior. In all five instances, nurses reported a decrease in agitation in response to viewing the family video message. Each family member approached was willing to participate in the video.

Therefore, a randomized control trial was designed to examine the effect of family video messages on the agitation level of hospitalized, delirious, acutely agitated patients. This study tested the hypothesis that the viewing of a family video message by hospitalized delirious patients would decrease agitation.

Methods

The Institutional Review Boards of both Hartford Healthcare and Sacred Heart University approved and monitored this study protocol. This work was carried out in accordance

with The Code of Ethics of the World Medical Association for experiments involving human subjects.

Setting: The study was conducted in an 850 bed inner city level one trauma center in the state of Connecticut, USA. The clinical staff at this hospital performed delirium screening with the short version of the Confusion Assessment Method⁻³⁹ on all inpatients three times per day as part of routine care. Continuous observation by a patient care assistant was an intervention commonly used for patients exhibiting agitation related to hyperactive or mixed delirium.

Sample: The study sample consisted of consecutive patients admitted to the hospital, age 18 years or older, who displayed hyperactive or mixed delirium as evidenced by a positive score on the Confusion Assessment Method (CAM)³⁹ and a score >0 on the Richmond Agitation Sedation Scale (RASS)⁴⁰ documented in the record within 24 hours of the record review. Additionally, the individual must have been under continuous observation at the time of enrollment and have been receiving visits from an English-speaking family member. Exclusion criteria included significant vision loss, severe hearing loss that did not improve with an amplification device, and hyperactive or mixed delirium thought to be due to substance withdrawal, terminal restlessness or a psychiatric disorder. A target sample size of 126 was calculated based upon previous pilot work by the author with the Agitated Behavior Scale (ABS)⁴¹, the measurement tool chosen to quantify the primary outcome of agitation. The study was powered at 80% for a moderate effect size. A research randomizer program (Research Randomizer) performed permuted block randomization with 10 blocks of 12 and one block of 6, assigning participants to one of three groups with 42 participants per group. Group #1 received a family video message plus usual care (intervention), group #2 received a nature video plus usual care (attention control), and group #3 received no video plus usual care (control). Usual care

included any care delivered to the patient to address an immediate care need that arose during the study period, such as assistance with toileting, repositioning for comfort or redirecting any unsafe behavior. The randomized group assignment was generated by the statistician and written on the inside of each folder marked with sequential case number by a research assistant. This assignment was not known to the primary investigator (PI) until after the participant had been consented and assigned the next case number in the sequence. The individual assessing the outcomes was blinded to the intervention. A second randomization table was generated by the statistician using a research randomizer program to determine the order in which each of the 4 time point recordings generated for each study participant would be shown to the outcome assessor.

Design: This study was a single site randomized control trial. A mixed factorial design of three groups (family video, nature video and control group) by four time points (pre-intervention/baseline; during intervention; immediately post intervention; 30 minute post intervention) was chosen.

Intervention: The intervention of interest was a one minute family video message, a form of SFP, created and played for the participant at a time when agitation was present and the family was not. The message contained a personalized greeting delivered by one or more family members intended to provide a sense of calm and familiarity for the delirious participant. A one minute segment of a nature video containing images and sound of rain falling on colorful tropical plants or flowers was the attention control intervention. This was included in the study design in order to differentiate the effect of the content of the video from the presentation of a video.

Procedure: The PI reviewed the list of patients receiving continuous observation on a daily basis and took steps to identify and recruit those meeting eligibility criteria. Since all

potential participants were delirious and unable to give informed consent, a legally appointed representative if one existed, or next of kin was approached for consent by the PI. For the group enrolled and assigned to the family video, at least one family member was recruited and an arrangement was made between the PI and the family to meet at an agreed upon place and time, obtain written consent, and create the family video message. This took place in a quiet area located somewhere in the hospital. The family participants were shown a sample video on a DVD player and were then given a written guide to review for suggested topics to include in their family video. When ready, a one minute video was filmed.

After enrollment, the PI assessed the participant for delirium with the 3D CAM⁴² and obtained verbal assent to implement the intervention during this hospitalization. Assent was obtained by asking the participant if the researcher could return later that day if and when the participant felt “out of sorts” to possibly show a video. The continuous observer was instructed to notify the PI by phone immediately if the participant displayed any behaviors listed on the ABS.⁴¹ When notified, the PI returned to the participant’s room and unobtrusively filmed the agitated behavior for one minute. Immediately thereafter, the participant was administered the intervention by the PI. Any participant assigned to the family or nature video watched the video on a DVD player placed on the over bed table located two feet in front of the participant. Those in the control group received no video intervention. The participant’s behavior was filmed for one minute during this intervention period by the PI. After one minute, the intervention (if being administered) was then stopped, and the PI filmed a third one minute segment of behavior. The door was then closed and a sign was posted stating that a procedure was in process and that the patient should not be disturbed until a certain time. In addition, the nurses were instructed to delay assessments and medications for the 30 minute period, unless the continuous observer

contacted the nurse for a change in patient status. During this time, the continuous observer kept a written record of the participant's behavior, any potentially contributing environmental stimuli, and any care delivered to the participant by the continuous observer in five minute intervals for the next 30 minutes, after which time the PI returned and filmed the participant's behavior for one final minute. All filming captured only the participant's face and upper torso to assure outcome assessor blinding to the type of intervention and the time period (pre, during, immediately post or 30 minutes post intervention). The outcome assessor was an expert in assessing agitated behaviors. To further reduce potential bias, this expert viewed each video without sound so as not to hear if the family video message or nature video was playing. This method was chosen over the use of headphones for every participant, as headphones may be a source of agitation. A written transcription of the participant's and continuous observer's verbalizations during each of the four filming segments was provided to the outcome assessor so that this information could be used to score the ABS. Costs associated with this intervention included a video camera, DVD discs and a DVD player.

Measures: Clinical and demographic participant characteristics were collected from the electronic health record at the time of enrollment just prior to the intervention. These included age, gender, race/ethnicity, pre-existing dementia, presumed etiology of delirium, admission diagnosis and family relationship to participant for those who received the family video message. Following the intervention, specific information regarding medication administered for the purpose of decreasing agitation was collected. The dose, route and time of selected medications that had been administered to the patient within 12 hours preceding the observation and intervention were recorded. These medications included drugs within the pharmacological categories of neuroleptics/psychotropics, sedative/hypnotics, benzodiazepines, anti-seizure, and

sedating antidepressants. It was then determined whether or not the medications were peaking at the time of the intervention measurement period. Those participants receiving a medication peaking during the measurement period were considered to be under the effect of a sedating medication. A pharmacist prepared at the doctoral level approved of this rationale. A research assistant skilled in communication rated each family video message as positive, neutral, or negative based upon its content and delivery. Positive videos would include encouraging personalized statements with mention of feelings of affection delivered with a pleasant tone of voice and facial expression. Neutral videos would include a message with cliché phrases and little or no personalization delivered in a flat tone. Negative videos would feature any message whose content or delivery might be interpreted to increase stress or agitation in the viewer. The outcome assessor described in the previous section viewed each of the four one minute film clips of each of the participants and assigned a score between 14-56 to reflect the participant's degree of agitation using the ABS.⁴¹ The ABS consists of 14 behaviors which the examiner rates on a scale from 1-4, a score of 1 indicating no agitation and 4 indicating severe agitation. This valid and reliable tool has been used to measure agitation in persons with anoxic encephalopathy, traumatic brain injury, and dementia.⁴³

Statistical Methodology:

Nonparametric statistics were used as the distribution of both age and ABS scores violated the assumption of normality in spite of log transformation. As there is no mixed factorial nonparametric statistic, this necessitated the use of different analytical tests applied to explore longitudinal change in median ABS scores within each group (Friedman) and cross sectional differences among groups (Kruskal Wallis) and between groups (Wilcoxon Ranked Sum). A Pearson Chi-Square examined differences between and among the groups in regards to the

proportion of participants experiencing a reduction in agitation from pre- intervention to during, immediately following and 30 minutes following the intervention. In order to avoid a Type 1 error, a Bonferroni correction was applied with significance level set at .0125 for the individual tests. All tests were run in SPSS v21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.).

Results

Of the 422 individuals screened for eligibility from July 2015 to March 2016, 136 were deemed eligible and after the responsible parties gave informed consent, 126 individuals were enrolled. The recruitment period ended March 2016 as target enrollment was reached. Following enrollment, fifteen of the 126 enrolled participants did not complete the intervention due to resolution of delirium (n=3), lack of agitation (n=5), continuous family presence (n=2), discharge (n=3), or death (n=2). Therefore, 34 participants received the family video message plus usual care, 40 received the nature video plus usual care, and 37 received no video and only usual care. This is displayed in Figure 1.

There was no statistically significant difference in the clinical or demographic variables among those who were enrolled (n=126), those who completed the intervention (n=111), and those who did not (n=15). Nor was there a statistically significant difference in the clinical or demographic variables among the 111 participants who completed the intervention based upon randomized group assignment. As described in Table 1, the median age of this sample receiving the intervention was 79 years and participants were predominantly male (53.2%), Caucasian (82.9%), spouseless (55%), had baseline dementia (60.4%), and were admitted for a medical

reason (79.3%). Most participants received the intervention while on a general medical or surgical unit (78.4%) and were not under the effect of a sedating medication (79.3%). The etiology of the delirium was most often presumed to be from an internal source (73%), such as metabolic, infectious, fluid imbalance, vascular or other, rather than from an external source such as trauma or medication. This was determined from documentation in the medical record. None of the participants were determined to be exposed to potentially agitating environmental stimuli during the 30 minute period between post intervention observations based upon the 5 minute incremental documentation of the continuous observer. The continuous observers documented delivering any necessary care, such as responding to the patient's request for food, drink or toileting. Other entries included providing reassuring answers to questions asked or statements made by the patient, as well as reminders not to pull at medical apparatus if the patient was attempting to do this.

A total of 56 family members participated in the creation of 42 family video messages. Due to the attrition of eight participants assigned to the family video who did not complete the intervention, 34 videos were actually shown. The majority (76%) of the family members featured in the videos were adult children. The video messages were between 45 and 90 seconds in length and took approximately five minutes to create. The family participants quickly and easily constructed a family message in one attempt. The majority (85.7%) of the videos were rated as positive with an encouraging message delivered in a warm and caring way. The neutral

messages contained non-personalized themes delivered without positive emotion. One video was rated as negative due to the family member asking questions of the viewer.

The primary outcome measure of this study was agitation as measured by the ABS. Cronbach's alpha indicated moderate internal consistency with 0.723. The range of ABS scores in this study were 14-29. There were statistically significant ($p < .001$) changes in median ABS scores across the four time periods for both the family video message and nature video groups but not the usual care group (Figure 2). The ABS baseline median scores for each of the three groups were not significantly different ($p = .071$). During the intervention period, a statistically significant ($p < .001$, $d = 0.197$) difference was found among the three groups with the family video group displaying the lowest median ABS scores. Further analysis demonstrated a statistically significant difference between the median ABS scores of the family video and nature groups ($p = .002$, $d = 0.32$) and between the median ABS scores of the family video and usual care groups ($p < .001$, $d = 0.194$) during the intervention period (Table 2).

An additional analysis examined the proportion of participants in each intervention group that experienced a reduction in agitation during the intervention, one minute following and 30 minutes following the intervention compared to the pre-intervention/baseline period. There was a statistically significant difference among all three treatment groups ($p < .001$) in the baseline to

during intervention time period comparison, with 94.1% of the family video group, 70% of the nature video group, and 29.7% of the usual care group experiencing a reduction in agitation. In addition, statistically significant differences were seen between the family video and nature video groups ($p=.008$), family video and usual care groups ($p<.001$), and nature video and usual care groups ($p<.001$) during this time period comparison. When comparing the proportion of participants experiencing a reduction in agitation from baseline to immediately following the intervention, there remained a statistically significant difference among all three treatment groups ($p=.001$), as well as between family video and usual care ($p=.001$). There were no statistically significant differences in the proportion of participants experiencing reduced agitation when comparing baseline to 30 minutes post-intervention ($p=.043$) (Figure 3).

No patient or family participants appeared to have suffered harm or adverse effects from participating in the study. No patient participant verbally or behaviorally indicated a desire to stop viewing the family or nature video, or to have the PI leave the area while responses were

being recorded. Family members who participated in the creation of a family video message were eager to learn of its effectiveness.

Discussion

This study explored the effectiveness of using SFP to decrease agitation in hospitalized patients experiencing hyperactive or mixed delirium. Although simulated presence therapy has been used successfully in persons with dementia in nursing homes to decrease agitation ³²⁻³⁶ 34-38, there were no reports in the literature of its use with hospitalized delirious patients.

This study demonstrated that persons with agitated delirium can respond positively to simulated presence therapy involving family. There were small but statistically significant findings to support the use of family video messaging to decrease agitation in hospitalized, hyperactive delirious. There was also evidence that a nature video performed better than no intervention, but not as well as a family video message to decrease agitation.

These results suggest that delirious individuals can show interest in a family video stimulus. The greatest benefit occurred while the family video was playing and immediately following the video. It is unclear whether or not the temporary benefit was due to the features of delirium or to the single, short exposure to the stimulus. The post-intervention median agitation scores were not statistically significantly different among the family, nature, and usual care groups, although all three groups were less agitated at the 30 minute post intervention times compared to baseline measurement. Fatigue or an inability to sustain high levels of agitation over an extended time may be a contributing factor and potential explanation for this finding. Of interest is that each of the video groups showed a smaller proportion of participants less agitated

from baseline as the time from the exposure to the stimulus increased, where as it was the opposite for the control group.

Baseline agitation scores reflected states of mild agitation. The researcher encountered difficulty capturing the states of high level agitation on video due to time lapse between researcher notification and arrival at bedside, one minute recordings, and unprovoked clinical situations. In spite of the low ABS pre-intervention/baseline scores and subtle changes, the family video message was able to demonstrate a statistically significant decrease in agitation while it was being administered and for at least one minute after the stimulus was stopped. However, no conclusions can be made concerning more severe agitation states.

The creation and use of family video messaging is potentially feasible, effective and affordable. This intervention could be implemented by an organization for less than \$500 in equipment costs and minimal staff time to create and show the video message to the delirious patient. The costs of creating the family video intervention for this study included the purchase of a video camera, DVD player and DVDs. The one-time investment costs are the video camera (\$250.00) and the portable DVD player (\$60.00). The DVD disc must be purchased for each individual patient at a cost of \$2.00 per disc. The staff time to film and burn the video is approximately 15 minutes. Filming could be done by any available hospital employee or volunteer willing to learn and participate in the process. The staff time to show the video is approximately 2 minutes if all equipment is at the bedside. An organization might purchase several portable DVD players if they plan to use this intervention on several patients simultaneously. Total estimated initial cost for a hospital would be under \$500. Compared to the costs associated with continuous observation and pharmacological therapy for agitated patients, this is a cost effective intervention.

Several limitations are noteworthy. The majority of participants were over the age of 50 and had a pre-existing dementia. This limits the generalizability of the findings. However, the effectiveness of the intervention held true regardless of whether the participant did or did not have dementia. All participants were under the care of a continuous observer further limiting the generalizability. The presence of the continuous observer and the PI recording the participant's behavior could have influenced their response. It is also possible that the source of the agitation influenced the participant's response to the intervention. If the agitation was due to pain, fear, hunger or need for toileting, the intervention may not have satisfied the patient's need. If the agitation was related to boredom or fear, the family video message may have been more effective. The response of the participants deemed to be under the effect of a sedating medication at the time of the study intervention (20.7%) may have been influenced by the pharmacological substance.

Conclusion

This research suggests that family video messaging can decrease agitation in selected hospitalized patients with hyperactive or mixed delirium. This work lays the foundation for future studies to explore the impact of SFP on the potential reduction of restraints and sedatives, response to SFP provided more often and for a longer duration, and the potential to use SFP to prevent delirium in hospitalized patients at high risk for this condition. This research also suggests that a nature video may also be an alternative nonpharmacological intervention to decrease agitation in older hospitalized patients with hyperactive or mixed delirium if and when the creation or viewing of a family video message is not possible.

This line of research fills an important gap in the literature on nonpharmacological person-centered delirium interventions involving family. If the results are replicated, it can make a significant contribution to delirium management as part of a multi-component approach.

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This study was not registered.

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Legends

Figure 1 Enrollment.

Figure 2 Median Agitation Behavioral Scale (ABS) scores for each of the three groups (family video, nature video, usual care) at each time point (pre-intervention, during intervention, immediately post-intervention, 30 minutes post-intervention.) Potential range of ABS score = 14-56.

Figure 3 Proportion (%) of participants in each group (family video, nature video, usual care) who show a reduction in ABS scores from pre-intervention to during the intervention, from pre-intervention to immediately following the intervention, and from pre-intervention to 30 minutes following the intervention.

Figure 1

Enrollment

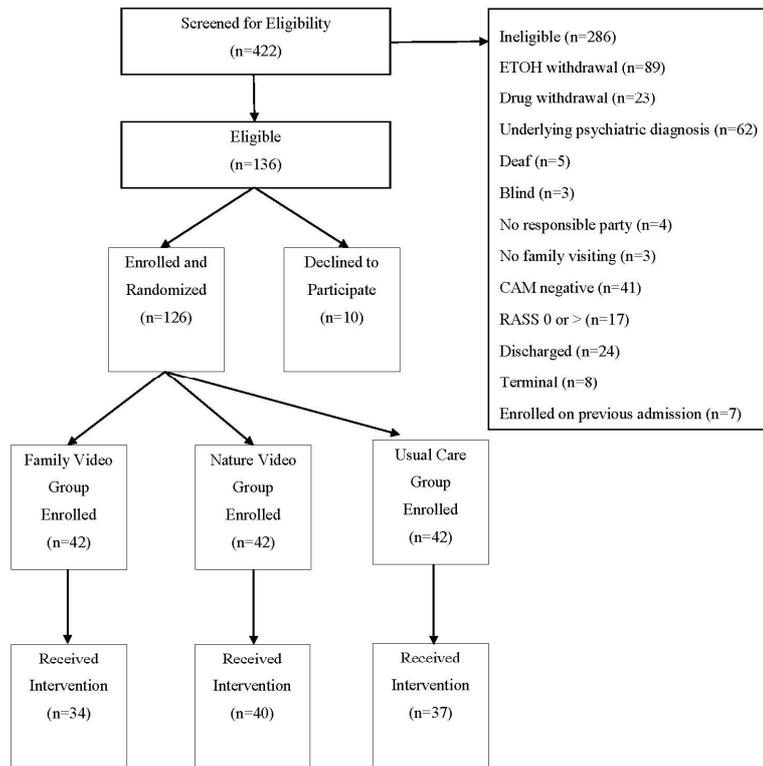


Figure 2

Figure 2: Median ABS scores per group at each time point

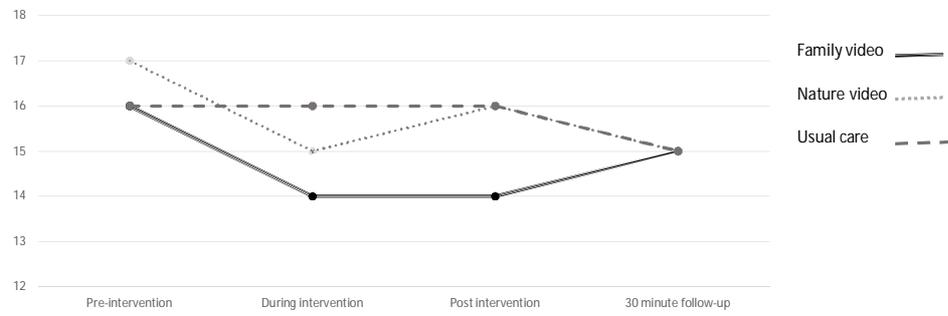


Figure 3

Proportion (%) of Participants Who Show a Reduction in ABS Scores from Baseline to During and Following Intervention Based Upon Group Assignment

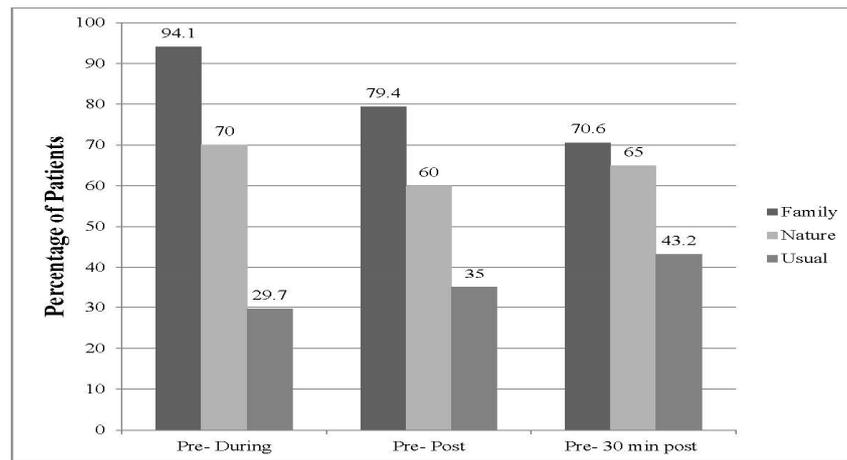


Table 1
Demographic and Clinical Characteristics by Treatment Group

Characteristic	Total (n=111) n (%)	Family video (n = 34) n (%)	Nature video (n = 40) n (%)	Usual care (n = 37) n (%)	p
Female	52 (46.8)	17 (50)	19 (47.5)	16 (43.2)	<i>p</i> =.846
Marital Status					
With spouse	50 (45.0)	16 (47.1)	20 (50.0)	14 (37.8)	<i>p</i> =.541
No spouse	61 (55.0)	18 (52.9)	20 (50.0)	23 (62.2)	
Ethnicity					
Caucasian	92 (82.9)	28 (82.4)	33 (82.5)	31 (83.8)	*
African-American	5 (4.5)	2 (5.9)	2 (5.0)	1 (2.7)	
Latino	10 (9.0)	4 (11.8)	3 (7.5)	3 (8.1)	
Asian	4 (3.6)	0 (0)	2 (5.0)	2 (5.4)	
Dementia co-morbidity	67 (60.4)	19 (55.9)	24 (60.0)	24 (64.9)	<i>p</i> =.740
Delirium Etiology					
Internal source	81 (73.0)	21 (61.8)	31 (77.5)	29 (78.4)	<i>p</i> =.209
External source	30 (27.0)	13 (38.2)	9 (22.5)	8 (21.6)	
Admission diagnosis					
Medical	88 (79.3)	28 (82.4)	31 (77.5)	29 (78.4)	<i>p</i> =.865
Surgical	23 (20.7)	6 (17.6)	9 (22.5)	8 (21.6)	
Level of Care					
ICU/SD	24 (21.6)	11 (32.4)	8 (20.0)	5 (13.5)	<i>p</i> =.149
Med/surg	87 (78.4)	23 (67.6)	32 (80.0)	32 (86.5)	
Medically Sedated	23 (20.7)	6 (17.6)	11 (27.5)	6 (16.2)	<i>p</i> =.412
Age					
Median	79.0	78.0	81.0	81.0	<i>p</i> =.569
Min-max	19-99	50-97	18-99	52-99	
IQR	15.0	7.0	18.0	18.5	

*Frequencies too small for statistical analysis

Table 2

Comparison of ABS Scores across Groups over Time

Time period	Family video median (min-max)	Nature video median (min-max)	Usual care median (min-max)	Significance level
Pre-intervention	16.0 (15-24)	17.0 (14-27)	16.0 (14-22)	$p = .071$
During intervention	14.0 (14-18)	15.0 (14-26)	16.0 (14-24)	$p < .001$
Immediate Post-intervention	14.0 (14-19)	16.0 (14-29)	16.0 (14-22)	$p = .158$
30 minutes Post-intervention	15.0 (14-21)	15.0 (14-28)	15.0 (14-22)	$p = .971$

ABS potential range of scores = 14-56