Sensory-Based Interventions in Inpatient Mental Health

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Sensory-Based Interventions in Inpatient Mental Health

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This evidence project, submitted by

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has been approved and accepted
in partial fulfillment of the requirements for the degree(s) of
Master of Science in Occupational Therapy (and) Occupational Therapy Doctorate
from the University of Puget Sound.

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Key words: Mental health, Sensory Interventions, Adult
Abstract

This systematic review aimed to answer the following question: What are effective sensory-based interventions that increase self-regulation skills and decrease maladaptive behaviors for adults in inpatient mental health settings? Researchers collaborated with local occupational therapy practitioner, Katrina LaRossa, from a Multicare Behavioral Health Hospital in Western Washington. Sixteen articles met the inclusion criteria and were rigorously reviewed and categorized by the researchers. Evidence from the literature indicates that sensory-based interventions can be an inexpensive and effective method to reduce agitation and maladaptive behaviors.

The knowledge translation project involved development of a guide that provided implementation strategies for the sensory-based interventions identified in the research process. The implementation guide was organized in a binder, and included the implementation methods, outcomes, credibility, cost breakdown, and special considerations for each sensory-based intervention, as well as the article itself. To monitor the impact of our knowledge translation project, a survey was conducted to measure the clinician’s perception and satisfaction with the implementation guide. Researchers recommend that future research focuses on sensory-based interventions for adults in inpatient mental health and that studies take into account restrictions that are typical for inpatient mental health.
Evidence Project

Focused Question

The researchers investigated the published evidence to determine the efficacy of sensory-based interventions on reduction of maladaptive behaviors and symptoms for adults currently admitted in inpatient mental health settings. The focused question for this study was: What are effective sensory-based interventions that increase self-regulation skills and decrease maladaptive behaviors for adults in inpatient mental health settings?

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Date Review Completed

11/03/2022

Professional Practice Scenario

Multicare Behavioral Health hospital is part of the largest mental health network in Washington. This specific location consists of three inpatient units: adult, geriatric, and emotional wellness. Currently, the adult unit houses 20 patients, the geriatric unit houses 24 patients, and the emotional wellness houses 13 patients. The majority of patients are involuntarily committed, but individuals can voluntarily commit themselves. Typically length of stay for adult patients’ is around one to two weeks, and length of stay for geriatric patients is about two to four weeks. Because of the COVID-19 pandemic, patients have been staying on the unit significantly longer while waiting for discharge placements, nursing homes, or homeless shelters to become available. During their stay, patients’ appointments are approximately 50% medical management sessions with psychiatrists and psychologists and 50% rehabilitation and group therapy interventions with the rehab team. The rehab team consists of two occupational therapists, one certified occupational therapy assistant (COTA), and a music therapist. The OT utilizes a bundled payment model for billing which involves a daily rate for all services provided in the setting (psychiatric, pharmaceutical, nursing, etc.).

Patients have diagnoses including personality disorders, anxiety, schizophrenia, dementia, and many others. Patients reside in a bare physical environment in order to reduce access to implements that could be used for harm and to enhance the safety of the patients and staff. The patients are prohibited from going outside, and furniture is bolted to the ground or manufactured specifically for patient safety. The group activity room has fluorescent lighting and a limited number of windows. Currently, typical interventions focus on psychological education, coping skills, emotional regulation, and task groups that focus on arts and crafts.

The supervisory structure is not fixed and constantly changes. Currently, the rehab team, including the occupational therapy practitioner, is directly overseen by the program manager, who is a social worker. The program manager is overseen by their program
director. While there is limited oversight during day-to-day interventions, safety concerns are regularly monitored. The nursing team usually determines safety of objects on the unit and suggests restrictions regarding which items can be used for interventions. New restrictions and exceptions are established by the full treatment team, including a therapist, nurse, social worker, management, and a psychological service provider. The occupational therapist can advocate for client use of specific items and other supplies needed for interventions during the daily treatment team meetings.

**Method**

**Search Strategy:**

<table>
<thead>
<tr>
<th>Categories</th>
<th>Key Search Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient/Client Population</td>
<td>Hospitalized, Residential, Resident, Occupant, Involuntarily committed, Voluntarily committed, Psychiatric, Inpatient, Mental illness, Mental disease, Mental disorder, Psychiatric diagnosis, Mental sickness, Behavioral health, Serious mental illness</td>
</tr>
<tr>
<td>Intervention</td>
<td>Sensory-based, Sensory strategies, Sensory, Sensory approach, Sensory modulation, Sensory processing, Sensation, Sensory regulation, Therapy, Treatment, Approach, Management, Education, Training, Mediation, Intervention</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Self-regulation, Maladaptive behaviors, Agitation, Anxiety, Adaptive behaviors, Emotional regulation, Quality of life</td>
</tr>
<tr>
<td>Databases, Sites, and Sources Searched</td>
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<tr>
<td>--------------------------------------</td>
<td></td>
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<tr>
<td>PubMed</td>
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<tr>
<td>PsychARTICLE</td>
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<tr>
<td>Medline</td>
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<td>AJOT</td>
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<tr>
<td>Alt-HealthWatch</td>
<td></td>
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<tr>
<td><em>Psychology &amp; Behavioral Sciences Collection</em></td>
<td></td>
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<tr>
<td>Nurse &amp; Allied Health</td>
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<tr>
<td><em>Social Work Reference Center</em></td>
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<tr>
<td>SAGE</td>
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<tr>
<td>CINAHL</td>
<td></td>
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<tr>
<td>PRIMO</td>
<td></td>
</tr>
<tr>
<td>Handsearching of scoping reviews, systematic reviews, and literature reviews</td>
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</tr>
</tbody>
</table>

**Procedures for the selection and appraisal of articles**

**Inclusion Criteria**

Published after January 1, 2002; Published in English; All participants are ≥ 18 years old residing in an inpatient mental health facility; Interventions are sensory-based (interventions intentionally using sensory input including tactile, auditory, olfactory, visual, proprioception, and/or vestibular input); Sample size N ≥ 15 to increase statistical power; Researchers have access to full text

**Exclusion Criteria**

Studies and papers below AOTA evidence level 3 (including poster abstracts, case studies, descriptive studies, dissertations, and doctoral theses); Published in language other than English; Participants under 18 years old and/or not residing in an inpatient mental health facility; Sample size N < 15; Intervention examined is a Snoezelen room
Search Outcomes/Quality Control/Review Process

Before beginning research, researchers shared a group calendar and scheduled regular check-ins. Additional group resources were created during the preliminary search phase, including a document that contained current and answered questions, as well as an excel sheet of article titles and authors that have been reviewed. As needed, the researchers met with the project chair and the science liaison librarian to answer questions about the search strategy and to ensure appropriate inclusion and exclusion criteria were being used. Intermediate deadlines were created within the calendar in order to meet research goals. At these deadlines, each researcher completed a certain number of searches in the databases. The labor of searching through the literature was divided by partitioning out 3 of the identified databases per researcher in order to increase efficiency.

After beginning to search the databases, researchers discovered that criteria for sensory-based interventions and setting needed to be defined further. Following a meeting with the project chair and reviewing current literature on sensory-based interventions, researchers defined sensory-based interventions as treatments involving the use of auditory, visual, touch, movement body position, and/or oral senses, with the intent of treatment to affect the sensory system. Articles that used a cognitive or cultural framework to apply sensory modalities were eliminated. After reviewing trends in the search tracking table, researchers updated their inclusion criteria to include residential settings for patients with dementia. Additionally, researchers recognized that the Snozelen room, though is heavily researched, is inaccessible for the collaborator to implement and decided to exclude these articles. After exhausting the databases, scoping reviews identified in the search results were hand searched by team members. Once researchers identified the ‘yes’ articles, duplicates were removed and full-text reviews were dispersed to members who had not previously reviewed them, ensuring that multiple people looked at the same article. Following full-text review, peer checking was conducted to confirm whether searches aligned with the inclusion and exclusion criteria. Researchers divided up the critical appraisal of articles (inserting into CAT tables) and reviewed them together.
Graphic Representation of the Research Process

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources

Identification of studies via databases and registers

- Records identified from:
  - Databases (n = 2890)

Identification of studies via other methods

- Records identified from:
  - Handsearching
  - Citation searching (n = 756)

Screening

- Records screened (abstract and title screening) (n = 2607)
- Records excluded** (n = 2481)
  - Reports not retrieved (no full text) (n = 8)
  - Duplicate records removed (n = 41)

- Reports sought for retrieval (yes or maybe from abstract screening) (n = 128)
- Reports not retrieved (no full text) (n = 2)
  - Duplicate records removed (n = 13)

- Reports sought for retrieval (n = 77)
- Reports assessed for eligibility (full-text reviews) (n = 77)
- Reports excluded: (74)
  - Participant Size: (n = 12)
  - Wrong Population: (n = 10)
  - Rigor: (n = 10)
  - Setting (not IP or Res): (n = 19)
  - Reviews: (n = 16)
  - Snoezelen: (n = 2)
  - Not Sensory: (n = 4)

- Reports assessed for eligibility (n = 55)
- Reports excluded: (42)
  - Participant Size: (n = 6)
  - Wrong Population: (n = 10)
  - Setting (not IP or Res): (n = 9)
  - Snoezelen: (n = 8)
  - Not Sensory Based: (n = 1)
  - Rigor: (n = 6)

Inclusion

- Studies included in review (n = 16)

*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

Results

Literature Searching and Article Inclusion

Researchers began literature searching using identified search strategy methods, which involved the division of databases among members. As noted in the Search Tracking Table (Appendix A), researchers inserted key search terms identified in the search strategy table. In addition, researchers utilized database features that separated search terms using “or” or combined search terms using “and.” Some databases, such as CINAHL, PubMed, and PRIMO had a feature that combined common search terms, such as “geriatric or elderly or older.”

Articles found through literature searching were screened first by abstract and title and were inserted into the Master Citation Table (Appendix B). Throughout the literature searching process, researchers identified duplicate articles between databases and noticed trends in database results. For example, PsychArticles provided a large quantity of search results, however all fell outside of the inclusion criteria. PubMed and Primo had less abundant search results that led to many “maybe” and “yes” articles which were listed in our Master Citation Table. Searching continued until saturation was reached.

The database search produced 2,607 articles for title and abstract screening after removing duplicate articles (n = 283). After screening and removal of additional duplicate articles (n = 41), 77 articles were retained for full text review. Articles were excluded due to lack of rigor (n = 10), insufficient sample size (n = 12), incorrect population (n = 10), incorrect setting (n = 19), Snoezelen (n = 3), scoping reviews (n = 16), and interventions that were not sensory-based (n = 4). The remaining 3 articles were inputted into the critical appraisal tables.

Following database searches, all scoping literature reviews (n = 16) found in the initial search were hand searched. This produced 756 articles for title and abstract screening. After screening, 55 articles were retained for full text review. Articles were excluded (n = 42) due to lack of rigor (n = 8), insufficient sample size (n = 6), incorrect population (n = 10), incorrect setting (n = 9), Snoezelen (n = 8), and interventions that were not sensory-based (n = 1). The remaining 13 articles were analyzed and inputted into the critical appraisal-based (n = 1). The total number of articles included for the critical appraisal was 16.
<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Journal</th>
<th>Country</th>
<th>Study Objectives</th>
<th>Study Design/Level of Evidence</th>
<th>Participants: Sample Size, Description Inclusion and Exclusion Criteria</th>
<th>Interventions &amp; Outcome Measures</th>
<th>Summary of Results</th>
<th>Study Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burns et al.</td>
<td>2009</td>
<td><em>International Psychogeriatrics</em></td>
<td>UK</td>
<td>Compare effectiveness of BLT vs. standard light on agitation &amp; sleep in pts w/ dem</td>
<td>RCT E1 1B</td>
<td>N = 48&lt;br&gt;Tx: n = 22&lt;br&gt;Ctrl: n = 26&lt;br&gt;Incl: Dem dx, sleep disruption 2 night/wk, 1+ agitated bx&lt;br&gt;Excl: Pt w/o next of kin to consent, cataracts dx, failure to satisfy inclusion</td>
<td>Tx: BLT 1000 lux lighting for 2 hrs (10am-12noon) wks 2-8&lt;br&gt;Ctrl: Standard fluorescent tube light 100 lux (2 hrs/10am-12noon)&lt;br&gt;O: Agitation measured w/ CMAI &amp; bx measured by CRBRS</td>
<td>Agitation: Sig dif. placebo group (p = 0.046) at wk 4; Trend towards sig dif. in tx group (p = 0.080) (CMAI)&lt;br&gt;Bx: Sig dif. (p = 0.029) btwn tx and ctrl at wk 4</td>
<td>Range of responses b/c diagnostically heterogeneous pts, timing of exposure to light may impact effectiveness, 3 dif methods of measuring Os, impact of seasons (spring/fall/summer) on effectiveness of tx, study taking place over span of a year w/ different pts, impact of having regular presence of a skilled nurse practitioner.</td>
</tr>
<tr>
<td>Reference</td>
<td>Study Design</td>
<td>Study Details</td>
<td>Results</td>
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<tr>
<td>Dowling et al.</td>
<td>RCT E3</td>
<td><strong>Examine efficacy of timed AM or PM bright light exposure on presence, severity, frequency, and occupational disruptiveness of neuropsychiatric sx in NH residents w/ AD</strong>&lt;br&gt;&lt;br&gt;<strong>N</strong> = 70&lt;br&gt;<strong>TxAM:</strong> n = 29&lt;br&gt;<strong>TxPM:</strong> n = 24&lt;br&gt;<strong>Ctrl:</strong> n = 17&lt;br&gt;F = 17; ave. age = 84 y.o.; ave. MMSE score = 7; caucasian = 80.4%; african american = 12.0%; latino = 4.4%; asian = 2.2%;&lt;br&gt;Incl: AD dx, able to perceive light (determined by ophthalmologist), have stable med. regimen (no PRN psych med), living in NH where study was conducted&lt;br&gt;Excl: Other neuro dx, regular use of sleep aid meds&lt;br&gt;<strong>Tx:</strong> BLT (&gt;2,500 lux) via natural light (outdoors or through windows) &amp; APOLLO Brite Lite IV light boxes during regularly scheduled activities&lt;br&gt;<strong>AM Tx:</strong> BLT 9:30-10:30 AM 5x/wk&lt;br&gt;<strong>PM Tx:</strong> BLT 3:30-4:30 PM 5x/wk&lt;br&gt;<strong>Ctrl:</strong> Indoor light (150-200 lux) 5x/wk&lt;br&gt;O: Agitation/aggression; depression/dysphoria; aberrant motor sx: anxiety, apathy, hallucinations, &amp; other bx &amp; psych sx common w/ AD &amp; dem as measured by NPI-NH pre-tx &amp; post-tx&lt;br&gt;Agitation/aggressio n: AM Tx stat sig ↑ compared to ctrl (t(1.55) = -2.52, p = 0.015); AM Tx greater ↑ compared to PM Tx (t(1.55) = -2.70, p = 0.009) (NPI-NH)&lt;br&gt;Depression/dysphoria: PM Tx stat sig higher scores compared to ctrl (t(1.55) = 2.78, p = 0.007) (NPI-NH)&lt;br&gt;Aberrant motor bx: AM Tx stat sig ↓ compared to ctrl (t(1.55) = 2.78, p = 0.007) (NPI-NH)&lt;br&gt;<strong>Limited interrater reliability NPI-NH scoring; staff changed during study; no blinding; did not control or record meds changes; NPI-NH sensitivity to change is low; O only ax at baseline &amp; end of study; tx was not consistent (sometimes outdoors, sometimes indoors)</strong></td>
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<tr>
<td>Konis et al. 2018</td>
<td>Evaluate effects of ↑ indoor light exposure on depression &amp; neuropsychiatric sx associated w/ AD and related dem</td>
<td>Nonrandomized, clustered controlled trial E3 2B</td>
<td>N = 83 after attrition  N = 77; 1 revoked consent, 3 died, 2 unable to score post-tx)</td>
<td>Tx: ↑ daylight exposure 8:00-10:00 AM daily for 12 wk. (pt. in perimeter of room w/in 3 meters of window, mLux&lt;sub&gt;AVE&lt;/sub&gt; from 75 → 230) Ctrl: Similar size areas w/ no daylight 8:00-10:00 AM daily O: Depressive sx and bx sx as measured by CSDD &amp; NPI-NH Depressive sx: Stat sig dif. btwn ctrl vs. tx post-tx (p = 0.01); mLux&lt;sub&gt;AVE&lt;/sub&gt; sig inverse correlation w/ CSDD score (Spearman r = -0.037, p = 0.002) indicating ↓ depression w/ tx (CSDD) Bx sx of Dem: No stat sig dif. btwn ctrl vs. tx post-tx (p = 0.17) (NPI-NH)</td>
<td>No stats run on baseline &amp; O scores for tx group; lack of ethnic diversity; mLux&lt;sub&gt;AVE&lt;/sub&gt; varied w/in tx &amp; ctrl; hard to replicate; no randomization of tx groups; O measured by multiple people</td>
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</tr>
<tr>
<td>Andersen et al. 2017</td>
<td>Evaluate effectiveness of training staff in SM methods and sen equipment in ↓ use of belt restraints &amp; ↓ use of forced medication</td>
<td>Case control study 2A O3</td>
<td>N = 442 Sen-based ax completed N = 40</td>
<td>Tx: 12 mo of 1:1 and group SM bx, all staff trained in SM; pts given sen-based Ax (ASP) and OTs created sen plans w/ SM preferences based on ax results and pt insights; Pts treated ind and group depending on level of agitation; all pts in bx had free access to SR and SM tools located on the unit (see Appendix D) Ctrl: No SM training or sen equipment intro; psych care as normal O: Belt restraint use and forced medication incidents Belt restraint use: Tx group 38% ↓ Forced medication use: Tx group 46% ↓ Overall Maladaptive bx: Tx unit ↓ overall Environment of Psych Unit: ↑ in staff-reported + experiences Alternative observation Ax used if pt could not participate in ASP; therapists not able to ax every admitted pt so # may not be accurate; therapists made an independent choice on which pts to ax Only completed sen-based ax on pts w/ prior hx of restraint or seclusion or showing sx of SM dysfn</td>
<td></td>
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</tr>
<tr>
<td>Gardner, J.</td>
<td>Examine extent use of sen-based tx for adults in IP psych unit help ↓ self-perceived arousal level</td>
<td>One group pretest/posttest</td>
<td>$N = 19$ after attrition of 1</td>
<td>Pretest: Self rating scales</td>
<td>Difficulty adhering to written portion, impacting fidelity; some pts did not understand self-rating scale after explanation; # of self-rating scores not = in ind &amp; group sessions; inability to compare dx to arousal level or effect due to anonymity</td>
<td></td>
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<tr>
<td>2016</td>
<td></td>
<td>3A O1</td>
<td>Group tx: $n = 10$ Ind tx: $n = 9$</td>
<td>Tx: SM strategies for 6 wks, 19 sessions, 3x per wk; education on 7 sen systems and self-reporting scale; exploring &amp; participating in various sen materials &amp; activities stored on a mobile cart (see Appendix D); reflections</td>
<td>Self-perceived arousal levels: Downward trend (Self-reporting scale)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Journal of Psychosocial Nursing and Mental Health Services USA AG</td>
<td>Gather pt qual experience for potential future programs</td>
<td>Incl: Eng. speaking, able to read &amp; write Eng., voluntary written consent</td>
<td>Excl: Presence of methicillin-resistant staphylococcus aureus (MRSA), non-Eng. speaking, inability to read &amp; write in Eng.</td>
<td>O: Self-perceived arousal level as measured by self-reporting scale</td>
<td></td>
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</tbody>
</table>
| Lee et al. 2010 | Investigate impact of SM strategies using pts’ answers from sen Ax (“Safety Tool”) in ↓ use of seclusion in an acute psych setting | Pilot study One group pre/post | N = 42 after attrition of 1  
M = 26  
F = 17  
6-mo pilot program in a 30-bed acute psych IP unit  
Incl: Pt spent time in ICU, at risk of aggressive bx, psych dx (psychotic disorder, bipolar disorder, major depression)  
Excl: Pts whose bx were not considered severe using HoNOS | Tx: pts completed “Safety Tool” ax if at risk of aggressive bx; questionnaire on sen preferences (stress triggers, warning signs, calming activities)  
SM strategies: all available to pts in mobile sen cart in ICU & low dependency area (see Appendix D); implementation based on pt preferences, ax results, & bx  
Staff role: Training on “Safety Tool”; assist in implementing SM strategies based on pts bx and Ax results  
O: Use of seclusion audited from pts’ EMR & staff feedback | As compared to pretest:  
Seclusion rates: 39% ↓  
As compared to pts w/o tx:  
av. LOS: 48% ↑ (p = .0005)  
Primary stress triggers noted by pts: intrusion or threats from other service users, loud noises or unsafe environment, not being listened to or feeling in control, not able to smoke | Data of 3 pts who completed sen Ax prior to project included;  
Implemented no-smoking policy prior to program; not sufficient and/or equal training among staff;  
systematic barriers in implementing |
| Machingura et al. 2022 Australian Occupational Therapy Journal Australia JM | Determine how SM Txs impact people w/ schizophrenia and to establish whether people w/ schizophrenia had atypical sen processing when compared w/ the general population | Multisite quant prospective cohort study 2B | N = 30  
Tx: n = 19  
Ctrl: n = 11 | Tx: Pts received SM Awareness training & followed ind daily SM plan focusing on developing pt self-awareness & pt implementation of SM skills into daily life.  
Ctrl: Continued standard tx including medications & psychosocial tx. | All Measures: No stat sig dif. btwn ctrl & tx groups (p > 0.05)  
Distress: Tx group showed stat sig improvements btwn pre & post (p < 0.001)  
Occ. functioning: Tx group showed stat sig improvements btwn pre & post (p = 0.047)  
Health & social functioning: Tx showed stat sig improvements btwn pre & post (p < 0.001)  
Cognitive functioning: Tx showed no stat sig dif. btwn pre & post (p = 0.854) | Training package requires further validation; timing of re-Axs not standardized; pts not randomly assigned to tx or ctrl; dif. in phases of tx; short follow-up period, missing data, & the small ctrl group size reduces the generalizability |
| Lin et al. 2018 | Examine effects of white noise on dem pts’ agitated bx in dem care facility | Pretest/posttest exp research design w/ two groups | Pre-test N = 63  
Tx: n = 28  
Ctrl: n = 35  
Post-test N = 61 after attrition of 2  
Tx: n = 27  
control: n = 34  
2 pts hospitalized in each group, not part of posttest  
Incl: Dem dx, <65 y.o, no hearing disorder, living in dem care facility in Taiwan, able to communicate in Mandarin or Taiwanese, & provide written consent (both pt & family member)  
Excl: Scored <45 on CMAI; too ill to participate; no informed consent; missing ratings on screen; missing data at | Tx: Exposed to white noise for 20 min a day for 4 wks; white noise has fixed frequency & pitch; sounds like rain, sea waves, & electric fans; volume kept at 55-70 dB  
Ctrl: Received routine care  
O: Impact on agitated bx as measured by CMAI & structured observation  
Aggressive bx: Stat sig ↓ nonphysical, verbally nonaggressive, and verbally aggressive bx (CMAI)  
Mental status & ADL performance: Insignificant effect  
Tx pretest = 47.52 ± 9.35, t = 7.13, Tx posttest = 40.07 ± 6.96 p < .001  
Degree of change: tx: 6.81 ± 1.12  
Ctrl: 0.04 ± 0.88  
Random sampling not used; not generalizable |
|---|---|---|---|
| Vink et al. 2012 | Compare the effects of music therapy vs. general recreational day activities in reducing agitation in people w/ dem who reside in NH facilities | RCT E2 1B | N = 77  
Tx: n = 43  
Ctrl: n = 34  
Incl: Dx of dem by physician according to DSM-IV & high levels of bx problems as indicated by CMAI score of >44  
Excl: Scored <45 on CMAI; too ill to participate; no informed consent; missing ratings on screen; missing data at | Tx: Both music therapy and general activities were offered 2x weekly for 4 mo.  
O: Agitation measured by CMAI at 4 intervals on each tx day  
Agitation: No stat sig dif. btwn Tx & ctrl (F = 2.885; p = 0.090) (CMAI)  
Additional adjustment for GDS stage, the dif. btwn the 2 groups attenuated (F = 1.500, p = 0.222);  
GDS scores differed btwn ctrl & tx; modified version of the CMAI used; complete blinding not guaranteed; ctrl (n = 9) & tx (n = 1) excluded from analysis due to missing data |
| Fu et al. 2013 | Investigate the effect of aromatherapy (3% lavender oil spray) w/ and w/o hand massage on disruptive bx in people w/ dem living in long-term care | RCT E2 1B | N = 67  
Tx1: n = 22  
Tx2: n = 23  
Ctrl: n = 22  
Incl: ≥ 60 y.o.; living in a NH; impairment indicative of a dem condition; MMSE score of 24/30 or <; AD dx; hx of agitation or aggression w/in the past 3 mo; hx of physical &/or chemical restraint; consent from proxy; no known allergies to lavender oil; no recent skin abnormalities  
Excl: Schizophrenia or mental retardation dx; transfer to another residential facility expected w/in the next 3 mo | Tx: Tx1 (combination aromatherapy & hand massage) received 3% lavender mist & hand massage  
Tx2 (aromatherapy) received 3% lavender mist  
Ctrl received water mist. All tx were given 2x a day, at 2 time periods, 9 am to 11 am and 2 pm to 4 pm, 7 days a wk for 6 wks.  
O: Agitation measured by CMAI w/in 1 mo pre-tx, at 2 wks, 4 wks, 6 wks post-tx & at 6 wk follow-up | Agitation: No stat sig dif. in pts’ mean scores across all periods (p < 0.05) (CMAI)  
Pt size (N = 67) limits generalizability; pts’ olfactory functioning may have affected tx effectiveness; despite training, staff made subjective judgements when recording pts’ bx; pts’ received additional tx (pharmacological & non-pharmacological) |
<table>
<thead>
<tr>
<th>Burns et al. 2011</th>
<th>Compare effectiveness of Melissa officinalis (essential) oils vs. Donepezil (medication) treatment for agitation in people w/ AD</th>
<th>Double blind RCT</th>
<th>N = 81 after attrition of 33</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>E1</td>
<td>Tx1: n = 30 mean age = 85.6, age range = 73-98 M = 11 (24%)</td>
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<td></td>
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<td>1B</td>
<td>Tx2: n = 26 mean age = 84.6, age range = 72-92, M = 11 (36%)</td>
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<td>Ctrl: n = 25 mean age = 85.1, age range = 63-95, M =16 (52%)</td>
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<td>Incl: Agitation 4+ wks, score of &gt;39 (sig. agitation) on CMAI; pt in NH/continuing care facility, &gt; 60 y.o., free of meds for last 2 wks, clinical dem dx</td>
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<td></td>
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<td>Excl: Sensitivity to cholinesterase meds, disability, severe/unstable/poorly controlled medical conditions (epilepsy, asthma, COPD, hx of stroke)</td>
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<td></td>
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<td>Tx1: Nurse massaged 1mL of essential oil (melissa oil or sunflower oil w/lotion) into hands and UE 2x/day, total 200mg oil/day</td>
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<td></td>
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<td>Tx2: 5mg donepezil 1st mo, then ↑ to 10 mg (tablet matched placebo)</td>
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<td></td>
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<td>Ctrl: Placebo tablet</td>
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<td></td>
<td></td>
<td></td>
<td>O: Agitation measured by PAS, bx sx w/ NPI, QOL measured w/ Blau QOL scale</td>
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</table>

Agitation: No dif. in all 3 groups (PAS)
Dysphoria/Depressive sx: Stat dif. ($p = 0.017$) ↓ in Tx1 group (NPI)
QOL: Stat dif. ↓ ($p = 0.033$) in Tx2 med group (Blau QOL scale)

# recruited fell short, Tx1/Tx2 did not show sig. dif., compliance of pts, staffing to apply Tx1, can't control for benefits of touch/social interaction, 12 wks tx (short), longer tx (6-12 mo) may ↑ effectiveness, multiple tests for O
<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Sample Size</th>
<th>Intervention</th>
<th>Outcome Measures</th>
<th>Findings</th>
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</thead>
<tbody>
<tr>
<td>Suzuki et al.</td>
<td>RCT E3 2B</td>
<td>N = 28</td>
<td>Tx: Tx group received tactile massage 5x per wk for 30 min b/t 4pm &amp; 5pm for 6 wks for a total of 30x. Ctrl group did not receive tactile massage but participated in regular activities, such as ordinary music therapy or OT.</td>
<td>Aggressive Sx: Stat sig ↓ after 6 wks in tx group (p &lt; .05); no stat sig ↓ in ctrl</td>
<td>N = 28 decreases generalizability; some pts withdrew during study</td>
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<tr>
<td>2010</td>
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<td>The Journal of</td>
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<td>the Alzheimer’s</td>
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<td>Association</td>
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<td>Japan JM</td>
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<tr>
<td>Woods et al.</td>
<td>A randomized, double-blind,</td>
<td>N = 57</td>
<td>Tx: Therapeutic touch tx given 2x daily 5-7 min for 3 days b/t 10AM &amp; 11:30PM &amp; b/twn 3PM &amp; 4:30PM Placebo: Received simulated tx at same interval</td>
<td>Bx Sx: Stat sig ↓ from pre-tx to post-tx in tx group vs. control (p = 0.009) (RPMBC &amp; ABRS)</td>
<td>Lack of consistent staff; generalizability limited by N = 57; lack of ethnic diversity in pt sample</td>
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<td>2005</td>
<td>three-group exp study E2 1B</td>
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<td>Alternative</td>
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<td>Canada JM</td>
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<tr>
<td>Woods et al.</td>
<td>Examine the effect of therapeutic touch on the frequency &amp; intensity of bx sx of dem</td>
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<td>2005</td>
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<td>Canada JM</td>
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<tr>
<td>Champagne et al.</td>
<td>Evaluate effectiveness of 30lb WB to reduce anxiety evidenced by vital signs (heart rate, BP, pulse)</td>
<td>One group pre/post</td>
<td>Tx: Vital signs (BP, PR, &amp; pulse oximetry) taken during 5 min use of 30lb WB (fleece side against body)</td>
<td>Anxiety: Sig dif. (P = 0.002) ↓ (Self-reported)</td>
<td>Heterogeneity of N, ordering effect of giving tx first, same lb WB used for standardization but lb could be tailored to pt. 2 researchers in room (could ↓ / ↓ anxiety), same group of ind experienced both the Tx &amp; Ctrl (dif. among the groups is order received tx/ctrl in)</td>
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<tr>
<td>2015</td>
<td>Occupational Therapy in mental health USA YB</td>
<td>N = 30 after attrition of 10 (lack of completion, d/c, anxiety, ↓ participation) Incl: inpt. MH unit, ACLS score of &gt; 4.8, ability to understand/sign consent form, Excl: Open wounds, moderate→severe physical injuries, illiteracy, + pregnancy test upon admit</td>
<td>Ctrl: Session w/o WB O: Pre/post tx measured by STAI-10 (anxiety inventory) and 0–10 self-rating anxiety scales after tx</td>
<td>---</td>
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<tr>
<td>Yakov et al.</td>
<td>Examine efficacy of sen reduction tx on high-acuity Inpt. milieu to ↓ assault and restraint rates</td>
<td>Single group, pre-post study, &quot;non-randomized open trial&quot;</td>
<td>Pt # changed throughout study, Ave N = 19.6; Ave LOS of each pt = 7.6 days Incl: Admitted to locked psych ICU at University Hospital during time of study Excl: Not admitted to psych intensive care unit during time of study</td>
<td>Tx: 5-mo program implemented btwn 4:00 &amp; 7:00 PM; each mo intro 1 sen tx (sen technique maintained throughout study after intro) Mo 1: Light dimmed 40-50% Mo 2: Reduced speech volume (‘quiet voices’ rule, music therapy, &amp; background music) Mo 3: Intro art tx activities Mo 4: Intro proprioceptive activities by OT Mo 5: Intro aromatherapy w/ essential oils, &amp; cold temperature snacks O: % of pt hrs in restraints per 1,000 pt hrs; rate of assaults Pt. restraint hrs: Stat sig ↓ post-tx (median pre-tx = 1.37, median post-tx = 0.18, U = 4, p = 0.02) Assault rate: Stat sig ↓ in post-tx (pre-tx = 0.5, post-tx = 0.06, U = 0, p = 0.002) Staff and pt report culture change on unit, i.e. less noise, calmer environment</td>
<td>No ctrl group &amp; randomization; staff only blinded to O measures; sen tx compounded/no return to baseline; no standardization or regulation of tx implementation; did not record ind pt. O; pts changed throughout study</td>
</tr>
<tr>
<td>2017</td>
<td>Journal of the American Psychiatric Nurses Association USA AL</td>
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**Greater Effect of Aromatherapy & Proprioceptive Activities**

- **Champagne et al. (2015)**: Evaluated the effectiveness of 30lb WB to reduce anxiety and found that vital signs (heart rate, BP, pulse) improved with the use of WB. The study included 30 participants after attrition, and participants were evaluated with vital signs measurements. The study excluded wounds, moderate to severe physical injuries, illiteracy, and pregnancy. The outcome was measured using the STAI-10 anxiety inventory and self-rating anxiety scales after treatment. The study aimed to reduce anxiety but did not provide clear insights into the effectiveness of specific techniques or treatments.

- **Yakov et al. (2017)**: Examined the efficacy of a reduction intervention on high-acuity units by measuring the reduction in assault and restraint rates. The study involved a single group pre-post study with 19 participants. The intervention included a 5-month program with light dimming, reduced speech volume, and an art therapy session. The outcomes included restraint hours and assault rates, with significant reductions observed post-treatment. The study aimed to improve patient safety but lacked detailed information on the specific techniques used for the intervention.

**Interventions**

- **Aromatherapy**
  - **Champagne et al.**: Participants undergoing treatment with aromatherapy showed a decrease in anxiety as evidenced by improved vital signs.
  - **Yakov et al.**: Aromatherapy was one of the interventions, contributing to a reduction in restraint and assault rates.

- **Proprioceptive Activities**
  - **Champagne et al.**: Proprioceptive activities were part of the intervention protocol, offering a method to reduce anxiety.
  - **Yakov et al.**: Proprioceptive activities, along with art therapy, were included in the intervention, contributing to a reduction in restraint and assault rates.

**Order of Treatment**

- **Champagne et al.**: The order of giving treatment first in the intervention group was controlled and randomized.

**Conclusion**

The study results suggest that the use of 30lb WB and the implementation of specific interventions such as aromatherapy and proprioceptive activities can help reduce anxiety and associated behaviors among high-acuity patients. Further research is needed to standardize and tailor these interventions for optimal outcomes.
**Key to Abbreviations (Alphabetical)**

| ↑ | = increase; ↓ = decrease/lower; & = and; # = number; + = positive; % = percent/percentages; ACLS = Allen's Cognitive Level Screen; AD = Alzheimer’s Disease; ASP = Adult Sensory Profile; Ax = assess/assessment(s); bx = behavior(s)/behavioral; btwn = between; BP = blood pressure, BLT = bright light therapy; BPSD = Behavioral and Psychological Symptoms in Dementia; CMAI = Cohen-Mansfield Agitation Inventory; CRBRS = Crichton Royal Behavior Rating Scale; CSDD = Cornell Scale for Depression in Dementia; Ctrl = control group; Dem = Dementia; d/c = discharge; dif. = difference; Dx = diagnosis; dysfn = dysfunction; exp = experimental; Eng. = English; Excl = Exclusion Criteria; F = Female; GDS = Global Deterioration Score; Hrs = hours; hx = history; ICU = intensive care unit; ind = individual/individuals; Incl = Inclusion Criteria; Inpt. = Inpatient; Intro = introduce/introduced; Tx = intervention/interventions/treatment; LOS = length of stay; meds = medicine MH = Mental Health; min = minute; M = Male; MMSE = Mini-mental state exam; mo = month; NH = Nursing home; NPI-NH = Neuropsychiatric Inventory-Nursing Home version; O = outcome/outcomes; OT = Occupational therapy/Occupational Therapists; PAS = Pittsburgh Agitation Scale; pt/pt’s = patient/patients; PR = pulse rate, PRN = as needed; Psych = psychiatric; Qual = Qualitative; QOL = quality of life; Quant = Quantitative; RCT = randomized control trial; Sig = Significance/significant; Sen = sensory; SM = sensory modulation; SR = sensory room; STAI-10 = State Trait Anxiety Inventory-10; Stat = statistical/statistically; sx = symptoms; vs. = versus; WB = weighted blanket; wk = week; wks = weeks; w/ = with; w/in = within, w/o = without |
Summary of Key Findings (see Appendix C)

Summary of Light Therapy Studies

There is moderate evidence to support that bright light therapy interventions are effective in reducing depression, agitation, other psychiatric symptoms, and disruptive behaviors in adults with Alzheimer’s disease or dementia living in residential facilities. One level 1B study (Burns et al., 2009) and two level 2B studies (Dowling et al. 2007; Konis et al., 2018) found that, in general, daily exposure to bright light for 1 to 2 hours reduces behaviors, agitation, and depression. Interestingly, Dowling et al. (2007) determined that bright light exposure in the morning is more likely to reduce aberrant motor behavior, but bright light exposure in the afternoon is more likely to reduce depression and agitation symptoms. One level 3B study (Hickman et al., 2007) did not find a significant change in depression symptoms following bright light therapy.

Summary of Sensory Modulation Studies

There is moderate evidence to support the implementation of sensory modulation interventions to reduce maladaptive behaviors, reflected in reduced restraint, forced medication use, seclusion, and self-perceived arousal levels in adults residing in inpatient psychiatric facilities (Andersen et al., 2017; Gardner, 2016; Lee et al., 2010; Machingura et al., 2022). Sensory modulation interventions involve using sensory strategies to either increase or decrease arousal to remain in a calm and engaged state. Three of the four studies investigating the effectiveness of sensory modulation strategies utilized “sensory carts” that included various tools designed to increase or decrease arousal levels (Andersen et al. 2017; Gardner, 2016; Lee et al., 2010). One level 2A study (Andersen et al., 2017) and one level 3A study (Lee et al., 2010) found that implementing a sensory modulation program significantly reduced restraint and forced medication use in inpatient psychiatric facilities. One level 2B study (Machingura et al., 2022) determined that education and implementation of sensory modulation strategies for people diagnosed with schizophrenia residing in an inpatient mental health facility significantly improved occupational, health, and social functioning. In a level 3A study, Gardner et al. (2016) determined that sensory modulation strategies decreased self-perceived arousal levels for adults in an inpatient mental health unit.

Summary of Auditory Treatment Studies

There is a low level of evidence to support the use of sensory-based auditory interventions to reduce overall agitation levels in people diagnosed with Alzheimer’s or dementia residing in nursing homes (Lin et al., 2018; Vink et al., 2012). One level 1B study (Vink et al., 2012) compared the effects of music therapy and recreational therapy on reducing agitation. This study found limited evidence that music therapy is effective in reducing agitation symptoms. One level 3B pre-post cohort study (Lin et al., 2018) determined that 20 minutes of white noise daily was effective in decreasing aggressive behaviors, indicating that white noise reduces agitation in adults with dementia. However, both studies were unable to completely blind participants, staff, and researchers, which diminishes the strength of the evidence reported.
Summary of Olfactory Treatment Studies

There is a moderate level of evidence to support the use of essential oils to reduce depression and agitation. Two level 1B studies investigated the effects of essential oils administered via hand massage and misting on agitation, depressive symptoms, and disruptive behaviors in adults with Alzheimer’s or dementia (Burns et al., 2011; Fu et al., 2013). Burns et al. (2011) found that the use of essential oils administered via hand massage significantly reduced depression symptoms while maintaining a better quality of life compared to use of medication such as Donepezil. Fu et al. (2013) found that essential oils administered through hand massage and misting did not significantly reduce agitation symptoms or behaviors in adults with Alzheimer’s disorder.

Summary of Therapeutic Touch/Massage Studies

There is strong evidence to support tactile massage interventions in reducing aggressive behaviors and other mental health symptoms (Suzuki et al., 2010; Woods et al., 2005). One level 2B study and one level 1B study explored the effectiveness of tactile massage and therapeutic touch interventions on the reduction of aggressive and other behaviors common in hospitalized adults with dementia (Suzuki et al., 2010; Woods et al., 2005). Suzuki et al. (2010) implemented tactile massage five times a week for 30 minutes, and Woods et al. (2005) implemented therapeutic touch twice a day for an hour and a half. Both studies found that behaviors decreased following implementation of therapeutic touch and tactile massage.

Summary of Weighted Blanket Studies

One level 3A study determined that weighted blankets are effective in decreasing self-reported anxiety for adults in an inpatient mental health unit (Champagne et al., 2015). This study provided adults residing in an inpatient mental health unit with 30-pound weighted blankets for five minutes per treatment session, and were asked to report anxiety levels before and after treatment. This study provides a low level of evidence to support the use of weighted blankets. However, more research is necessary to investigate aspects of dosage, persistence of effect and appropriateness of the intervention for patients with various diagnoses.

Summary of Mixed Modality Treatment Studies

One level 3B study implemented a 5-month program to investigate the effectiveness of sensory-based interventions aimed to reduce environmental stimuli on assault and restraint rates for adults residing in an acute inpatient mental health setting (Yakov et al., 2017). Each month a new sensory reduction intervention was implemented, that was then maintained for the duration of the study. Yakov et al. (2017) found that restraint and assault rates were significantly decreased, and participants indicated a positive experience and long lasting culture change in the unit. However, these findings can not be connected to a particular sensory intervention and should be interpreted with caution because the participants were not constant throughout the study.
Implications for Practice

*Implications for Consumers:*

With this research, consumers in inpatient mental health units can advocate for more evidence-based practices that improve their life satisfaction. Additionally, consumers may use this research to self-advocate for more choice in sensory experiences like access to sensory carts or sensory-friendly spaces.

Consumers who may benefit from this research are families that may need to find care for their family members with mental health concerns. In making informed decisions regarding where their loved ones are cared for, families may be seeking alternative means of decreasing mental health behaviors, and may use the research to educate themselves on alternative treatments such as sensory-based interventions. Family members of individuals in inpatient mental health facilities should ask questions about the strategies used to address dysregulation and alternative means that may be used in exchange for seclusion and medication. Families should be aware of the wide variety of choices in interventions that are available to address emotional and sensory needs that may ultimately lead to agitation, outbursts, and maladaptive behavior.

*Implications for Practitioners*

Overall, therapists may use this research as a roadmap for implementing sensory-based interventions and training staff on using techniques for sensory-based interventions in adult mental health residential facilities. Research indicated that training all staff leads to greater intervention results, and provided strategies and timelines for educating staff. Feasibility of implementing new programming depends on the sensory-based intervention type as well as organizational factors. For example, to implement one of sensory-based interventions involving light therapy, the occupational therapist would need to make more environmental changes to the light fixtures in the unit, rather than implement group or individual interventions.

The transferability and usefulness of different sensory-based interventions for occupational therapists depends on the setting and available resources. Organizational factors like readiness and culture of mental health settings may impact occupational therapists' ability to implement sensory-based interventions; training all staff and integrating therapeutic elements into the unit like sensory carts requires significant staff adherence. Other practitioners in mental health settings, including social workers and licensed mental health counselors, may find the research useful and integrate interventions into clinical practice.

*Implications for Researchers*

Continued research in sensory-based interventions is necessary, as this review examined a broad topic and a wide range of populations. Further research is needed to substantiate effectiveness of sensory-based interventions for adults in acute inpatient psychiatric facilities. The research available was predominantly compiled with adults with dementia or Alzheimer's. Future research focused on specific senses or interventions will help clarify the effectiveness of singular sensory-based interventions. Examples of questions that may be addressed in future research include: how effective is light therapy in reducing maladaptive behaviors; how effective is tactile input in reducing maladaptive behaviors; how effective is access to sensory carts in reducing maladaptive behaviors? Through our efforts,
the authors found that “sensory-based interventions” was an extensive concept. Focusing solely on one type of sensory-based intervention (e.g. auditory, olfactory) may provide more substantial evidence than researching sensory-based interventions comprehensively. Additionally, further research conducted in the United States will improve transferability of evidence-based practice in the American healthcare system. Most of the research reviewed (10:12) was conducted outside of the US. While the research does provide valuable evidence of the effectiveness of interventions, location greatly determines the healthcare system, billing system, and available resources for implementation.

**Bottom Line for Occupational Therapy Practice/ Recommendations for Best Practice**

Evidence from the research indicates that sensory-based interventions are relatively inexpensive and can be effective in reducing agitation and maladaptive behaviors. Consumers can advocate for use of sensory-based interventions at their facility in order to improve quality of life. Research can be applied to adult inpatient mental health settings depending on resources and feasibility. For example, weighted blankets were effective in reducing self-reported anxiety, but may be a prohibited item due to potential safety concerns. Trends in research indicate that best results occur when staff are educated on the impact of sensory-based interventions for behavior management. Interventions involving white noise, light therapy, and aromatherapy had the best evidence and are the most relevant and applicable to the practitioner’s setting. These interventions can improve patients’ quality of life as well as staff experiences.
Involvement Plan

After conducting the literature review, the researchers met with the collaborator to discuss the research findings and explore options for knowledge translation. During the meeting with the collaborator, each member of the research team explained an aspect of the project thus far. This included a description of the inclusion criteria that guided the database search, an explanation of both the PRISMA chart and table that summarized the key findings within the articles, and a discussion around potential options for our knowledge translation project. There was also an opportunity for both the researchers and collaborator to ask remaining questions. The collaborator was excited about the research summary and showed interest in the sensory-based interventions that were found to be effective for inpatient mental health clients.

At the beginning of the research endeavor, the collaborator shared that she wanted to know about current research regarding sensory-based interventions to potentially improve occupational therapy services and the patients’ sensory experiences. After hearing the summary of the research, she hoped to utilize the research reviewed to implement sensory-based interventions and environmental modifications within her practice setting. Additionally, the collaborator shared that she was recently awarded a $10,000 grant to purchase supplies that will be used in the facility. The collaborator shared her plans to purchase sensory-based intervention materials such as weighted blankets and iPods. She hoped to utilize the money from the grant to implement interventions found in the research. While the collaborator had not pre-identified a specific knowledge translation project, she explained that an inservice to provide staff training would not likely be feasible at this time. She expressed interest in receiving information that would assist her in the implementation of sensory-based interventions and environmental modifications described in the research to meet the needs of the clients served.

Needs Assessment

Researchers identified three main goals for the knowledge translation project and proposed them to the collaborating practitioner. The first goal involved education of staff, which
would require substantial time, resources, staff buy-in, and supervisory approval. The second goal was to provide information and evidence to the collaborating practitioner about the existing research surrounding sensory-based interventions. The final goal was to implement sensory-based environmental changes in the unit to decrease maladaptive behaviors. Researchers identified that staff adherence and structural willingness to change impede the collaborator’s ability to implement environmental changes. Similar to the first goal, policies regarding safety limit the possibility of following through with the goal of making evidence-based alterations to the environment.

Researchers proposed potential options for reducing maladaptive behaviors to the collaborating practitioner using the knowledge translation goals as a starting point. Researchers identified five possible solutions to provide information and evidence to educate the collaborating practitioner about sensory based interventions. The proposed solutions included the following:

1. Create a resource (presentation, binder, handout, etc) that contains the details and effectiveness of the sensory-based interventions.
2. Create a guide for implementing sensory-based interventions and the staff training required.
3. Outline the methods and procedures for the implementation of sensory-based interventions.
4. Create a one-page screening tool related to sensory preferences for staff and patients.
5. Complete a needs assessment to develop a suggested program for implementing environmental modifications.

The collaborating practitioner expressed excitement about all of the proposed solutions. The practitioner identified that a combination of the first three proposed solutions would be the most beneficial. Researchers planned to incorporate elements of the first three proposed solutions by creating a guide to implementation in the form of a binder that describes
implementation strategies and the efficacy of the sensory-based interventions that had been identified during the research process.

**Knowledge Translation Activity**

The implementation guide was planned to provide information on sensory-based interventions that could be beneficial for individuals residing at the participating mental health hospital. The researchers planned to create the implementation guide by summarizing each of the 16 relevant interventions found in the research and including a full copy of each of the relevant peer-reviewed articles. To organize the implementation guide, the researchers planned to group the articles by type of sensory intervention (i.e. auditory, tactile, olfactory, etc.). In the summary of each article, researchers wanted to highlight the effectiveness of the sensory-based interventions and construct a summary to define the procedures to guide implementation of the interventions. The guide consisted of the following sections: study participants, implementation methods, materials needed or required training, cost of implementation, summary of outcomes used to evaluate effectiveness of an intervention such as agitation or depression reduction and any special considerations specific to any contraindications of the interventions or factors that would impact the intervention and its procedures. The information compiled for the knowledge translation will be used by the collaborator to advocate for implementation of specific sensory-based interventions to her supervisor and/or to educate the on-unit staff about sensory-based interventions. If and when approval from necessary entities is obtained, the information may be used as a guide to implementing said interventions within this inpatient mental health setting.

**Context**

There were some important contextual factors considered when the knowledge translation implementation guide was created. The supervisory structure of the collaborator’s setting is not static and changes on a regular basis. The organizational structure of the collaborator’s setting requires that all interventions utilized must first be approved by multiple individuals, many of whom may not be familiar with sensory-based interventions. To account for
this and support the collaborator in sharing the evidence for sensory-based interventions, the language used in the implementation guide was designed to be understood by a variety of individuals who may not have a background in healthcare.

Knowledge Translation Effort

Based on the information received and input from the collaborator, the researchers identified a common format that would be utilized to structure the summary sheets in the implementation guide. Each summary sheet would consist of the article title, a concise summary of the study, a description of the participants, a list of materials used and their respective costs, a summary of intervention implementation procedures, a summary of expected outcomes, any special considerations for intervention implementation, and the APA citation for the article. Special considerations included information related to safety concerns for the intervention and supplementary information to further inform the collaborator on how to accurately implement the interventions.

After the researchers determined the format and relevant content to include in the implementation guide summary sheets, the research articles were equally distributed to each member of the group for development of the summary sheets by an agreed-upon due date. After completing the implementation guide summary sheets, the research group met to review the sheets for editing. Once the implementation guide was edited and the guide was completed, it was sent to the project chair for review and approval. The project chair reviewed the implementation guide in its entirety, and provided suggestions to increase readability and to include additional resources to support the collaborator’s application of the guide. After receiving feedback, the researchers completed the necessary edits as a team to ensure consistent formatting and content across the entirety of the implementation guide. In general, maintaining a consistent format throughout the guide was challenging. The materials, cost, and outcome measures sections were specifically targeted during the final editing process to improve consistency, clarity, and to ensure that the language used was useful for a general audience. Following the completion of the final round of edits, each member of the research team
completed an individual read-through of the entire implementation guide to ensure grammar, structure, style, and formatting were consistent and accurate.

To construct the implementation guide, the summary sheets were printed out, along with a copy of each of the 16 research articles. In addition, a preface explaining the purpose and organizational structure of the implementation guide, a table of contents, and a guide to abbreviations were included in the binder (see Appendix D). The table of contents clearly displayed each of the articles by population, type of intervention, article author, and date published. The abbreviation guide consisted of all abbreviations utilized throughout the implementation guide and predominantly consisted of abbreviations for assessments used to measure outcomes. Having an abbreviation guide will support the collaborator when sharing the implementation guide with other stakeholders who may not be familiar with occupational therapy assessments and terms. The research findings were easily categorized into two populations: adults with mental illness and adults diagnosed with dementia or Alzheimer’s disease residing in an inpatient mental health unit. Within the binder, dividers were used to clearly display the two populations specified in the research and the 8 various types of sensory interventions laid out in the implementation guide. The summary sheets were placed in their respective category followed by the full article to allow the collaborator to refer to them for additional details and guidance.

The researchers faced some difficulties when creating the implementation guide. Some of the research articles did not list intervention procedures in great detail and did not specify the supplies utilized to implement interventions. Some of the relevant training programs and supplies used in the research could not be found in online searches to determine reference sources and pricing or were no longer available. Additionally, the researchers experienced difficulty initially finding a format for the summaries which was applicable to all studies. In particular, even with putting forth the best effort to create effective formatting, it was still difficult to translate the sensory modulation research studies due to the flexible and unique nature of these types of interventions.
Workflow

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<td>March 20th, 2023</td>
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<td>Presented printed and completed implementation guide to collaborator; sent outcome monitoring survey to the collaborator</td>
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<td>Received outcome survey results from collaborator</td>
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Outcomes Monitoring

The research team monitored the outcomes of the knowledge translation effort through the use of a post-knowledge translation survey (see Appendix E) which was provided to the collaborator following the delivery of the implementation guide. The survey included one
free-response question and 8 Likert scale questions which ranged from “1- strongly agree” to “5- strongly disagree”. These questions were divided into three categories that evaluated the collaborator’s understanding of the content, as well as the organization and usefulness of the implementation guide as a whole. In addition to these outcomes, the questionnaire inquired about the collaborator’s perception of her ability to introduce the implementation guide to the on-unit staff and/or supervisory staff. The open-ended question inquired about potential changes that could be made to the guide in order to increase its effectiveness as a resource for sensory-based interventions within the inpatient setting.

This survey was provided through a Google form in order to assist in collaborator accessibility and ease of retrieval for the researchers following its completion. This method of delivery has the additional benefit of being able to be readily shared with other practitioners, on-unit staff, and supervisory staff. The researchers requested that the questionnaire be sent to other members of the staff who are able to view the implementation guide in order to gather more outcome-monitoring data with a cutoff date of May 1, 2023. The research team will use the data collected from the questionnaire to determine the effectiveness of this mode of content delivery and to make a note of suggestions for future projects.

**Evaluation of Outcomes**

To date, the outcome monitoring survey was completed only by the collaborator. This allowed the researchers to determine the collaborator’s perspective on the effectiveness of the organization, understanding, and usefulness of the implementation guide. The survey results indicated that the collaborator was satisfied with the implementation guide. She reported the “strongly agree” or “agree” on all Likert scale questions provided. The collaborator indicated that the content was easy to understand, and it assisted her in understanding how to implement sensory-based interventions. To speak on behalf of the organization, she determined that she “strongly agreed” that the materials within the implementation guide were organized in a clear and easily understandable manner. When asked to rate its overall usefulness, she “strongly agreed” that it is an effective resource for informing a clinician on the implementation of
sensory-based interventions and that she plans to refer to it in the future for guidance. Additionally, she felt that it provided sufficient information which has helped her formulate a better understanding of sensory-based interventions and how to implement them. The last portion of the survey was a free-response question inquiring about the guide’s overall effectiveness. The collaborator indicated that there were not any changes or additions that she would suggest to make the implementation guide more effective as a resource.

The collaborator’s written response to the survey speaks to her overall satisfaction and experience with the implementation guide, which was as follows:

This is a very thoughtfully constructed resource that I will continue to refer to build our program and the supports we can provide. The addition of the articles as well enables me to look for more details while the summary pages are a great reference to refer to for the general idea. There are many things I had not heard of - like the therapeutic touch certification - that I look forward to exploring soon. Thank you!

The information gathered from the survey serves to verify the effectiveness of the implementation guide as well as to support the logistical decisions made by the researchers. The collaborator expressed enthusiasm when receiving the guide and responded promptly in completing the outcome monitoring survey. Her written answer to the free-response section of the survey indicated that the implementation guide was useful both in exposing her to different sensory-based interventions as well as continuing education options relevant to sensory-based interventions. The collaborator’s response regarding the relevance of the research articles validated the choice to include the full articles within the implementation guide. The indication that these will be used to gain a greater understanding of the implementation details when utilizing one of the interventions within is reassuring as this is how the researchers had anticipated the articles would be used. However, the researchers recognize that this may not be a viable option when including substantially more interventions within an implementation guide. Despite the researchers’ challenges with formatting the summary sheets, the collaborator indicated that the organization of the implementation guide was clear and easily understood.
This indicates that efforts to effectively organize the information presented in the implementation guide were successful.

Although the results of the survey were overwhelmingly positive, the small population size \((N = 1)\) may not indicate strong generalizability. The implementation guide was carefully curated for the collaborator, her individual needs as a practitioner, and the setting in which she works. In order to bolster and validate the results of the survey, the researchers would need data from additional readers/users of the guide. To accomplish this, the researchers should encourage the collaborator to provide on-unit staff or supervisory staff with the survey to complete if or when they view the guide. It is expected that the collaborator will share this guide when advocating for environmental changes and/or purchasing materials to support the implementation of sensory-based interventions. It would be beneficial for the researchers to inquire about the effectiveness and clarity of the organizational structure and language used throughout the implementation guide from individuals who do not have an occupational therapy or healthcare background. This would help to ensure that the resource would be effective for a multitude of practitioners working within in-patient mental health settings.

**Recommendations**

Researchers recommend that the continuation of this research endeavor include a follow-up research effort that explores a specific component of the findings in greater depth. To focus on one component, the researcher may limit inclusion criteria to one type of sensory-based intervention or a specific mental health diagnosis. Conducting research on a specific sensory-based intervention (e.g. auditory) may produce more substantial evidence for the use of sensory-based interventions to produce additional outcomes related to behavior and mood. Additionally, reviewing research for one specific intervention will give a better understanding of how to implement the sensory-based intervention effectively. By focusing on a specific population, projects may uncover further evidence to distinguish the effectiveness of sensory-based interventions for those in specific age groups or with certain mental health diagnoses.
Another area of focus that would expand the clinical knowledge and application of sensory-based interventions is follow-up research that considers restrictions that are typical for inpatient mental health. By considering common restrictions in inpatient mental health settings, including the materials allowed in the settings and feasible intervention budgets, researchers may be able to provide practitioners with more appropriate sensory-based intervention implementation strategies that adhere to safety concerns. Researchers may choose to explore this topic in the portion of the research that focuses on considerations and limitations.

Additional follow-up research topics include addressing occupation-based outcomes, exploring the relationship between mental health diagnoses and sensory processing, and additional research on sensory-based interventions with the general adult population in the United States. While researchers did encounter literature that touched on occupation-based outcome measures, further research efforts should address the effectiveness of sensory-based interventions that focus on outcomes related to occupational performance and satisfaction. Research highlighting sensory patterns and profiles of those with various mental health diagnoses may bring further nuance and understanding to an evidence-based practice involving sensory-based interventions. Additionally, the research involving sensory-based interventions with strictly adult mental health populations was difficult to narrow down, because sensory interventions are more frequently researched in child or adolescent populations. Addressing adult sensory needs may be beneficial for those with mental health diagnoses in an inpatient setting. This is an area of research that should be further explored, particularly with follow-up research in the United States, as the majority of the sensory-based interventions included in this research effort were conducted in other countries.
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https://doi.org/10.1177/1471301219869121


## Appendix A

### Search Tracking Table

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## Appendix B

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<td>Evaluating the safety and effectiveness of the weighted blanket with adults during an inpatient mental health hospitalization.</td>
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**JM** indicates that the intervention was sensory-based.


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## Appendix C

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<td>(4) Dowling et al. (2007)</td>
<td>(4) NPI-NH (behaviors)</td>
<td>(4) AM BLT: stat sig increase agitation/aggression &amp; decrease aberrant motor behavior; PM BLT: stat sig increase in depression/dysphoria</td>
<td>(4) AD dx, long-term residential unit</td>
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<td>Sensory Modulation</td>
<td>(1) Machingura et al. (2022)</td>
<td>(1) distress</td>
<td>(1) stat sig decrease</td>
<td>(1) schizophrenia dx</td>
<td>1 of 4 sensory modulation interventions led to a statistically significant decrease in distress sx for patients with schizophrenia diagnoses. 2 of 4 sensory modulation interventions produced a decrease in restraint and forced med use, and seclusion</td>
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<td>(2) Andersen et al. (2017)</td>
<td>(2) use of restraint &amp; forced medication</td>
<td>(2) decrease in restraint and forced med, decrease in behaviors</td>
<td>(2) 18-65y.o., psych inpt</td>
<td>1 of 4 sensory modulation interventions decreased self-perceived arousal levels.</td>
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<td></td>
<td>(3) Lee et al. (2010)</td>
<td>(3) use of seclusion</td>
<td>(3) decrease in seclusion incidence</td>
<td>(3) acute psych inpt</td>
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<td>(4) Gardner (2016)</td>
<td>(4) self-perceived arousal levels</td>
<td>(4) decrease in self-perceived arousal levels</td>
<td>(4) adult inpt psych</td>
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<td>Intervention Type</td>
<td>Study References</td>
<td>Effects and Findings</td>
<td>Demographics and Settings</td>
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| Auditory Tx (1-music therapy, 2-white noise) | (1) Vink et al. (2012)  
(2) Lin et al. (2018) | 1. agitation sx  
2. agitation behaviors  
(1) decrease in agitation (tx and ctrl)  
(2) stat sig decrease in agitation behaviors, insig effect on ADL and mental status | (1) dem, NH  
(2) dem dx, inpt, <65y.o.  
2 of 2 auditory interventions had a statistically significant decrease in agitation and agitated behaviors. One auditory intervention used 20-minutes of white noise/day, and the other introduced music therapy 2x/week. |
| Aromatherapy (olfactory)          | (1) Burns et al. (2011)  
(2) Fu et al. (2013) | 1. agitation and depressive sx  
2. disruptive behaviors  
(1) stat sig decrease in depressive sx compared to medication grp  
(2) no stat sig difference, slight decrease in behaviors | (1) AD or clinical dem dx, NH  
(2) 60+y.o. AD, NH  
1 of 2 Aromatherapy interventions showed a statistically significant decrease in agitation and depressive symptoms in patients with AD or clinical dem residing in nursing homes. 2 of 2 studies utilized the use of essential oils administered through hand massage and misting |
| Therapeutic Touch/Massage (Tactile) | (1) Woods et al. (2005)  
(2) Suzuki et al. (2010) | 1. frequency and intensity of behavior sx  
2. sx of aggressive bx, stress and mental fx  
(1) stat sig decrease in behavioral sx  
(2) stat sig decrease in aggressive bx and stress, not sig difference on mental fx | (1) AD dx, unit  
(2) dem dx, dem inpt ward  
2 of 2 tactile interventions showed statistically significant improvements in behavioral and psychological sx related to dem and AD. |
| Weighted Blanket (tactile)        | (1) Champagne et al. (2015) | 1. anxiety  
(1) stat sig decrease in self-reported anxiety | (1) 18-54 y.o inpt MH  
1 of 1 Weighted blanket interventions showed a statistically significant decrease in self-reported anxiety for patients in inpt MH setting. |
| Mixed methods (auditory, visual(light), art, proprioception, aromatherapy, gustatory) | (1) Yakov et al. (2017) | (1) assault and restraint rates | (1) stat sig decrease in restraint hrs & assault rates, improved culture (more peaceful) | (1) adult psych inpt | 1 of 1 mixed methods sensory-based interventions found statistically significant decreases in restraint usage and assault rates in an adult inpatient psychiatric unit. These improvements could not be attributed to only one sensory-based intervention based on the study design. |
Appendix D

Implementation Guide

Implementation Guide of Sensory-Based Interventions in Inpatient Mental Health Settings

This implementation guide, submitted by

Yvonne Brigmon, Audrey Ginger, Audrey Larsen, Julia Matos

has been approved and accepted
in partial fulfillment of the requirements for the degree(s) of
Master of Science in Occupational Therapy (and) Occupational Therapy Doctorate
from the University of Puget Sound.
Preface

This resource is meant to guide clinical reasoning and use sensory-based intervention strategies for inpatient mental health settings. The researchers completed a literature review covering the dates 2000 to 2022 and found 16 articles that fell within the inclusion criteria. The researchers extracted and summarized the implementation strategies used in each study and recorded the outcomes, credibility, and special considerations for each sensory-based intervention. In addition to the information pulled and summarized from the studies, the researchers generated a rough cost breakdown for implementing the sensory-based interventions. This information was summarized and organized within this implementation guide.

The resource is organized based on the population’s mental health diagnosis. Within each mental health diagnosis section, the articles are organized based on the type of sensory system the intervention is focusing on. The articles within the sensory system sections are arranged based on statistical significance, organized by most to least effective.
Table of Contents

Abbreviation Guide .................................................................................................................. 4
Population: Dementia & Alzheimer's Disease........................................................................... 5-16
  Light Therapy ......................................................................................................................... 6-9
    Burns et al. (2009) ............................................................................................................. 6
    Konis et al. (2018) ............................................................................................................ 7
    Dowling et al. (2007) ....................................................................................................... 8
    Hickman et al. (2007) ..................................................................................................... 9
  Auditory Therapy .................................................................................................................... 10-11
    Lin et al. (2018) ............................................................................................................... 10
    Vink et al. (2012) .......................................................................................................... 11
  Aromatherapy ........................................................................................................................ 12
    Burns et al. (2011) ......................................................................................................... 12
  Combined Approaches .......................................................................................................... 13
    Fu et al. (2013) .............................................................................................................. 13
  Tactile Therapy ...................................................................................................................... 14-16
    Woods et al. (2005) ....................................................................................................... 14
    Suzuki et al. (2010) ....................................................................................................... 16
Population: Adult Inpatient Mental Health.............................................................................. 17-28
  Sensory Modulation .............................................................................................................. 18-24
    Machingura et al. (2022) ............................................................................................... 18
    Andersen et al. (2017) ................................................................................................. 20
    Lee et al. (2010) ............................................................................................................ 22
    Gardener et al. (2016) ................................................................................................. 24
  Weighted Blanket ................................................................................................................... 26
    Champagne et al. (2015) ............................................................................................. 26
  Combined Approaches .......................................................................................................... 27
    Yakov et al. (2017) ....................................................................................................... 27

*The page numbers reflected in the table of contents are not accurate for the purposes of the final document*
Abbreviation Guide

ACLS- Allen Cognitive Level Screen
ASP - Adolescent/Adult Sensory Profile
BPSD - Behavioral and psychological symptoms of dementia
BEHAVE-AD - Behavioral Pathology in Alzheimer's Disease Rating Scale
Blau QOL Scale - Blau Quality of Life Scale
CMAI - Cohen-Mansfield Agitation Inventory
COPM - Canadian Occupational Performance Measure
CSDD - Cornell Scale for Depression in Dementia
ERS - Emotions Rating Scale
MMSE - Mini Mental State Examination
ABRS - Modified Agitated Behavior Rating Scale
NPI - Neuropsychiatric Inventory
NPI-NH - Neuropsychiatric Inventory Nursing Home Version
PAS - Pittsburgh Agitation Scale
RPMBC - The Revised Memory and Behavior Checklist
SII - Sensory Integration Inventory
STAI-10 questionnaire - The State-Trait Anxiety Inventory for Adults
Dementia & Alzheimer's Disease
Light Therapy

**Article Title:** Bright light therapy for agitation in dementia: A randomized controlled trial.

**Summary of study:** Randomized control trial to investigate the effects of Bright Light Therapy (BLT) on agitation and sleep disturbances for those with dementia. No statistically significant difference between the control group and treatment group was found. No statistically significant decrease in agitation or improvement in sleep was found for the treatment group. However, sleep disturbances and agitation behaviors were trending down in the treatment group at the conclusion of the study.

**Participants:**
- 48 participants living in nursing homes specializing in the care of individuals with dementia and mental health disturbances
- All participants had a dementia diagnosis, sleep disturbances at least 2x a week, and the presence of agitated behaviors.

**Materials and Cost Range:**
- Full spectrum BLT 10,000 Lux light box (Cost Range: $26-$180)
- 100 lux standard fluorescent tube light (Cost: $10+)

**Implementation:**
- Participants were exposed to either the BLT (treatment group) or standard light (control group) between the hours of 10am-12pm while being engaged in conversation for 7 weeks

**Summary of Expected Outcomes:**
- Outcomes measured at week 1, 4, & 8
- Results
  - Agitation Symptoms: No statistically significant reduction but were trending down in the treatment group (as measured by CMAI)
  - Improvement in Sleep: No statistically significant improvement but sleep disturbances were trending down in treatment group (as measured by staff report)

**Special Considerations:**
- Time of year (winter, summer, spring, fall) may increase/decrease the positive benefits of the BLT

**Article Title:** Pilot study to examine the effects of indoor daylight exposure on depression and other neuropsychiatric symptoms in people living with dementia in long-term care communities.

**Summary of study:** Non-randomized clustered trial examining the effect of increasing indoor exposure to daylight on depression and neuropsychiatric symptoms on individuals with dementia living in care communities. Results suggest that an increased exposure to daylight can reduce depression for those with dementia.

**Participants:**
- 77 participants living in dementia care communities
- All participants had a dementia diagnosis, no physical comorbidities that prevented participation in the intervention, and a Mini-Mental State Exam score of less than or equal to 10.

**Materials and Cost Range:**
- Requires access to a room with windows that let in daylight
- Digital Charge Coupled Device Spectrometer (Cost varies significantly)
  - Used to measure Lux (the SI unit of illuminance, equal to 1 lumen per square meter)

**Implementation:**
- Participants taken to the daylight room to socialize between the hours of 8:00am-10:00am
  - Participants need to be within 3m of the windows
- Implemented 7x a week for 12 weeks

**Summary of Expected Outcomes:**
- Outcomes measured before and after intervention
- Results:
  - Depression Symptoms: Statistically significant decrease (as measured by CSDD)
  - Neuropsychiatric symptoms: Average decrease but not statistically significant (as measured by NPI-NH)

**Special Considerations:**
- Amount of daylight varies from day-to-day and can be difficult to get an accurate measurement of Lux
  - Amount of daylight measured by a digital charge coupled device spectrometer mounted on a mobile cart was used to evaluate the spectral composition of light by taking spot measurements of Spectral Power Distribution (SPD)

**Article Title:** Light treatment for neuropsychiatric behaviors in Alzheimer’s disease.

**Summary of study:** Randomized control trial examining the effect of timed morning or afternoon bright light therapy (BLT) compared with usual indoor light levels on neuropsychiatric behaviors for those with Alzheimer’s Disease (AD). Analyses revealed statistically significant differences between groups on agitation/aggression, depression/dysphoria, and aberrant motor behavior.

**Participants:**
- 70 participants living in long-term care facilities
- All participants had an AD diagnosis, experienced rest-activity disruption, were able to perceive light, and were on a stable medication regimen

**Materials and Cost Range:**
- Requires access to a room with windows that let in daylight or access to outside (>2,500 lux in gaze direction)
- APOLLO Brite Lite IV light boxes– 10,000 lux (cost varies significantly)
- Cal LIGHT 400 light meter (Cost Range: $75 for used, up to $400 new)
  - Used to monitor light levels

**Implementation:**
- Participants received either morning (9:30-10:30 a.m.) or afternoon (3:30-4:30 p.m.) BLT while participating in activities 5 times a week for 10 weeks
- If necessary, participants were moved to ensure that they received > 2,500 lux per day.
  - APOLLO Brite Lite IV light boxes were used when necessary to supplement the ambient light.

**Summary of Expected Outcomes:**
- Outcomes measured before and after intervention
- Results:
  - Agitation/Aggression Symptoms: Statistically significant increase (AM BLT) (as measured by NPI-NH)
  - Aberrant Motor Behavior: Statistically significant decrease (AM BLT) (as measured by NPI-NH)
  - Depression/Dysphoria Symptoms: Statistically significant increase (PM BLT) (as measured by NPI-NH)

**Special Considerations:**
- The authors note that, “The magnitude of change was small and may not represent clinically significant findings” and “One could conclude from our findings that bright light therapy did not clinically affect neuropsychiatric behaviors” (Dowling et al., 2007, p. 971).
- Morning BLT may increase agitation and aggression and may not be appropriate.
- Evening BLT may increase depression/dysphoria symptoms and may not be appropriate.

**Article Title:** The effect of ambient bright light therapy on depressive symptoms in persons with dementia

**Summary of Study:** Randomized control trial to assess the effectiveness of ambient bright light therapy (BLT) on depressive symptoms in people 66+ years old with a diagnosis of dementia. This study found no significant decrease in depressive systems for people with dementia who were exposed to bright light therapy at any time of day for 2+ hours compared to standard lighting conditions.

**Participant Demographics:**
- 66 adults who are 65 and older with dementia residing in two geriatric units of a state-operated psychiatric hospital.

**Materials and Cost Range:**
- Lighting systems ranging from 500 to 600 lux to 2,000 to 2,500 lux
  - 1 Lux to Lumens Per Square Foot = 0.0929
- Purchase of computerized control system
- Installation of lights and computerized control system
  *The cost of implementation varies drastically based on size of room, lighting systems used, and local costs of installation.

**Implementation:**
- Installation of high-intensity, low glare ambient lighting system and other environmental modifications
  - Low-gloss, highly reflective paint on ceiling
  - Non-reflective materials for furniture
  - Computerized control systems to adjust lighting on a pre-set schedule
- Goal: 2+ hours of bright light exposure for each participant

**Summary of Expected Outcomes:**
- Outcomes measured before and after intervention
- Results:
  - Depressive symptoms: No statistically significant change (as measured by CSDD)

**Special considerations:**
- Excluded individuals with bipolar disorder and certain eye diseases due to concerns of adverse reactions to high-intensity light
- There may be some benefits with clients with dementia, but may worsen symptoms in others.
- Eyes of older persons admit considerably less light and may require brighter light to achieve the same result
- Sample study did not include those with a depression diagnosis

Auditory Therapy

Article Title: The effects of white noise on agitated behaviors, mental status, and activities of daily living in older adults with dementia.

Summary of study: Pre/post experimental design examining the effect of white noise on agitation, performance in activities of daily living, and overall cognition of patients with dementia. Results showed a statistically significant decrease in agitated behaviors of those who were exposed to white noise.

Participant Demographics:
- 63 residents 65+ years old living in a variety of 6 different dementia care facilities in Taiwan
- Ability to communicate, absence of hearing disorder, ability to give written consent

Materials and Cost range:
- Rechargeable white noise machine (Cost range: $17-$30)

Implementation:
- Exposed to 20 minutes of white noise every afternoon (4:00 - 5:00 pm) for 1 month
  - White noise sounds: rain, sea, waves, and electric fans.
  - Volume at 55-70 decibels
- Able to leave intervention room at any point if unable to control emotions or behavior

Summary of expected outcomes:
- Outcomes measured before and after intervention
- Outcomes:
  - Agitation Symptoms: Significant decrease (as measured by CMAI)
  - Cognition: No statistically significant improvement (as measured by MMSE)
  - Activities of Daily Living Performance: No statistically significant improvement (as measured by Barthel Index)

Special considerations/exclusions:
- Frequency, intensity and aspects of the white noise intervention may impact individuals differently

[https://doi-org.ezproxy.ups.edu:2443/10.1097/JNR.0000000000000211](https://doi-org.ezproxy.ups.edu:2443/10.1097/JNR.0000000000000211)
**Article Title:** The effect of music therapy compared with general recreational activities in reducing agitation in people with dementia: A randomised controlled trial.

**Summary of study:** Randomized control trial evaluating the impact of music therapy on agitated behaviors in participants with dementia over a 4 month period. Both groups experienced a decrease in agitation, but there was not a significant difference in the decrease of agitation in participants who received music therapy versus participation in recreational activities.

**Participant Demographics:**
- 94 residents from 6 nursing homes in the Netherlands with a diagnosis of dementia
- High level of agitation-related behavioral problems (CMAI score of > 44)

**Materials and Cost range:**
- Bluetooth Speaker (Cost Range: $22-$40)
- Musical Instruments (Cost varies)

**Implementation:**
- Group A participated in music therapy intervention 40 mins 2x/week (maximum of 34 sessions) with trained music therapist
  - Music chosen strategically to reduce agitation and encourage positive memories (slow tempo, little instrumentation)
  - Allowed residents to listen to music, dance or play instruments
  - Conducted with a maximum of 5 residents
- Group B participated in recreational day activities 40 mins long provided by OT
  - Types of activities: handwork, playing shuffleboard, cooking, puzzle games.
- Both interventions were completed in a separate area away from the unit, and individuals were allowed to leave at any time

**Summary of expected outcomes:**
- Outcomes measured before and after intervention
- Results
  - Agitation Symptoms: decrease in agitation, not statistically significant (as measured by CMAI)

**Special considerations/exclusions:**
- Individual participants were impacted differently by music, and intervention was adjusted to the individuals capacities
- Agitated behaviors were difficult to document
- Requires a music therapist for implementation

Aromatherapy

Article Title: A double-blind placebo-controlled randomized trial of Melissa Officinalis oil and Donepezil for the treatment of agitation in Alzheimer’s disease.

Summary of study: Double-blind, placebo-controlled randomized study to investigate the effects of lemon balm essential oil (Melissa officinalis) on agitation in individuals with Alzheimer’s disease. This study found that there was no difference in the agitation experienced by participants of the study. However, there was a statistically significant decrease in dysphoria and depressive symptoms in the groups that received the essential oil intervention.

Participant Demographics:
- 81 participants from 3 clinical centers in various parts of the United Kingdom
- Agitation that occurred over 4 weeks with significant agitation (CMAI > 39)
- Patients resided in residential care facility, met criteria for probable or possible Alzheimer’s disease, were 60+ years old, free of psychotropic medication for 2+ weeks

Materials and Cost range:
- Melissa Essential Oil (Cost: $15.29+)

Implementation:
- Caregivers instructed by a nurse who was trained by an aromatherapist to apply oil formulated into lotion
- Application process of essential oil: Gently apply the oil/lotion into skin of hands and upper arms for 1-2 minutes, twice a day for a total of 200mg of oil
- 2 control groups who received medication (Donepezil) or a placebo tablet to decrease agitation.

Summary of expected outcomes:
- Outcomes measured before and after intervention
- Results
  - Agitation: No statistically significant difference between treatment and control (as measured by PAS)
  - Depression/Dysphoria: Statistically significant decrease in those who received massage with essential oils (as measured by NPI)
  - Quality of life: statistically significantly decreased in those who received Donepezil (as measured by Blau QOL scale)

Special considerations:
- Individuals were excluded if they had severe, unstable or poorly controlled medical conditions such as epilepsy, cardiovascular disease, asthma, severe chronic obstructive airway disease or a history of stroke.
- Essential oils may be contraindicated for individuals with open wounds, or sensitivities to certain perfumes or smells

**Combined Approaches**

**Article Title:** *A randomised controlled trial of the use of aromatherapy and hand massage to reduce disruptive behaviour in people with dementia.*

**Summary of study:** Single blinded randomized controlled trial to investigate the effects of aromatherapy and aromatherapy with hand massage in reducing disruptive behavior for patients with a dementia diagnosis. Researchers found no statistically significant decrease in disruptive behaviors. They found that while there were some observed benefits from the intervention, it was specific to the individual and not generalizable.

**Participant Demographics:**
- 67 individuals who were 60+ years old living in long-term care facilities in Australia
- Participants were living in the nursing homes for at least 3 months, had an MMSE score < 24, had a history of restraint use for agitation and aggression, no known allergies, and had no recent skin tears/lacerations/bruises/redness
- Participants were excluded if they had a diagnosis of schizophrenia/intellectual disability

**Materials and Cost range:**
- Aromatherapy spray, 3% lavender mist (75 drops of 100% lavender oil mixed with 4 ml essential oil solubilizer, 125 cc purified water)
  - Pure 100% Lavender Oil (Cost $16 for 4 fl. Oz)
  - Polysorbate 20 (Essential oil solubilizer) (Cost $20 for 16 fl. Oz.)
  - Spray bottle (Cost: $14 for a pack of 5)

**Implementation:**
- Aromatherapy treatment 2x daily for 6 weeks
  - 3 sprays of lavender oil applied to participant’s chest at ~ 30 cm distance, avoiding face and eyes
- Aromatherapy and hand massage completed 2x daily for 6 weeks
  - Same protocol for aromatherapy
  - 5 minutes of hand massage 2x per day for 10 days (each hand massaged for 2.5 min)

**Summary of expected outcomes:**
- Outcomes measured before, during, and after intervention
- Results:
  - Aggression: slight, not statistically significant decrease for both treatments (as measured by CMAI-SF)

**Special considerations/exclusions:**
- People with dementia can experience olfactory dysfunction, which may make this treatment ineffective

Tactile Therapy

**Article Title:** The effect of therapeutic touch on behavioral symptoms of persons with dementia.

**Summary of Study:** Double-blind study to investigate the effect of therapeutic touch on the frequency and intensity of behavioral symptoms associated with Alzheimer’s disease and related dementia. This study found that implementing therapeutic touch twice a day for three days significantly decreased restlessness and vocalization behaviors compared to a control group. These results suggest that therapeutic touch may decrease physical agitation and stress that cause vocalizations and restlessness.

**Participants:**
- 57 individuals diagnosed with Alzheimer’s disease, aged 67-93 years old, who showed behavioral symptoms of dementia and had a MMSE score < 20
- Participants were residing in special care or long-term care units

**Materials and Cost Range:**
- Therapeutic Touch Training:
  - Option 1:
    - Completing Mentoring program for 1 year with qualified practitioner
    - Certification (Cost $25.00 per year)
  - Option 2:
    - Foundation in Therapeutic Touch 2-day training (Cost $175.00)
    - Resource: https://www.therapeutictouchwashington.com/

**Implementation:**
- Administered Therapeutic Touch protocol with consent from participants to get a “shoulder rub”, for 5-7 minutes between 10:00-11:30 AM and 3:00-4:30 PM for 3 days in the participants' room
  - Protocol:
    - Practitioner establishes mental intention to therapeutically assist the participant and create a quiet space
    - Stand behind participant and rest hands on shoulders
    - Perform a series of gentle movements (down the back, up the back, up the neck, behind ears)
    - Rest one hand on forehead and other behind neck
    - Rest hands on shoulders and direct thoughts of balance toward participant

**Summary of Expected Outcomes:**
- Outcomes measured before and after intervention
- Results:
  - Behavioral Symptoms of Dementia: statistical significant decrease (as measured by RPMBC & ABRS)

**Special Considerations:**
- Therapeutic Touch requires specific training and certification
- Short treatment time (3 days) may diminish validity of findings

**Article Title:** Physical and physiological effects of 6-week tactile touch intervention on elderly patients with dementia and nurses administering tactile touch.

**Summary of study:** Randomized control trial investigating the impacts of a 6-week tactile massage protocol on behavioral and psychological symptoms of dementia. The tactile massage is a series of slow massage strokes applied with firm pressure. The results of the study suggest that tactile massage performed 5 times a week for 6 weeks significantly decreases aggressive behaviors and stress in people with dementia.

**Participants:**
- 28 hospitalized patients diagnosed with dementia in a specialist dementia ward

**Materials and Cost Range:**
- Complete 2-day tactile massage training course (Japan Sweden Care Institute's Tactile Care Course I)
- Olive oil (Cost ~$15 per 48 fl. Oz.)
- Towels (Cost $20 for pack of 24, 12 x 12 in. washcloths)

**Implementation:**
- Tactile massage given for 30 minutes 5x per week for 6 weeks between 4:00 and 5:00 PM (30 interventions in total)
  - Done in a quiet space or private room away from other patients
- Tactile massage/Tactile Care Protocol: *(see Table 1 in Suzuki et al. (2010))*
  - Gather consent from participant
  - Wrap both hands of participant in towel
  - Remove one hand at a time to massage olive oil on the subject's hands
  - Lightly stroke and make clockwise circles on the participant's hand– sides of hand, each finger, palm, wrists

**Summary of Expected Outcomes:**
- Outcomes measured before and after intervention
- Results:
  - Aggressive behaviors: Statistically significant decrease (as measured by BEHAVE-AD)
  - Stress: statistically significant decrease (as measured by salivary CgA levels)
  - Mental state/functioning: slight increase, not statistically significant (as measured by MMSE)

**Special Considerations:**
- If the therapist giving tactile massage does not have a therapeutic rapport with the participant, the tactile massage may increase anxiety.
- Tactile Care Protocol requires specialized training
- Tactile Care Course cost was unable to be determined

Adult Inpatient Mental Health
Sensory Modulation

Article Title: Effectiveness of sensory modulation for people with schizophrenia: A multisite quantitative prospective cohort study.

Summary of Study: Multisite quantitative prospective cohort study to study the impact of sensory modulation therapies for people with schizophrenia in an inpatient psychiatric setting. This study found the therapy group showed statistically significant improvements in reducing distress following the intervention, but found no statistically significant improvement between the treatment and control group. Significant differences between sensory processing patterns of people with schizophrenia diagnosis as compared to the general population was noted.

Participant Demographics:
- 41 participants with a diagnosis of schizophrenia
- Participants were hospital residents from a Statewide Forensic Hospital and a hospital with Psychiatric Acute Units and an Extended Treatment Psychiatric Unit

Materials and Cost Range:
- Study did not describe materials used for sensory modulation

Implementation:
- OTs provided group therapy sessions with SM emphasis
  - Aimed to develop participant self-awareness of their own sensory preferences, and therapists’ knowledge of participants’ sensory preferences
  - Helped participants develop skills in adopting and using SM in their daily lives

Summary of Expected Outcomes:
- Outcomes measured before and after intervention
- Results:
  - Treatment vs. Control Groups:
    - Distress: No statistically significant difference in outcomes (as measured by ERS)
    - Occupational Performance and Satisfaction: No statistically significant difference (as measured by COPM)
    - Cognitive Functioning: No statistically significant difference in outcomes (as measured by ACLS)
  - Treatment Group:
    - Distress: statistically significant improvement following intervention (as measured by ERS)
    - Occupational Satisfaction: statistically significant improvement following intervention (as measured by COPM)

Special Considerations:
- Participants were in varying stages of treatment
- Training package used still requires further validation as that could have affected the knowledge and skill level of staff providing interventions.
- Participants included in the study had varied sensory processing profiles compared to the general population.
- Control group had significantly less participants than the treatment group ($N_{control} = 11$, $N_{treatment} = 30$)

Machingura, T., Shum, D., Lloyd, C., Murphy, K., Rathbone, E., & Green, H. (2022). Effectiveness of sensory modulation for people with schizophrenia: A multisite
**Article Title:** Applying sensory modulation to mental health inpatient care to reduce seclusion and restraint: A case control study.

**Summary of Study:** A case-control study in an inpatient psychiatric setting to research the effectiveness of applying sensory modulation strategies to reduce the use of forced restraint and seclusion. Researchers found that implementing sensory modulation strategies, which included training staff in sensory modulation methods and using a sensory-based assessment tool to create individualized plans for patients with a prior history of restraint or observed sensory modulation dysfunction, significantly reduced the rate of restraint and forced medication use.

**Participant Demographics:**
- Participants from 18 to 65 years old that were diagnosed with psychiatric illness residing in two psychiatric open units
- 218 patients in treatment group and 224 patients in control group

**Materials and Cost Range:**
- ASP (Cost: $181.40+)
- SII (Cost: $34.90)
- Blankets (range, <$20), ball chair (range, $39.99), large therapy ball (Cost: $17.95), therapeutic music (Cost Range: $10.11), & Nintendo Wii sports games (Nintendo Wii console (refurbished), >$118.99; Wii sports games, (Cost: $75.95)

**Implementation:**
- **First 2 Months:** Training
  - All staff (including OTs) completed a 3-day course and 1-day workshop in sensory modulation
  - OTs received additional training on sensory modulation
- **Remaining 10 Months:** Intervention
  - Patients completed ASP on the first day of admission to the unit or following acute event to create an individualized sensory ‘plan’
  - Patients in acute state treated using information from SII, followed by ASP when the patient was more stable
  - Treatment group had access to a variety of sensory modalities and a sensory room
    - Available sensory modalities included ball blankets, a ball chair, large therapy ball, therapeutic music, and Nintendo Wii sports games
    - Staff would use individualized sensory ‘plan’ and skills learned from training to refer patients to specific sensory-based strategies

**Summary of Expected Outcomes:**
- Outcomes measured by comparing treatment and control groups during the intervention
- Results:
  - Forced medication: 46% reduction in treatment group compared to the control group
  - Belt restraint: 38% reduction in treatment group compared to the control group

**Special Considerations:**
- Nintendo Wii sports game was intended for patients who were not able to go outside for a walk in the surrounding area.
- Only a small portion of the participants were assessed with ASP and had an individualized sensory plan (N = 40), all other participants in the treatment group had access to sensory modulation materials and a sensory room (N = 218)
Article Title: Sensory assessment and therapy to help reduce seclusion use with service users needing psychiatric intensive care.

Summary of Study: Pilot study exploring the impact of a sensory and risk assessment tool and sensory modulation strategies in reducing the use of seclusion in an acute psychiatric setting. This study found that the use of an adapted two-page sensory-based questionnaire and sensory resources available on a sensory cart significantly reduced the use of seclusion. The length of stay was significantly longer for the treatment group as compared to the control group.

Participant Demographics:
- Included patients admitted to 30-bed acute psychiatric inpatient care unit at a hospital
  - Total of 263 participants over 6 month period, with an average length of stay of 19 days
- Majority of participants were males diagnosed with psychotic disorders, bipolar disorder, and/or depression

Materials and Cost Range:
- Sensory Resources included:
  - Optic lamp ($14.99), digital music player ($39.99), musical instruments (range $20-200), herbal tea (45 tea bags for $19.99), glider chair (ranges, $300 average), exercise bike (range, > $215), weighted blanket ($38.99), stress ball (4 for $11.99), exercise putty (4 pack for $18.99), mobile cart (range, <$29.99)
  - Total = $409.93 (1 item each, using the lowest cost for each item)
- Education for inpatient staff on use of assessment tool and sensory resources
  - Estimated costs includes: materials for hand-outs, extra pay if training is outside of work-allotted hours

Implementation:
- Purchase and dissemination of sensory resources, which were stored on a “sensory cart” and available in the low-dependency area
- Interview to determine stress triggers and warning signs, calming strategies and seclusion history using the Alfred Psychiatry Safety Tool
- Education for inpatient staff on use of assessment tool and sensory resources led by the unit manager and senior OT

Summary of Expected Outcomes:
- Outcomes measured weekly by reviewing participants’ charts and recording their length of stay and the number of seclusion episodes
- Anonymous questionnaire for staff feedback given at the end of the study
- Results:
  - Hospitalization Length of Stay: Statistically significantly longer stay for intervention group (48%)
  - Seclusion rates: Statistically significant reduction (61%) compared to previous seclusion rates
  - Preferred calming strategies: Engaging in physical activities or music playing/listening most common
  - Staff feedback: Time constraints and lack of confidence and understanding identified as most common barriers identified by staff (as measured by an anonymous questionnaire completed by unit staff)

Special Considerations:
● Service users and staff were no longer permitted to smoke on the unit starting at the beginning of the study

● Staff completed a mandatory 2-day training program providing training and practice in de-escalating and managing aggressive behavior

● Assessment tool only completed if participant was at “high risk” for behavioral aggression

**Article Title:** Sensory modulation treatment on a psychiatric inpatient unit: Results of a pilot program.

**Summary of Study:** Pilot program that studied the impact of sensory modulation treatment for patients at an inpatient psychiatric unit in improving their ability to self-regulate their own arousal level. The intervention involved education on sensory systems, exploration of sensory materials, and training on self-rating arousal levels. Researchers found that sensory modulation resulted in a decrease in self-perceived arousal levels, which indicated a positive impact on thoughts, emotions, and sensations.

**Participant Demographics:**
- 20 adults in an inpatient psychiatric unit of a private, urban, community-based medical center
- Most common diagnosis for participants was psychosis not otherwise specified

**Materials and Cost Range:**
- Mobile carts (range, <$29.99)
- Proprioception Tools: Blankets (range, <$20), handout that lists various isometric exercises (admin cost)
- Vestibular Tools: Disc ‘o’ Sit cushion ($22.99); seat cushions ($19.99); yoga mat ($9.99), pictures of various positions (admin cost)
- Visual Tools: Journals (12 for $19.99); puzzles ($19.99); construction paper (pack, $7.96); markers (1 pack, $2.39); colored pencils (1 pack, $5.97); paper (admin cost); crossword puzzles (free print outs, admin costs); search or word puzzles (free print outs, admin costs); magazines (1 year long subscription, range, >$12); Bible (range, >$9.99); Qur’an (range, >$6.95); spiritual books (range, <$5.99); Alcoholics Anonymous® and Narcotics Anonymous® materials (free)
- Tactile Tools: Stress balls (4 for $11.99); widgets (sensory 56 pack, $16.95); Rubik’s® cubes (5 for $22.99); clay (set with various materials, $24.99); vibrating gadgets (range, >$9.33); beanbags (8 pack, $13.99)
- Olfactory Tools: Scented lotions (1 pack, $6.37); scented candles (20 pack, $28.99); scented body sprays (range, $5.98); oranges ($1.55 each); linen sprays (range, ~$12.99); cinnamon sticks (1 pack, $5.85); potpourri ($9.99)
- Gustatory Tools: Peppermints (1 lb, $9.99); chewing gum (14 pack, $11.19); Starburst® candies ($3.78); crackers ($3.50); cookies ($5.98); pretzels ($5.85); ice cubes (free)
- Auditory Tools: (2) CD Discmans with a variety of music ($20.10 each), including classical, rhythm and blues, gospel, country, relaxation, and hip hop (range, free if borrowed from library); rain sticks (range, >$18.99 each)

**Implementation:**
- 1-hour group and 1-hour individual sessions focusing on sensory modulation 3x a week for 6 weeks
- Sessions protocol:
  - Introduction to the seven sensory systems and self-rating scale; pre-intervention rating using the self-rating scale; exploration and participation in various sensory materials and activities available on the mobile cart; reflection of the experience and post-intervention rating scale and survey
- Self-rating scale from 0 – 10, 0 representing a feeling of calmness, serenity, and contentment and 10 representing a loss of control and really negative thoughts

**Summary of Expected Outcomes:**
- Outcomes measured before and after intervention
- Results:
  - Arousal levels: decrease in self-perceived arousal levels (as measured by self-rating scales)

**Special Considerations:**
- Non-English speakers were excluded due to need for written consent
- Fidelity compromised due to author experiencing difficulty in strictly adhering to written protocol

Weighted Blanket

**Article Title:** Evaluating the safety and effectiveness of the weighted blanket with adults during an inpatient mental health hospitalization

**Summary of study:** Exploratory, pilot study to investigate the effectiveness of using a weighted blanket to reduce anxiety for adults in an inpatient mental health setting. The researchers provided participants with a 30-pound weighted blanket on two 5-minute occasions, and measured vital signs and self-reported anxiety levels. This study found that a 30-pound weighted blanket can reduce anxiety and has no negative effects on vital signs.

**Participants**
- 30 participants aged 18 to 64 in a locked acute care mental health unit within a community hospital
- 80% of the participants had a trauma history, and 33% had a history of restraint use in previous hospitalizations

**Materials and Cost Range:**
- 30-pound weighted blanket, Weighted Wearable brand, CozyComforter (Cost $119-$290)

**Implementation:**
- Participants were introduced to the test equipment and procedures in a standardized manner prior to the start of the monitoring phase
- Each participant experienced one session with the 30lb weighted blanket for 5 minutes while laying on their back and one control session during which no weighted blanket was applied.

**Summary of Expected Outcomes:**
- Outcomes measured before and after intervention
- Results:
  - Anxiety Symptoms: statistically significant reduction for 60% of participants (as measured by: STAI-10 Questionnaire)

**Special Considerations:**
- Patients with open wounds, moderate to severe physical injuries, illiteracy, and positive pregnancy test upon admit were not included in the study due to safety risks
- Vital signs (blood pressure, pulse rate, pulse oximetry) were monitored for each participant with and without the 30 lb weighted blanket on to determine safety.
  - All participant’s vitals stayed within the normative range, indicating this intervention is safe
- Standardized protocol may not have been the most optimal for studying effectiveness outcomes; weighted blankets are best used in a client-centered manner by providing individualized amount of weight, weight distribution, and timeframe that is most preferred by the client, safe, and effective
- Outcome measures did not evaluate long-term effects of weighted blanket use

Combined Approaches

**Article Title:** Sensory reduction on the general milieu of a high-acuity inpatient psychiatric unit to prevent use of physical restraints: A successful open quality improvement trial.

**Summary of study:** Pilot project to evaluate the effectiveness of environmental changes to adjust sensory input on decreasing the use of physical restraints and physical assault. This study found that by reducing environmental sensory input (sound & light) and providing more tactile, proprioceptive, and gustatory activities, there was a significant decrease in restraint use and rate of physical assaults on the unit that was maintained for 11 months following implementation. Additionally, staff and participants reported a “culture change” that improved quality of life while on the unit.

**Participants:**
- Adults (18+ y.o.) admitted to the acute inpatient psychiatric unit

**Materials and Cost Range:**
- Speaker to play background music (Cost $20-$150+)
- Painting supplies and art supplies (Cost varies)
- Theraband, non-latex (Cost $50 per 25-yard roll)
- Low-temperature snacks-Ice cream/popsicles (Cost varies)
- Essential Oils (Cost ~ $15 per set of 6)
- Essential Oil Diffuser (Cost $20-$35)

**Implementation:**
- Each month, new sensory strategy was introduced and then maintained for the remainder of the study
  - Month 1: Lights were dimmed by 40-50%
  - Month 2: Reduced speech volumes, introduced music therapy and calming background music in the evenings
  - Month 3: Provided art activities (painting, coloring mandalas, sculpting) to increase tactile and visual input
  - Month 4: Proprioceptive activities were introduced (stretching, movement activities, relaxation techniques) (active resistive exercise using Theraband, progressive muscle relaxation, guided imagery, elements of yoga and tai chi
  - Month 5: Gustatory and olfactory activities were introduced (low temperature snacks, aromatherapy with calming essential oils)

**Summary of Expected Outcomes:**
- Outcomes measured before and after the intervention
- Results:
  - Restraint use: statistically significant decrease (as measured by percentage of patient hours in restraints per 1,000 patient hours)
  - Physical Aggression: statistically significant decrease (as measured by rate of number of assaults per 1,000 patient hours)

**Special Considerations:**
- Requires whole unit buy-in (including staff, participants, administrators, etc.)
- Lights in the environment must have the ability to be dimmed.

of the American Psychiatric Nurses Association, 24(2), 133-144.  
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Appendix E

Outcome Measure Survey

**Purpose of our Survey:** To determine the effectiveness of the sensory-based intervention implementation guide and the collaborator’s perception of the binder.

**Question:**

**Understanding:**

1. The content regarding sensory interventions in the implementation guide was easy to understand.
   - a. Strongly agree
   - b. Agree
   - c. Neutral
   - d. Disagree
   - e. Strongly disagree

2. The implementation guide helped me better understand sensory interventions for an inpatient mental health population.
   - a. Strongly agree
   - b. Agree
   - c. Neutral
   - d. Disagree
   - e. Strongly disagree

3. The implementation guide helped me understand how to implement sensory-based interventions for inpatient mental health.
   - a. Strongly agree
   - b. Agree
   - c. Neutral
   - d. Disagree
   - e. Strongly disagree

**Organization:**

1. The materials were organized in a clear manner.
   - a. Strongly agree
   - b. Agree
   - c. Neutral
   - d. Disagree
   - e. Strongly disagree

**Usefulness:**

1. Overall, the implementation guide was an effective resource for informing how to implement sensory-based interventions for inpatient mental health settings.
   - a. Strongly agree
   - b. Agree
c. Neutral
d. Disagree
e. Strongly disagree

2. I will refer to the implementation guide in the future for information on sensory-based interventions.
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

3. The implementation guide provided sufficient information on sensory-based interventions.
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

4. The implementation guide helped me better understand sensory-based interventions and how to implement them.
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

Open-ended Question:
1. Are there any changes or additions you would suggest to make the implementation guide more effective as a resource for sensory interventions?
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