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Gerianne Ferrer

*Roseman University of Health Sciences*

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# The Effects of Music Therapy on Agitation and Anxiety in Patients with Dementia

Gerri Ferrer BSN, RN

Roseman University of Health Science

Nurs 512: Nursing Research and Evidence-Based Practices

Dr. Susan Watson & Dr. Jill Schwartz

December 12, 2021

# BACKGROUND & SITUATION

❖ **Dementia:** A degenerative, neurological condition in which there is deterioration in cognitive function beyond that of the normal biological aging process

- Symptoms progress from minor to severe over time
- Behavioral and psychological symptoms of dementia (BPSDs): agitation, anxiety, depression, and wandering

❖ **Poorly managed BPSDs can lead to:**

- Increased hospitalizations
- Quicker cognitive decline
- Earlier mortality
- Increased caregiver burden

❖ **Quality Improvement Goals:**

- Gain insight into the care of persons with dementia (PWDs)
- Find the most effective, least restrictive methods to manage BPSDs



# INTERVENTIONS


## ❖ Pharmacologic Interventions

- e.g. medications
- Cost-effective, medically effective
- May increase risk of: metabolic syndrome, over sedation, cerebral/cardiovascular events, and overall mortality

## ❖ Non-pharmacologic Interventions


- e.g music therapy, exercise, massage/meditation, art
- May be costly, staffing
- Less restrictive, promotes active lifestyle





**PICO:** In patients with mild to moderate dementia, is music therapy an effective non-pharmacologic intervention to reduce agitation and anxiety?

**AIM:** Examine the effectiveness of music therapy as a non-pharmacologic intervention in reducing symptoms of agitation and anxiety



# LITERATURE REVIEW

- ❖ Databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Library, and PubMed
  - “Dementia AND Music Therapy”
  - “Anxiety” or “Agitation”
  - Use of screening tool: Neuropsychiatric Inventory (NPI), the Quality of Life in Alzheimer’s Disease (QoL-AD), or the Cohen-Mansfield Agitation Inventory (CMAI)
  
- ❖ Seven studies chosen
  - Four randomized controlled trial studies (Cho, 2018; Dimitriou et al., 2020; Giovagnoli et al., 2018)
  - Two quasi-experimental studies (Chen et al., 2020; Gomez-Gallego et al. 2021)
  - One interventional study (Gillis et al., 2019)
  - One retrospective cohort study (Hsu et al., 2017)



# LITERATURE REVIEW

## ❖ Music Therapy as a Non-Pharmacologic Intervention

Chen et al. (2020), Cho (2018), Gomez-Gallego et al. (2020), and Hsu (2017)

### ■ Chen et al. (2020)

- 44 PWDs
- Active MT vs Passive MT, intervention for 40 minutes, twice a week, over 12 weeks
- NPI, QoL-AD - Reduced
  - NPI Score (Mean  $24.8 \pm 7.12$  vs  $23.77 \pm 5.25$ ;  $p < 0.005$ )
  - QoL-AD Score (Mean  $20.45 \pm 2.95$  vs  $19.86 \pm 2.45$ ;  $p < 0.005$ )
- Strength: Variability of MT
- Weaknesses: Lack of random placement, small sample size

### ■ Cho (2018)

- 52 PWDs
- Active MT vs Passive, for 45 minutes, twice a week, for 12 weeks
- QoL-AD - Increased difference
  - Active: increased QoL-AD ( $t = 7.02$ ;  $p = 0.187$ )
  - Passive: increased QoL-AD ( $t = 1.39$ ;  $p = 0.187$ )
- Strength: Variability of MT
- Weaknesses: Self-reports, small sample size



# LITERATURE REVIEW

## ❖ Music Therapy as a Non-Pharmacologic Intervention

### ■ Gomez-Gallego et al. (2020)

- 90 PWDs
- Active MT vs Passive MT for 45 minutes, twice a week, for 12 weeks
- NPI - Reduced
  - Active: (Mean  $20.92 \pm 9.20$  vs  $11.36 \pm 4.01$ ;  $p < 0.001$ )
  - Passive: (Mean  $18.48 \pm 7.48$  vs  $17.62 \pm 8.27$ ;  $p < 0.001$ )
  - Large effect size ( $\eta^2 = 0.61$ )
- Strength: Variability of MT
- Weakness: Lack of random placement

### ■ Hsu et al. (2020)

- 141 PWDs
- Passive MT weekly, over six months
- NPI, CMAI
  - Reduced overall NPI Score ( $7.95 \pm 8.56$  vs  $4.78 \pm 5.01$ ;  $p < 0.001$ )
  - Reduced CMAI Score (Mean  $35.7 \pm 6.92$  vs  $32.6 \pm 4.18$ ;  $p < 0.001$ )
- Strengths: Long study, large sample size
- Weaknesses: Risk of unmeasured confounding variables d/t design





# LITERATURE REVIEW

## ❖ Music Therapy vs Other Non-Pharmacologic Interventions

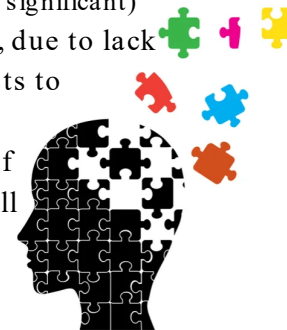
Dimitriou et al. (2020) and Gillis et al. (2019)

### ■ Dimitriou et al. (2020)

- 60 PWDs
- MT vs Exercise vs Aromatherapy; 5 days/week for 3 weeks
- NPI- post-test scores
  - MT: (Mean 5.2, SD 1.74;  $p < 0.05$ )
  - Exercise: (Mean 6.7, SD 1.73);  $p = 0.05$ )
  - Aromatherapy/Massage (Mean 6.9, SD 1.85;  $p < 0.55$ )
- Strength: Cross-over randomized controlled trial design, minimizing the risk of bias
- Weaknesses: Small sample size, short intervention period

### ■ Gillis et al. (2019)

- 65 PWDs
- MT vs Therapeutic Touch vs Individualized Meaningful Activities; daily for 20 minutes over 2 weeks
- NPI- post-test scores
  - MT: (Mean Change -7.3;  $p = 0.040$ )
  - Therapeutic Touch (Mean Change -4.7;  $p = 0.041$ )
  - Individualized Activities (Mean Change -0.5;  $p = 0.817$ ) (not significant)
- Strength: More relatable, due to lack of highly trained therapists to implement interventions
- Weaknesses: Absence of a power calculation, small sample size



# LITERATURE REVIEW

## ❖ Music With Pharmacologic Interventions

Giovagnoli et al. (2018)

- 45 PWDs
- Memantine alone vs Memantine + MT; daily for 24 weeks, with MT sessions lasting 40 minutes
- NPI
  - Memantine + MT (Mean Change  $-0.55 \pm 20.64$ ;  $p = 0.011$ );
    - Rate of worsened PWDs (31.8%;  $p = 0.048$ )
  - Memantine alone (Mean Change  $+6.29 \pm 17.78$ ;  $p = 0.011$ );
    - Rate of worsened (61.9%;  $p = 0.048$ )
- Strengths: Non-pharmacologic vs pharmacologic
- Weaknesses: Small sample size, high variance in baseline data (can compromise between-group differences)



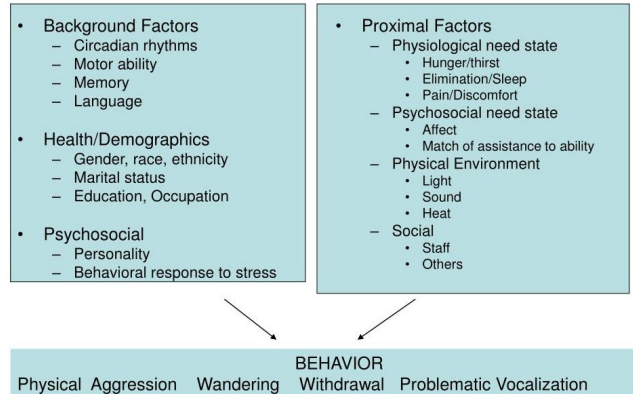
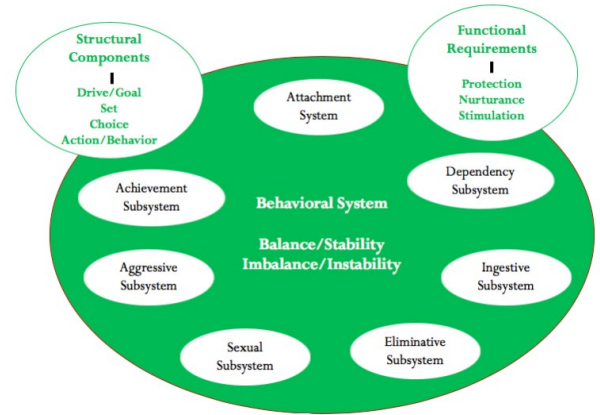
# THEORETICAL FRAMEWORK

## ❖ Behavioral System Model by Dorothy Johnson

- A person is a behavioral system made of 7 subsystems
  - Three functional requirements per subsystem: protection from noxious influences, provision for a nurturing environment, and stimulation for growth
- Goal is to foster efficient and effective behavioral functioning in patients to prevent illness

## ❖ Need-driven Dementia-compromised Behavior Model (NDB Model) by Donna Algase (and associates)

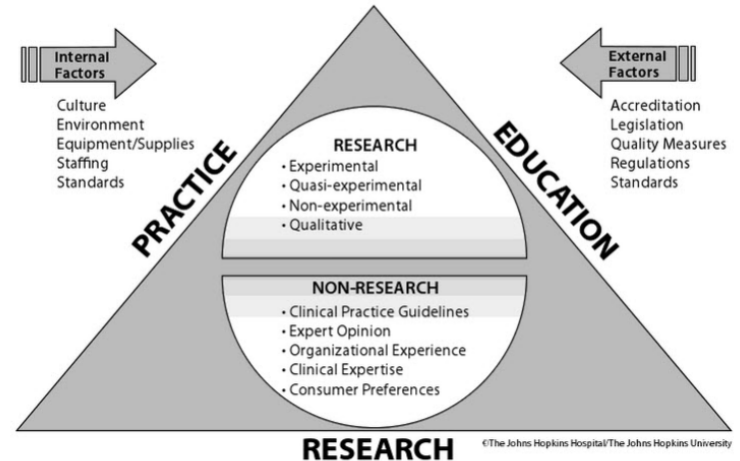
- Behavioral symptoms are the result of unmet needs
  - A result of an issue between background factors and proximal factors
- Goal is to recognize and identify both background and proximal factors to determine who is at risk for behavioral symptoms and intervening early



# EVIDENCE-BASED PRACTICE MODEL

## ❖ Johns Hopkins Evidence-Based Practice Model

- To ensure that the latest research findings and best practices are quickly and appropriately incorporated into patient care
- PET Process
  - *Practice* - What's the problem with the current practice?
  - *Evidence* - What does current literature say about that problem?
  - *Translation* - What studies can be done to fix that problem and how can we integrate it quickly into patient care?



# PLAN

## ❖ Design

- Prospective comparative, pre-test/post -test design

## ❖ Sample

- Convenience sample of adults during a 6 -week enrollment period
  - Minimum 64 - based on a power analysis, using a Student T-Test for differences between independent groups, with an alpha of 0.05, power of 0.80, and medium effect of 0.30
- Aged 65 years or older
- Diagnosed with mild to moderate dementia
- Have never participated in music therapy
- *Exclusions:* those who have received MT before or those who refuse to participate

## ❖ Setting

- One of 3 memory care units locations in Las Vegas
  - 30 – 45 beds, dedicated to seniors with Alzheimer's Disease or Dementia
  - Active participation with 'Music and Memory'

# DO

1. IRB Approval from Roseman University + facilities
2. Future Stakeholders: Academic mentor, memory care unit director(s), caregivers of participants, healthcare staff
3. Informational Packets given to staff and directors
4. Informed consent from participants or participants' legal representative/family
5. Demographic survey: age, gender, ethnic background, highest level of education, and previous occupation
6. Administration of pre -test NPI Screening by caregivers

## Neuropsychiatric Inventory- Nursing Home

Today's Date \_\_\_\_\_ Time \_\_\_\_\_  
 Resident's Name \_\_\_\_\_ Rater's Name \_\_\_\_\_

Symptom	√Check appropriate box		O Circle Frequency x			O Circle Severity =			Item Score	O Circle Disruption Score						
	No NA	Yes	1	2	3	4	1	2		3	0	1	2	3	4	5
1 Delusions			1	2	3	4	1	2	3		0	1	2	3	4	5
2 Hallucinations			1	2	3	4	1	2	3		0	1	2	3	4	5
3 Agitation			1	2	3	4	1	2	3		0	1	2	3	4	5
4 Depression/ Dysphoria			1	2	3	4	1	2	3		0	1	2	3	4	5
5 Anxiety			1	2	3	4	1	2	3		0	1	2	3	4	5
6 Apathy			1	2	3	4	1	2	3		0	1	2	3	4	5
7 Irritability			1	2	3	4	1	2	3		0	1	2	3	4	5
8 Euphoria			1	2	3	4	1	2	3		0	1	2	3	4	5
9 Disinhibition			1	2	3	4	1	2	3		0	1	2	3	4	5
10 Aberrant Motor Behavior			1	2	3	4	1	2	3		0	1	2	3	4	5
11 Night-time Behavior			1	2	3	4	1	2	3		0	1	2	3	4	5
12 Appetite/ Eating Changes			1	2	3	4	1	2	3		0	1	2	3	4	5

Total Neuropsychiatric Inventory Score: \_\_\_\_\_ / 144

Total Disruption Score: \_\_\_\_\_ / 60

# DO

7. Initiate ‘Music & Memory” session(s)
  - a. Thorough interview by Music and Memory therapists
  - b. Creation of customized playlist (iPod) that would promote feelings of content and nostalgia
  - c. Listening sessions for ~ 30 minutes, 2 -3 times a week
  - d. Therapists remain present with the participants to sing along or promote discussion or dance
8. Mid-intervention NPI Screening at end of Week 4
9. Final Post-Test NPI Screening at end of Week 8
10. Statistical analysis and interpretation of data
11. Release of information and discussion with stakeholders



# STUDY

## ❖ Neuropsychiatric Inventory (NPI)

- Cummings et al. (1994)
- Easy to use, comprehensive
- Free for investigator-led research
- Excellent inter-rater reliability (93.6%–100%)
  - Cohen's kappa = 0.88
- High test-retest reliability
  - 3 week interval
  - $f = 0.79$  ( $p = 0.0001$ )
- High internal consistency
  - Cronbach's alpha = 0.84

### Neuropsychiatric Inventory- Nursing Home

Today's Date \_\_\_\_\_ Time \_\_\_\_\_  
 Resident's Name \_\_\_\_\_ Rater's Name \_\_\_\_\_

Symptom	√Check appropriate box		O Circle Frequency x				O Circle Severity = Score			O Circle Disruption Score						
	No NA	Yes	1	2	3	4	1	2	3	Item Score	0	1	2	3	4	5
1 Delusions			1	2	3	4	1	2	3		0	1	2	3	4	5
2 Hallucinations			1	2	3	4	1	2	3		0	1	2	3	4	5
3 Agitation			1	2	3	4	1	2	3		0	1	2	3	4	5
4 Depression/ Dysphoria			1	2	3	4	1	2	3		0	1	2	3	4	5
5 Anxiety			1	2	3	4	1	2	3		0	1	2	3	4	5
6 Apathy			1	2	3	4	1	2	3		0	1	2	3	4	5
7 Irritability			1	2	3	4	1	2	3		0	1	2	3	4	5
8 Euphoria			1	2	3	4	1	2	3		0	1	2	3	4	5
9 Disinhibition			1	2	3	4	1	2	3		0	1	2	3	4	5
10 Aberrant Motor Behavior			1	2	3	4	1	2	3		0	1	2	3	4	5
11 Night-time Behavior			1	2	3	4	1	2	3		0	1	2	3	4	5
12 Appetite/ Eating Changes			1	2	3	4	1	2	3		0	1	2	3	4	5

Total Neuropsychiatric Inventory Score: \_\_\_\_\_ / 144

Total Disruption Score: \_\_\_\_\_ / 60



# STUDY

## ❖ Data Collection

- Demographic survey via Qualtrics on a tablet
- Paper NPI Screening forms, administered by caregivers
  - Week 0/1 (<1 week prior to first MT session)
  - Week 4 (Mid-Intervention)
  - Week 8

## ❖ Statistical Analysis

- SPSS version 28.0
- Descriptive Statistics
- Multivariate logistic regression analysis of variables
- NPI Scores: paired t-test, comparing pre-test/post-test
- Categorical variables: crosstabs table, chi-squared, alpha = 0.05
- Continuous variables: mean values with standard deviation

# ACT

## ❖ Weaknesses

- Presence of selection bias due to convenience sampling and lack of participation
- Limited generalizability, due to sample size and selection
- Limited insight on long-term effects, due to short intervention time

## ❖ Strengths

- Increased data on non-pharmacologic interventions for PWDs
- Encouragement of PWDs to participate in activities
- Potential to lessen caregiver burden

❖ Increased strength in literature for music therapy as a non-pharmacologic intervention for PWDs

❖ Increased strength in the use of NPI as a measurement tool for BPSDs

❖ Offering on music therapy as one of the first-line interventions for PWDs

❖ Increased quality of life and care for PWDs

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