Predicting Outcomes of Therapeutic Recreation Interventions for Older Adults with Dementia and Behavioral Symptoms*

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Abstract:

The purpose of this study was to examine the ability to predict outcomes of prescribed therapeutic recreation interventions (TRIs) for the treatment of the two major categories of disturbing behaviors in institutionalized older adults with dementia. Interventions were selected based on the participant's current level of functioning, past leisure interests, and the target behavior problem identified during baseline assessment. TRIs were then prescribed to calm individuals with agitated behaviors and (or) to alert individuals with passive behaviors. Each participant received two weeks of individually prescribed therapeutic recreation and biofeedback readings were randomly taken three times during the two-week intervention period to measure physiological change. The predicted outcome was found between 79-91% of the time when treating passivity, and between 92-100% of the time for agitation. Therapeutic recreation interventions were found to be predictable and efficacious for disturbing behaviors of dementia.

KEY WORDS: Predicting Outcomes, Prescribed, Therapeutic Recreation, Agitation, Passivity

Article:

Introduction

Recent years have seen an increase in attention paid to the behavioral symptoms of older adults with dementia. This interest has produced important advances in the definition of behaviors, their epidemiology, etiology, and associated risk factors as well as the development of objective measurement tools. Although a considerable amount of research has tested the efficacy of prescribed pharmacological treatments for dementia-related behaviors, testing of non-pharmacological interventions has not received the same attention or funding. Perhaps most notable among explanatory studies have been the significant efforts of two distinct research teams to identify the causes of behavioral symptoms in older adults with dementia (Algase et al., 1996; Hall et al., 1995). Despite a clearer understanding of behavioral symptoms as either unmet needs or as a response to stress, drug therapy and removal of clients from general activity programs or common areas have remained the predominant interventions (Buettner & Fitzsimmons, 2003a). Pharmacological treatments have limited effectiveness for certain behaviors such as wandering and vocalizing, and may aggravate the problem in people with mixed behavior types (Buettner & Fitzsimmons, in press). In addition, studies continue to show that individuals with the most severe cognitive impairments are offered the fewest therapeutic options in long-term care settings (Buettner, 1994; Buettner & Fitzsimmons, 2003a; Cohen-Mansfield, Marx, & Werner, 1994; Schroll, Jonsson, Mor, Berg, & Sherwood, 1997).

An abundance of research has explored the prevalence of dementia-related behaviors in various care settings. In terms of current epidemiology, a ten-year population-based longitudinal study found that 80% of the

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participants with Alzheimer's disease had exhibited behavioral symptoms (Lyketsos et al., 2002). The most prevalent symptoms in this study were apathy (36%), depression (32%), and agitation (30%). Another cross-sectional population-based study found 95% of clients with dementia had at least one behavioral symptom (Aarsland, Cummings, & Larsen, 2001). Tractenberg, Weiner, and Thal (2002) found 67.5% of community-dwelling elders with dementia had agitation. Another study of community-dwelling elders found 61% demonstrated behavioral disturbances with 27% displaying apathy, 24% depression, and 24% agitation (Lyketsos et al.).

Behavioral manifestations develop in older adults with dementia due to many factors including degenerative changes that are occurring in the brain. Clinical and research findings have identified the following risk factors for agitation and passivity: fatigue, loss of reserve, and pain (Algase et al., 1996); overwhelming influx of external stimuli (Ragneskog, Gerdner, Josefsson, & Kihlgren, 1998); deprivation of environmental stimuli or activity (Aubert et al., 2001); impaired physical function (Rapoport et al., 2001); depression (Menon et al., 2001); physical restraints; and a three-month prior pattern of antipsychotic drug use (Talerico, Evans, & Strumpf, 2002).

Additionally, it is important to prevent boredom in residents with dementia because it frequently leads to disturbing behavior (Cohen-Mansfield, Marx, & Rosenthal, 1989). There is strong clinical evidence that individuals who are deprived of environmental stimuli or the opportunity for meaningful activity are at an increased risk for disturbing behaviors (Aubert et al., 2001; Bennett, 2000; Cohen-Mansfield & Werner, 1995; Cohen-Mansfield, Werner, & Marx, 1990; Ragneskog et al., 1998; Struble & Sivertsen, 1987). Ironically, it is these stimulation seeking behaviors that often lead to removal of the individual from traditional facility programs causing increased social isolation and long periods of simply doing nothing (Buettner, 1994).

Most health care literature on disturbing behaviors continues to focus on medication management. Early psychotropic medications like Thorazine and Haldol had known risks that were considered serious in terms of their side effects; they were prescribed conservatively. Since the advent of newer, "safer" atypical antipsychotic medications, providers may have felt more comfortable prescribing these newer medications. Research indicates that over 50% of nursing home residents with dementia are on one or more psychoactive medication (Gibbs Brown, 1997) and that use of psychotropics in this population has been increasing since 1995 (Rehnquist, 2001). Medications always carry the risk of adverse effects and are associated with falls, loss of function, hip fractures, decreased cognition, and premature institutionalization (Dellasega, Klinetelter, & Halas, 2002). These untoward events carry increased risk of death. Consider the recent alert from the Federal Drug Administration "... that older patients treated with atypical antipsychotics for dementia had a higher chance for death than patients who did not take the medicine. Dementia behaviors are not an approved use" (US Food and Drug Administration, 2005).

As an alternative to psychotropic medications, clinicians' and researchers have proposed interventions to address the absence of appropriate stimulation, relaxation, and active recreation and movement opportunities for older adults with dementia and behavioral symptoms. The Dementia Practice Guidelines for Recreational Therapy: Treatment of Disturhing Behaviors (DPG) (Buettner & Fitzsimmons. 2003b) provides an evidencebased approach to positive behavior change in dementia care settings with 82 recreational protocols developed by expert clinicians. The literature review in this guideline lists over 150 studies in which the use of recreation was determined to have a statistically significant positive effect on behavioral problems. These positive behavioral changes include increased socialization, positive verbalization, sleep, engagement, ambulation skills, strength, flexibility, physical function, nutrition, and communication. The behavioral changes notably included decreased depression, anxiety, wandering, resistance to care, falls, restlessness, elopement, bath time resistance, screaming, verbal agitation, psychoactive medication usage, irritability, and aggressiveness as perceived by care providers. Although the DPG provides a consistent framework for recreational therapists to follow and an alternative or supplement to medications, no studies exist that show predictable outcomes occur due to these interventions. This study used the Biograph(TM) a new direct methodology to determine if physiological changes would take place due to therapeutic recreation interventions. This method of data

collection provided a direct measurement of heart rate and blood volume pulse in persons with dementia who might otherwise not be able to express themselves due to the disease process.

In order to scientifically determine if therapeutic recreation interventions can consistently change behavior in older adults with dementia some important questions need to be answered. The following research questions were addressed in this study as a starting point:

Question 1: Will prescribed therapeutic recreation interventions (TRIs) predicted to improve agitated behaviors produce a calming effect?

Question 2: Will prescribed TRIs predicted to improve passive behaviors produce an alerting effect?

Question 3: Will passive individuals who receive TRIs intended for alerting have a higher heart rate after 10 minutes of the intervention than at baseline?

Question 4: Will agitated individuals who receive TRIs intended for calming have higher Blood Volume Pulse after 10 minutes of the intervention than at baseline?

Defining the Dependent Variables

For the purpose of this study behavior change was the dependent variable. Specifically, a calming effect on participants with agitated behaviors is defined as the reduction of aggressive, physically non-aggressive, or verbally agitated behaviors that are changed to a state of alert engagement. Alerting effect on passive behaviors is defined as the reduction of apathy, decreased activity, and loss of interest that is changed to a state of alert engagement. The independent variable was the TRI that was introduced. The goal of all interventions in this study was the same, to produce a state of alert engagement free of disturbing behaviors.

Methods

Study Design

This study used a classical experimental design with one treatment and one delayed intervention group, which we called the control group. Following the collection of baseline assessment data on days 1-5, participants were randomly assigned to one of the two groups. Six participants were involved at a time, three in the treatment and three in control group. The treatment group received individually prescribed therapeutic recreation five days a week for two weeks. The control group received usual nursing home care and a 20-minute social visit from a research team member daily for two weeks, followed by the individually prescribed therapeutic recreation program for two weeks. The research protocol is listed below.

Research protocol

Step 1: Recruit participants who met study criteria

Step 2: Get signed consents for six participants at a time

Step 3: Baseline assessment for 5 days on the six participants

Step 4: Randomly select three for treatment and three for control

Step 5: Treatment group received two weeks of TRIs; Control group nursing home activities as usual and social visit from researcher.

Step 6: During two week treatment period three random pre- and post-biofeedback readings taken to measure physiological response to TRIs.

Step 7: Control group becomes new treatment group and process repeated.

Sample

This project included 107 participants from five different long-term care residences in Florida who met the following inclusion criteria: 1) 65 years of age or older; 2) diagnosis of dementia in the medical record; 3) Mini-mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975) score of 24 or less; 4) signed consent by guardian and assent by participant; 5) stable on current medications; and 6) identified by staff as having either behaviors of passivity or agitation. One hundred and twelve participants were recruited and of these 107 completed the study. The participants in this study consisted of 23.4% males (n = 25) and 76.6% females (n = 82) with a mean age of 86.1 years (Table 1). The majority of subjects had unspecified dementia (40.1%) or Alzheimer's disease (38.8%) (Table 2). The subjects' mean cognitive score was 8.39 (range 0-23) indicating severe cognitive impairment as measured by the Mini Mental State Exam. The range on the Global Deterioration Scale was 5-7 with a mean of 5.41. The subjects lived in several types of long term care environments including special care units, assisted living special cure units, general long-term care units, and assisted living units (Table 3).

Baseline Data Collection

To determine time and the type of behavior for each participant (passivity or agitation), data were gathered by observation on type of behavior the participant exhibited throughout the day for five days. This was coded for eight lime periods in two-hour blocks. The time periods evaluated started at 6 AM and ended at 10 PM. Each period was coded based on the predominant pattern of activity over the five-day baseline period, as documented by the primary nurses caring for the participant after training by the research team. These individuals were provided with detailed instructions on how to code the behaviors by a geriatric nurse practitioner researcher. Coding was as follows: 1 = sleeping, either in bed or elsewhere; 2 = passive, awake and not doing anything; 3 = alert and engaged; and 4 = agitated. Inter-rater reliabilities between each nurse and research team member were calculated regularly with correlation coefficients ranging from 0.89 to 0.97.

Passivity is defined as a personality pattern that is exemplified by a diminished ability to be open, conscious, and engaged. It is demonstrated as decreased activity, loss of interest in the environment, and apathy (Colling, 1999). Participants were classified as having passivity only if coded for at least one time period with passivity and no time periods of agitation. Agitation is manifested us three syndromes: 1) aggressive behavior (i.e. hitting, kicking, pushing), 2) physically nonaggressive behavior (i.e. restlessness, pacing, inappropriate motor patterns), or 3) verbally agitated behavior (i.e. complaining, negativism, repetitive vocalizing) (Cohen-Mansfield et al., 1989). Participants were coded as having agitation only if they had at least one period of agitation and no time periods of passivity. Participants were determined to have mixed behaviors if they had at least one time period of passivity and at least one time period of agitation. Participants identified as having passivity only were 29.9% (n = 32), agitation only 10.3% (n = 11), and a mix of passivity and agitation 59.89% (n = 64) (see Table 4). These became the participants' "target behaviors" and specifically what we were attempting to treat with the therapeutic recreation interventions.

Linking Therapeutic Recreation Assessment and Prescription Process

Participants were assessed using the seven-point Global Deterioration Scale (Reisberg, Ferris, Leon, & Crook, 1982) for current functional level and the Farrington Leisure Interest Survey (Buettner & Martin, 1995) for past recreational interests. Additionally the score on the Mini Mental State Exam (Folstein et al., 1975) was used in the admission criteria and as an indication of cognitive functioning. Past leisure interests were used as a starting point to find and adapt an appropriate recreational activity for the individual. The Principle Investigator or the

Co-Principle Investigator then prescribed the therapeutic recreation intervention based on the data from these baseline assessments. A sample of the prescription might read, "Wheelchair hiking daily for 30 minutes, five days per week for two weeks, to calm agitated wheelchair wandering in the late afternoon." Other recreational activities were adapted for functional level of the participant as needed. An example of a specific adaptation for wheelchair hiking might be that the participant needed a Hoyer(TM) Lift to be transferred on and off the bike and a pillow on his left side while riding to maintain upright seated posture.

During the five days of baseline assessment, additional information was collected and summarized as if completing a therapeutic recreation assessment. It involved interviewing the family, nursing staff providing direct care, and the participants. The research team also used information collected from behavioral observation, which was coded into two-hour blocks of time to formulate the prescription for the TRI. This helped determine the best time of day for treatment and possible adaptations that might be needed for success. For example, a client with verbally aggressive behavior in the late morning had past leisure interests of gardening and woodworking. Because she had a Global Deterioration Scale of Stage 6 and left sided paralysis due to prior stroke, she was prescribed a one-to-one recreational intervention to build an adapted Simple Pleasures planter box, fill it with soil, and plant flowers that she would tend at the end of the two week intervention. The project took many sessions to complete and was modified and structured for success. A rubber pad and clamp were adapted to hold the wood pieces in place for this participant because she had minimal use of her left arm and hand. The desired direction of change for this client was from aggressive agitation to a state of calm engagement in the activity during the late morning. Throughout this research project over 70 different recreational interventions were adapted to the assessed behavioral and functional needs of specific participants.

Scheduling and Duration

When possible, TRIs were scheduled to take place when disturbing behaviors most commonly occurred for the participant. This information was collected during the five day baseline assessment period and defined in the prescription. In general, passive behaviors peaked in late morning (10 AM-12 noon) and then again in the late afternoon (4 PM-6 PM). Agitated behaviors gradually increased throughout the day with a peak between 6:00 and 8:00 p.m. At times, TRI scheduling was less than optimal due to participant involvement in dining, personal care, appointments and other facility functions.

Conducting the Prescribed Therapeutic Recreation Sessions

Each participant received two weeks of individualized therapeutic recreation services that lasted approximately 30 minutes per day, five days per week. At the end of the two weeks a care plan was created and the facility staff was provided with the materials to continue the intervention. The research team remained consistent throughout the project, and included a certified therapeutic recreation specialist, a geriatric nurse practitioner with a certificate in recreational therapy, and a gerontology/therapeutic recreation graduate student assistant.

Seventy-two different recreational interventions were used during this project. Some were common activities; others were nontraditional interventions and recreational activities specifically adapted for the participant's individualized needs and abilities. The activities and the therapists' approaches were designed to stimulate participants with passive behaviors and/or calm participants with agitated behaviors.

TRI Session Data Collection

Engagement data were collected each time an intervention was attempted for a total of 1825 intervention attempts. Specific data collected during these attempts included time involved in minutes, level of engagement, encouragement needed, and participation levels. Table 5 shows the interventions utilized in terms of amount of time in minutes involved in the activity. Table 6 shows the interventions utilized in terms of percent of time engaged during the specific activity. In three randomly assigned sessions during the two-week intervention period, biofeedback data were collected for each participant to measure physiological change using the

ProComp(TM) Biograph system. This is a battery operated fiber-optic research grade biofeedback unit that directly records an intervention session into a laptop computer database. Readings were taken after a trusting relationship had been formed and the participant was comfortable with the researchers, beginning on day three of treatment. The environment was controlled and free of distractions to avoid any external stimuli impacting the Biograph readings. To take a reading, the sensor was attached to the participant's finger of the non-dominant hand. Three minutes after the application of the sensor, a twominute pre-test reading was recorded. The intervention was then started and ten minutes into the intervention a post-test two-minute reading was recorded. This ten-minute delay provided time for the physiological changes to occur as the result of the intervention. These physiological data, heart rate (HR) and blood volume pulse (BVP) were cleaned for artifact and coded for statistical analysis. Because each individual's physiological make up is unique, each participant served as his or her own control in this part of the analysis. Pre and post-test data were compared to identify the physiological effect the intervention had on that particular participant. This physiological data collection method eliminated the risk of subjective observations of the intervention's effects. The goal of the prescribed intervention was established before each session with the desired outcome of either alerting a passive participant or calming an agitated participant. The ultimate goal was active engagement in meaningful recreation for both types of problem behaviors.

The 72 types of interventions were coded into six categories for analysis: feelings based, relaxation based, physical, cognitive, life roles, and aroma. These categories were based on the goals of the particular intervention. The relaxation-based sessions were for reducing anxiety, physical and cognitive sessions were to improve physical or cognitive function, life roles addressed self-esteem and identity, and aromatherapy was placed in a separate group for analysis. The categories used in this research follow those established in the DPG. First, data were analyzed using chi-square to determine if the physiological response to the prescribed intervention created the desired calming or alerting effect. In addition, changes in heart rate and blood volume were analyzed using t-tests to detect significance in the desired direction.

Results

Alerting and Calming Effects

Sets of analyses were conducted using chi-square to understand the extent to which the prescribed TRI predicted to improve passive or agitated behavior produced the desired alerting or calming effects. For each type of intervention, the percentage of sessions with the desired calming or alerting effect was calculated by HR and BVP (Table 7). With the singular exception of aroma, each prescribed intervention had the desired effect on heart rate. Looking at change in HR the intervention categories of relaxation, feelings based, cognitive, physical, and life roles all lead to significant improvements in behavior. The greatest percentage of sessions with the desired alerting effect was in the physical intervention category (91%). The greatest percentage of sessions with the desired calming effects were found in the life roles (100%) and physical intervention (100%) categories. The desired calming effect was found in 93% of the feelings based TRIs and in 92% of the cognitive based TRIs. Both feelings based and cognitive based sessions had the desired alerting effect in more than 80% of the sessions. Findings for BVP were not significant; indicating that none of the prescribed interventions generated a statistically significant desired therapeutic effect as measured by BVP.

T-tests for correlated samples were conducted to understand if the changes in heart rate and blood volume were significant in the desired direction. Overall, except for aroma, for each type of prescribed intervention, direction of change for both heart rate and blood volume were as predicted. So, when a particular prescribed intervention intended to create a calming effect, it did create a calming effect; alternatively, when it intended to create an alerting effect, it did create an alerting effect. However, none of these changes were significant for blood pulse volume. Changes in heart rate, on the other hand, were significant for all but aroma interventions.

Desired direction of change achieved for overall physiological change and for each intervention category is presented in Tables 8 through 14. Looking at all intervention categories on Table 8, HR significantly changed as

predicted; that is HR increased when alerting interventions were provided, and HR decreased when calming interventions took place.

Table 9 presents interventions in the feelings based intervention category. HR changed in the direction predicted for alerting and calming treatments but only calming interventions reached significance ($p > .001$). Table 10 presents interventions in the relaxation category. HR changed in the predicted direction and reached significance ($p > .001$) for calming treatments. Interventions in the physical category are presented on Table 11. HR changed in the predicted direction and was significant for both alerting ($p > .002$) and calming ($p > .01$). Table 12 presents interventions in the cognitive category and indicates HR changed in the predicted direction for both alerting and calming interventions. Changes in alerting ($p > .000$) and calming ($p > .001$) were significant. BVP also showed a significant change in the predicted direction for calming cognitive intervention attempts. Table 13 presents the life roles category. HR changed in the predicted direction for both alerting and calming but only calming interventions were significant. Table 14 indicates interventions using aroma showed no change in HR for alerting attempts, and a change in the opposite direction for calming. When aromas were introduced that were clinically supposed to have a calming effect agitation occurred. None of the changes reached significance in this category.

Discussion

This study had several limitations that should be discussed. First the interventions were specifically designed for long term care residents with dementia and disturbing behaviors and cannot be generalized to other long-term care populations. The intervention period was restricted to a two-week time frame with no further follow-up data collected. Long-term benefits were not measured in this project leaving questions about dosing of the interventions and about recidivism. At times, the intervention delivery was limited by availability of participants at the time of day requested for treatment. The research team had to work around schedules and did not always provide the treatment at the ideal prescribed time. The participants were frail and many took numerous prescribed medications. We only requested that the participants were "stable on current medications" during the study and did not control for them otherwise. The findings were limited to five specified long-term care facilities in Florida and to participants who had detectable peripheral vascular blood flow. This study has not been replicated and should be considered preliminary.

The findings of this study of over 1800 intervention sessions with 72 different recreational activities, in five different facilities over a three year period of time demonstrates that therapeutic recreation can be prescribed to change specific agitated or passive behaviors in older adults with dementia. This process required a carefully completed baseline assessment and a finely tuned prescription using past leisure interests, current functioning, target behavior, and time of day the intervention was needed. It also required that each intervention be individualized to match the functional ability of the participant and adapted as needed by the therapist. Upon evaluation the predicted behavioral changes among participants with behavioral problems were found for the majority of the intervention sessions. This is the therapeutic recreation process in action, and it works. When compared to literature on the efficacy of psychoactive medications, which is 18%-26% (Lanctot et al., 1998), TRIs are by far the more efficacious option.

The study showed that a variety of recreational interventions, along with the therapeutic recreation process, were effective in changing behavior in the way predicted. With these stipulations in the approach, the therapeutic recreation interventions in the physical area were extremely effective. These findings support the work of Eslinger and Damasio (1986), who found gross motor skills preserved in older adults with Alzheimer's disease. Surprisingly we also found the cognitive category of interventions, which were designed to stimulate and use various areas of the brain, valuable and effective in changing behavior. Often we underestimate the cognitive abilities of long term care residents with memory loss. This intervention area along with the life roles of cooking, food preparation, and sharing in a psychosocial setting were extremely engaging for the majority of the participants in this study. The practicing therapeutic recreation specialist has many therapeutic options as a behavior specialist but must individualize the intervention to achieve the desired benefit.

These findings demonstrate effective contributions of therapeutic recreation in behavioral aspects of dementia care and underscore the need to educate recreational therapists in geriatric practice techniques. While many long-term care facilities underutilize TRIs or do not provide them at all, therapeutic recreation seeks professional recognition and reimbursement for service. Unlike the other rehabilitation specialists, recreational therapists are unique as they are behavior specialists able to produce predictable outcomes for calming and alerting residents with dementia through recreational interventions. This is the first large-scale study that has shown therapeutic recreation leads to predictable positive changes in dementia care outcomes.

Finally, the federal government became deeply involved in the oversight of long-term care with the passage of the Nursing Home Reform Amendments of the Omnibus Budget Reconciliation Act (OBRA) of 1987. OBRA '87 requires that residents be free from unnecessary drugs in favor of non-pharmacological interventions. The therapeutic recreation interventions tested in this research had a predictable impact on disturbing behaviors and should be offered as options in long term care settings. Unfortunately, when behavior problems occur staff often call the medical provider who generally orders one or more of the following: 1) an adjustment to existing psychoactive medications, 2) additional psychoactive medications, or 3) a psychiatric evaluation. Few write orders for non-pharmacological approaches such as therapeutic recreation because they do not know how TRIs can address the problem. This important information about non-drug approaches to treatment of dementia related behavior problems needs to become part of nursing and medical school training along with inclusion in the federal regulatory language.

Conclusion

This research demonstrated that therapeutic recreation interventions predictably alerted passive participants between 79-91% of the time, depending on the intervention category. It also demonstrated that therapeutic recreation interventions had a calming effect between 92-100% of the time, again depending on intervention category. This study concluded that the therapeutic recreation intervention process is effective in treating the behaviors of passivity and agitation.

Application of non-pharmacological interventions such as therapeutic recreation should be pursued vigorously by nursing home staff and consulting medical providers and made available before powerful medications are prescribed. Medical personnel need to have, and in fact, do have available a safe and efficacious alternative to psychotropic medications for their older adult clients who have dementia: professional therapeutic recreation for the treatment of disturbing behaviors.

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