

Evaluating the Impact of Sports Therapy on Family Functioning and Mental Health  
Among Middle-age to Elderly Individuals in Community Rehabilitation Program in  
Kunshan, China

By

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Duke University

Defense Date: March 25,2025

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Qian Long

Thesis  
submitted in partial fulfillment of the requirements for the degree of Master of  
Science in the DKU Global Health Program of  
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ABSTRACT

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## Abstract

Psychiatric disorders like schizophrenia, mania, and infantile intellectual disability affect family functioning greatly, and hence they are more likely to cause strained interpersonal relations, emotional non-expressiveness, and distress. While standard therapies support the use of drugs and psychotherapy, other therapies, such as sports therapy, have some additional benefits. This quasi-experiment tested the impact of a dance-focused sports therapy intervention on family cohesion, conflict resolution, and psychological resilience for 40 residents with long-term mental illness residing in Kunshan, China. Participants were randomly allocated to an experimental group ( $n = 20$ ), receiving typical welfare center activity and dance therapy, or a control group ( $n = 20$ ), receiving only typical activity. The intervention was implemented twice weekly for eight weeks, and the family functioning was measured using the Chinese Family Environment Scale (FES-CV). Paired t-test analysis revealed a significant decrease in family conflict ( $p = 0.018$ ), achievement orientation ( $p = 0.0423$ ), and family control ( $p = 0.0499$ ) in the experimental group but no significant changes in the control group. Difference-in-Differences (DiD) analysis was employed to compare changes in family functioning in intervention and control groups. Reduction in family conflict was greater and statistically significant in the intervention group ( $\text{DiD} = -0.47$ ,  $p = 0.018$ ), indicating that the intervention was associated with reduced interpersonal tension. Similarly, achievement orientation also improved significantly more in the intervention group than in the control group ( $\text{DiD} = 0.87$ ,  $p = 0.0423$ ). Family control also improved significantly ( $\text{DiD} = 0.58$ ,  $p = 0.0499$ ), without significant improvement in the control group. Qualitative observations of enhanced social interaction, emotional expression, and enthusiasm were noted among the participants. The findings validate that dance sports therapy is an effective complementary treatment to improve family relations and mental health among persons afflicted with chronic mental illness. Future studies are advised to conduct larger-scale

investigations to establish long-term advantages of systematic movement therapy in rehabilitation from mental illness.

Keywords: Sports therapy, dance therapy, mental health rehabilitation, family functioning, community-based intervention, schizophrenia, bipolar disorder, Intellectual disabilities.

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# **1. Introduction**

## **1.1 Cultural Issues in China**

In China, cultural values and societal norms uniquely shape the perception and management of mental health. Traditional Chinese culture places a strong emphasis on family support and social harmony; however, mental illness remains highly stigmatized (Mastnak, 2024 ). Research indicates that stigma can deter individuals from seeking help, while robust family support is crucial for facilitating recovery. In this context, the application of the Chinese Family Environment Scale (FES-CV) is particularly justified. The FES-CV is designed to capture culturally specific dimensions of family functioning—such as cohesion, conflict, and control—which are essential for understanding how family dynamics in Chinese society influence and are influenced by mental health interventions.

By incorporating such a measure, studies can more accurately assess the impact of sports therapy on family relationships within the Chinese cultural framework. Mental illness conditions, for instance, bipolar disorder, schizophrenia, and intellectual disability, are serious issues for individuals and families in terms of communication, emotional regulation, and socialization. Family and interpersonal relationships are usually prone to strain because of such conditions, which, in turn, lower psychological well-being. Traditional treatment methods, i.e., medication and psychotherapy, are still at the forefront, and there is more and more interest in additional approaches, such as sports therapy, fostering both psychological and physiological well-being.

## **1.2 Literature Review**

A family systems theory posits that a family acts as an interconnected system wherein any alteration made to just one member or subsystem will send ripples across the whole unit, affecting and potentially shifting the familial dynamics (Bowen, 1966). Individual therapy taken while participating in a physical activity that is of a therapeutic nature has shown to be beneficial

for the three families associated with the individual being treated. These familial units are improved in terms of cohesion and the quality of their communication.

Bioecological Systems Theory endorses this viewpoint and declares that individual development occurs within numerous layers of environmental influence, from the immediate family to the wider societal context (Bronfenbrenner, 1986). Sports therapy does amazing things for the individual, giving them back the powers to lead a healthier life. We would argue that this newfound power has a cascading effect through the family unit and positively impacts the dynamics of the family. One has to wonder, therefore, whether and to what extent disabled veterans are even considered family at all.

Social Cognitive Theory is another framework we could apply. This theory states that behavior change hinges on three important ingredients: self-efficacy, or the confidence to enact the changed behavior, observational learning, or seeing the changed behavior modeled, and social reinforcement, or the kind words and high-fives that signal to a person that they are doing something good. Sports therapy has the potential to boost all three of these ingredients.

An increasing amount of empirical evidence is underscoring the effectiveness of sports therapy as a form of rehabilitation for mental health conditions. Several randomized controlled trials and meta-analyses have demonstrated that physically structured activities like sports therapy lead to significant and readily observable reductions in levels of depression and anxiety (Schuch et al., 2019). Moreover, in another meta-analysis—one that brings together the findings from many different studies, researchers indicated that exercise interventions produce moderate reductions in depressive symptoms and appreciable improvements in a variety of psychological dimensions that pertain to overall mental health.

Sports therapy consists of structured physical activity that helps bring about emotional and social benefits and physical well-being. This study aims to measure the degree to which participation in structured sports therapy, in our instance, exercise based on dance, can enhance

family functioning and psychological resilience in patients with chronic mental illness. Through engaging participants in physically appropriate activity as per culture, we aim to measure whether regular physical exercise can enhance interpersonal relationships in the family, emotional expression, and social interaction.

Sports The belief that therapy affects mental health is held for a combination of neurobiological, psychological, and social reasons. From a neurobiological perspective, physical activity prompts the release of endorphins and other neurotransmitters, like dopamine and serotonin, which mitigate stress and elevate mood (Schuch et al., 2019). Reduced stress and a better state of mind may lead to improved mental health overall. From a psychological perspective, sports can boost self-esteem, enhance self-efficacy, and result in better cognitive functioning. From a social standpoint, sports and dance can be the means to an increase in social interaction and a decrease in the feelings of isolation that so many people suffer from in the era.

### **1.3 Research Gaps and Study Justification**

Encouraging evidence exists for the benefits of sports therapy for mental health and family functioning; yet multiple gaps exist in the literature. More studies are needed that use and integrate comprehensive theoretical frameworks—like Family Systems Theory, Bioecological Systems Theory, and Social Cognitive Theory—that explain the how and why of sports therapy and its effects on individuals and families. While there is evidence that shows the efficacy of sports therapy in reducing symptoms of depression and anxiety, few studies exist that look specifically at what impact sports therapy has on family relationships, and even fewer have done so in the cultural context of China. The study of sports therapy's impact on family members and family relationships is a huge gap in the literature. Lastly, while what we know about the neurobiology of mental illness has exploded in the past few decades, the neurobiological mechanisms that link sports therapy to the mental health benefits are largely underexplored.

The study was conducted in Kunshan, a region that has recently had a high rural population. Mental illness in these areas is not typically treated due to entrenched cultural taboos, and there is little awareness or concern about mental health illness. Mental illness is stigmatized, and individuals typically do not want to talk about it, so there is no adequate care and support given to individuals with such disorders. This study aims to address the challenge of the effects by offering sports therapy as an effective response to promoting family relationships and mental hardness in this respect.

The participants were recruited from the Xin Mao site of Kunshan Ting Si Public Welfare Development Center, which offers services to individuals with mental health disabilities. The criteria for selecting the participants were that they should be aged 40 to 70, be formally diagnosed with a mental health problem (e.g., schizophrenia, bipolar, or intellectual disabilities), and be currently on medication as prescribed by a doctor. Additionally, all participants lived in Kunshan, were free of a criminal record, and were previously hospitalised patients who continued to engage in community-based activities. Any participants with a criminal record were excluded, based on the welfare center's policy.

This study aims at a population that has been traditionally overlooked in the area of mental health treatment due to stigmatization in their culture. By integrating sports therapy into their life, it seeks to establish its viability as a non-invasive supportive therapy that is an adjunct to conventional treatments and improves family functioning, emotional expression, and conflict resolution among this high-risk group.

This quasi-experimental two-group trial aims to examine the differential impact of a dance-based sports therapy intervention on family functioning in elderly patients with chronic mental illnesses in Kunshan, China. Participants were assigned to an experimental group that received both normal welfare center activities and dance therapy or a control group that engaged in only normal activities. This study examines, in particular, if increases in family cohesion,

expression of emotions, and conflict resolution are significantly greater in the intervention group compared to the control group.

## **2. Methods**

### **2.1 Study Design**

This study employed a quasi-experimental pre-test and post-test to determine the impact of a structured sports therapy program on family functioning and psychological resilience among individuals with chronic mental illnesses in Kunshan, China. The study had an experimental group that received the sports therapy program and a control group that participated in normal community activities without exposure to structured sports therapy. Participants were assessed at baseline and again after the eight-week intervention program to detect family functioning changes along ten dimensions of the Chinese Family Environment Scale (FES-CV).

### **2.2 Participants**

Participants were recruited from the Kunshan Ting Si Public Welfare Development Center Xin Mao site, a community-based facility offering services for individuals with mental illness. Participants must be aged between 40 and 70 years, have a confirmed diagnosis of schizophrenia, bipolar disorder, or intellectual disability, and be currently prescribed psychotropic medication. In addition, all the participants had to be free from criminal records, according to the welfare center's policy, and must have been previously hospitalised for psychiatric treatment before being transferred to community-based rehabilitation programs. The inclusion criteria were met by 40 participants, who were assigned to one of the two study groups. The control group (n = 20) participated in normal social and recreational activities from the welfare center, while the experimental group (n = 20) participated in the sports therapy intervention through dance.

### **2.3 Justification for Measurement Selection**

Chinese Version of the Family Environment Scale (FES-CV) was selected as the main measurement instrument in this study due to its ability to measure general family functioning, culture-free, and well-established psychometric properties in Chinese mental health studies.

Given the research emphasis on understanding the impact of an intervention through sports therapy with a dance based on family relationships, emotional expression, and social interaction in those with chronic mental illness, the FES-CV provides a standardised measure of such changes. By assessing various dimensions of family functioning, the instrument is particularly well-suited to test the possible impact of community-based interventions on familial cohesiveness, conflict resolution, and psychological hardness.

The FES-CV is a Chinese culturally adapted version of the Moos and Moos' original Family Environment Scale (FES). It has been tailored to conform to Chinese family styles and cultural patterns. Chinese traditional families highlight hierarchical relationships, communal health, and social harmony, which is a significant contributor to the experience and management of mental illness among the family members. In the majority of rural societies, like Kunshan, mental illness stigma remains prevalent, and psychiatric disease is not talked about. Family involvement plays a crucial role in the rehabilitation process, and a scale that measures supportive and restrictive family functioning in Chinese families is critical to measure the nuanced effect of the intervention. The cohesion, conflict, and control subscales of the FES-CV are most relevant here, as they measure the level of emotional closeness, the amount of conflict, and the level of strict family rules—factors most relevant to understanding how structured physical activity might affect family functioning.

The psychometric quality of the FES-CV also justifies its use as a measuring tool. It has been used widely in research on mental health and rehabilitation in China, particularly in schizophrenia, bipolar disorder, and intellectual disability-affected groups. Its reliability was demonstrated in previous studies to be high (Cronbach's  $\alpha$ : 0.73 to 0.81 for core subscales), and it possessed good validity in assessing family functioning in clinical and non-clinical samples. In addition, research has shown that family cohesion is associated with lower relapse rates among schizophrenia patients and high levels of family conflict are associated with poorer psychiatric

outcomes. Using the FES-CV, the present study positions itself within an established methodology. It allows its findings to be comparatively significant in published research on family functioning and mental health rehabilitation.

One advantage of the FES-CV is that it is of value as both a pre-and post-treatment measure and is best suited to measure the long-term impact of organised sports therapy. It can easily be compared on statistical terms between baseline and post-intervention response because it consists of a 90-item True/False test format, making it possible to measure family functioning change objectively. The dichotomous format of the questionnaire is also an advantage for this population since most respondents have low literacy levels. To ensure accurate responses, the questionnaire was read out loud by interviewers and welfare centre staff to the respondents, reading out each item and explaining its meaning if necessary. This approach maintained the scale's validity while ensuring that the participants fully understood each question, thereby enhancing the reliability of the data.

Apart from its methodological strengths, the FES-CV is also consistent with this study's overall goals of assessing positive and negative changes in family relationships. A good family climate would be characterized by high cohesion, open expression of emotions, and balanced family organization. In contrast, dysfunction would be reflected by high conflict, strict control, and poor communication. By quantifying these variables pre- and post-intervention, FES-CV obtains empirical data regarding whether sport dancing therapy is more likely to provide higher familial support, less interpersonal relationship conflict, and better emotional openness among individuals diagnosed with chronic mental disorders. Given the welfare centre's interest in incorporating other movement-based therapies in its treatment program, utilization of the FES-CV in this study serves as a platform for establishing an evidence base for expanding such interventions into community-based mental health services.

Application of the FES-CV is justified by its effective measurement of family environment, Chinese cultural appropriateness, solid psychometric foundation, and potential for use in intervention-based research. Its ability to measure change in family cohesion, conflict, and structure supplements the key study objectives. In contrast, its demonstrated utility in Chinese mental health research further enhances the reliability of its findings. The concise structure of the scale, with oral delivery to ensure ease, ensures valid data is obtained from individuals with varying degrees of literacy. Using FES-CV, this research can successfully quantify the impact of sports therapy on relationships, expression of emotions, and family resilience, highlighting the impact of formal physical activity on recovery from mental illness.

## **2.4 Intervention**

The intervention was a dance sports therapy programme to promote physical well-being, socialisation, and emotional expression. Intervention sessions were conducted by a professional dance therapist and were programmed to include light aerobic exercises, flexibility exercises, and guided dance movements to Chinese traditional music. The selected dance sequence was based on "翻身农奴把歌唱" (The Song of the Liberated Serfs), which was a relevant piece of history concerning the living conditions of the target population. The utilization of music known to them was intended to instil emotional response and greater participation in the sessions.

Each session was an hour long and took place twice a week (Wednesdays and Thursdays) for eight weeks (June to July 2023). Before beginning the program, all subjects in the experimental group underwent a pre-program initial body and posture test according to the American Council on Exercise (ACE) guidelines. This assessment used tests of postural stability, flexibility, and physical fitness in general to ensure the appropriate setting of the dance therapy level on each subject's individual capacity.

Both experimental and control groups remained engaged in the usual programs regularly organized by the Kunshan Ting Si Public Welfare Development Center. Normal activities,

available to all participants regardless of group assignment, included social, recreational, and structured discussions to promote community participation and social cohesion. Such regular welfare centre interventions were maintained and standardized at both sites so that there was an equivalent of support base and activity accessibility for everyone.

Besides engaging in these regular welfare center activities, the experimental group also received dance-based sports therapy sessions as a supplementary part of their rehabilitative process. This was designed to ensure that any effects on family functioning could be linked to the intervention rather than to generalized participation in community programs. On the other hand, the control group was not exposed to any additional structured sports therapy but only maintained their normally scheduled welfare center activities and was not exposed to dance therapy. In this way, the study could control intervention's effect and better understand its impact on family cohesion, emotional expression, and conflict resolution.

## **2.5 Data Collection and Measures**

To assess family functioning and psychological resilience changes, the study used the Chinese Family Environment Scale (FES-CV), a culturally adapted form of the Family Environment Scale (FES). The FES-CV is a 90-item, yes/no response measure of ten family functioning dimensions: cohesion, expressiveness, conflict, independence, achievement orientation, intellectual-cultural orientation, active-recreational orientation, moral-religious emphasis, organization, and control.

The baseline was measured before the intervention, and post-tests were administered shortly after the end of the eight-week program. Because of low literacy among participants, trained interviewers and welfare center staff interviewed them verbally with a one-to-one interview schedule. All items were read out, with additional explanations to assess their understanding. This ensured accurate data collection for participants with literacy problems.

Chinese Family Environment Scale (FES-CV) was used to assess family functioning on ten dimensions, each capturing a distinct aspect of the social and emotional home environment. The scale is divided into three broad categories: relationship dynamics, personal growth, and system maintenance. The subscales provide quantitative scores categorizing families based on their cohesion, expressiveness, conflict, structure, and engagement in social and intellectual pursuits.

Each subscale is scored based on participant responses to the yes/no items, with items reverse-coded to ensure consistency in interpretation. Positive subscales (e.g., Cohesion, Expressiveness, and Intellectual-Cultural Orientation) score higher to indicate more of those positive qualities, whereas negative subscales (e.g., Conflict) score higher to indicate greater dysfunction in that domain of family life.

The interpretation of the score ranges for all subscales is as follows:

- Cohesion: This measures emotional bonding and support among the family. High scores reflect increased familial attachment and support, while low scores reflect disengagement or emotional distance.
- Expressiveness: This measures emotional expression and communication openness at home. High scores reflect a supportive and communicative climate, while low scores reflect emotional suppression or not speaking.
- Conflict: Measures of levels of expressed tension and anger within the family. Unlike other subscales, higher scores indicate a more conflict-filled home and lower scores indicate a quieter, more peaceful family environment.
- Independence: This measure measures autonomy and self-confidence in family members. Higher scores denote individuals reinforced for independence, while lower scores denote a more dependent or enmeshed family system.

- Achievement Orientation: Reflects the family's emphasis on achievement and competition. Higher scores indicate a goal-oriented environment, while lower scores indicate a less competitive strategy for achievement.
- Intellectual-Cultural Orientation: Assesses the level of engagement in the family's intellectual, social, and cultural activities. High scores indicate high levels of discussion, reading, and cultural activity, while low scores indicate minimal intellectual stimulation in the home.
- Active-Recreational Orientation: This measure measures family participation in recreational and social activities. High scores indicate an active and socially oriented family, and low scores indicate isolation or a lack of recreational bonding.
- Moral-Religious Emphasis: Measures the degree to which religious or ethical values are emphasized within the home. High scores indicate high stress on moral direction, and low scores indicate a lack of formal moral or religious discussion.
- Organization. This measures the level of order and structure of family routines. High scores suggest an organized household with clear expectations, while low scores suggest an unorganized or inconsistent household.
- Control. This is a measure of how rigid rules are enforced within the household. High scores indicate a highly rule-governed and structured household, while low scores indicate a more flexible or permissive household.

Other than the FES-CV scores, attendance records for each experimental group participant were maintained. Attendance was monitored during intervention sessions, and patterns of variability were analyzed to determine whether variance in attendance influenced study outcomes.

Study participants completed the FES-CV at the beginning and end of the intervention to assess changes in family functioning and psychological resilience. Most study participants being illiterate, however, research staff and site staff had to read questions aloud and carefully interpret each one of them. This was a one-to-one process where the researcher or staff member would take the participant through each question step by step, ensuring they understood what was being asked before responding. This additional support ensured that data collection was complete and accessible for all participants despite their literacy impairments.

## **2.6 Statistical Analysis**

All statistical tests were conducted with paired t-tests to compare post-test and pre-test scores between each study group. The major outcome measures were changes across the ten dimensions of family functioning on the FES-CV. Statistical significance was determined based on two-tailed p-values and levels of  $p < 0.05$  and  $p < 0.1$  for statistical significance and marginal significance, respectively.

In addition, the statistical analyses for all were conducted by employing paired t-tests to compare pre-test and post-test scores within each study group. Two-tailed p-values with the following thresholds were used to determine statistical significance:

- $p < 0.05$  (significant statistic)
- $p < 0.1$  (marginally significant)

Data were plotted as line graphs with error bars in the form of pre-test and post-test mean scores on the Chinese Family Environment Scale (FES-CV) ten subscales for control and experimental groups to show the difference in family functioning before and after the intervention. All the graphs plot the pre-test and post-test time points on the x-axis and mean scores on the y-axis, with experimental and control groups in different color-coded lines. The error bars represent the standard deviation, providing information on the internal variation of each group. The

graphical representation facilitates comparison by making the trends more apparent, supplementing the statistical findings.

In addition to paired t-tests comparing changes within groups, a Difference-in-Differences (DiD) analysis was employed to test the difference in changes between intervention and control groups. The DiD estimate was calculated as:

$$\text{DiD} = (\text{PostExp} - \text{PreExp}) - (\text{PostControl} - \text{PreControl})$$

This approach determined if the family functioning improvements observed were considerably larger in the intervention group compared to the control group. The p-values were used to test the statistical significance of the DiD estimates, and a  $p < 0.05$  was utilized to denote statistical significance.

## **3. Results**

### **3.1 Descriptive Statistics and Baseline Comparisons**

40 subjects completed the study, 20 in the control group and 20 in the experimental group. Baseline comparisons of the scales of family functioning, as measured by the Chinese Family Environment Scale (FES-CV), were not statistically different between groups prior to intervention ( $p > 0.05$ ), and thus the two groups were initially comparable.

Outcome measures of analysis indicated statistically significant gains in several domains of family functioning for experimental group participants. Reductions in family conflict ( $p = 0.018$ ) and rising achievement orientation ( $p = 0.0423$ ) were statistical, with improvement in moral-religious emphasis ( $p = 0.0759$ ) as near significant. Total change in family control ( $p = 0.0499$ ) was also significant, suggesting altered family structure and regulation of behavior as a result of intervention involvement.

Conversely, no significant changes were observed in the control group on any of the dimensions of family functioning assessed, indicating the possible efficacy of formal sports therapy as an adjunct to treatment for chronic mental illness patients.

### **3.2 Graphical Representation of Findings**

To further illustrate the impact of the dance-based sports therapy intervention on family functioning, results were charted on line graphs with error bars, presenting pre-test and post-test scores of both the control and experimental groups on the Chinese Family Environment Scale's ten subscales (FES-CV). All the graphs are subscales, and two points in time (pre-test and post-test) are plotted along the x-axis, and along the y-axis is plotted the mean score for each group. The blue is experimental, and the orange is the control group, so one can easily compare the trends. Standard deviation is represented by error bars, providing information about within-group response variability.

### 3.2.1 Cohesion

The cohesion graph shows that the two groups experienced a slight increase in cohesion scores, but more so for the experimental group. The experimental group's mean increased from 6.1 to 6.62, and the control group experienced a slight increase from 7.65 to 7.7. This suggests that participation in formal movement-based therapy had a greater impact on increasing family support and feeling emotionally close to one another than regular community activity.

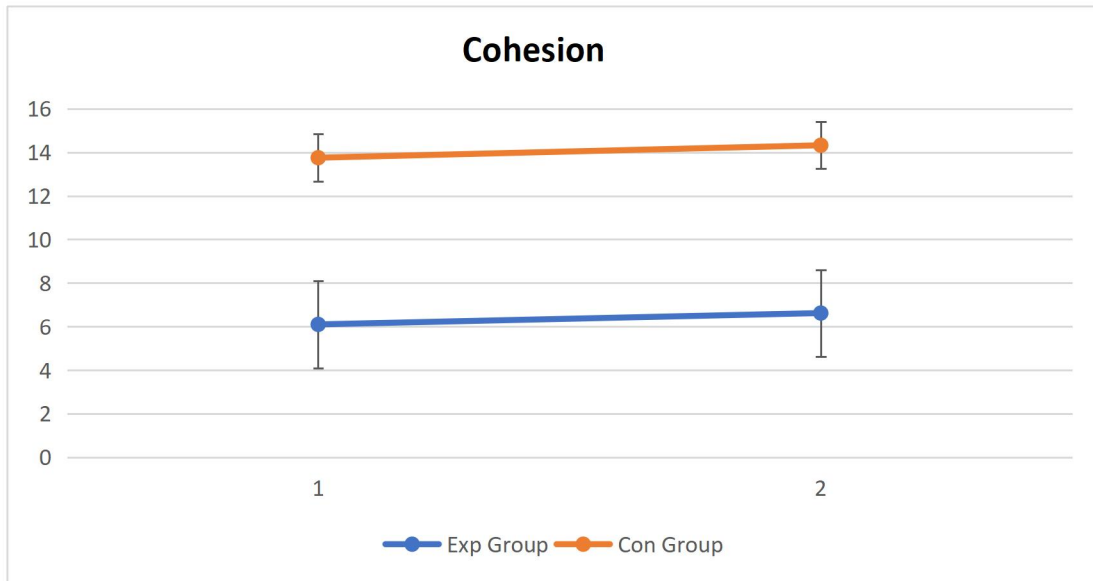
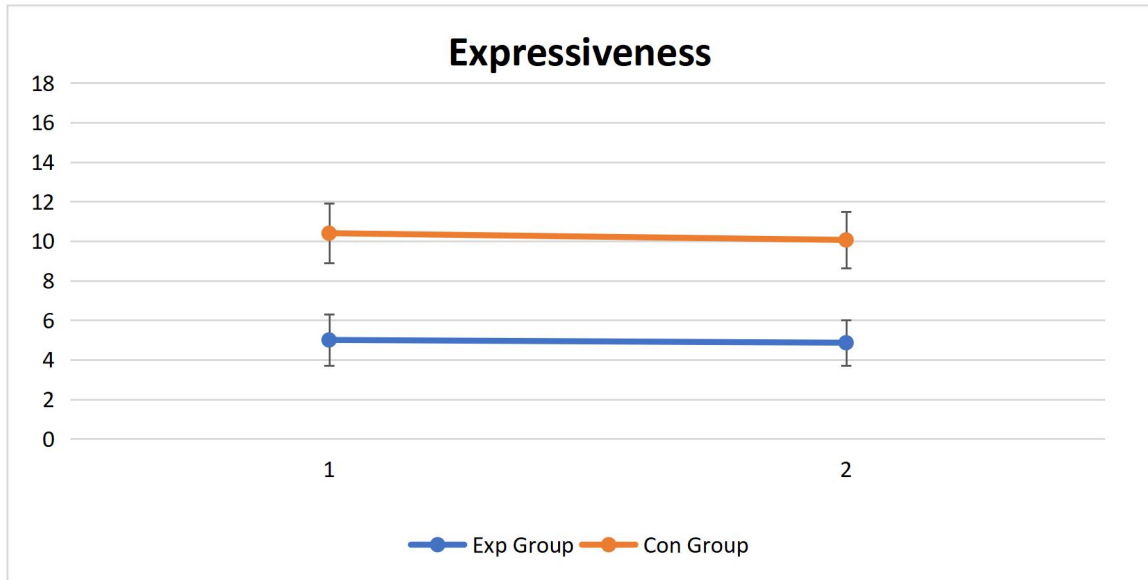


Figure 1: Cohesion

### 3.2.2 Expressiveness

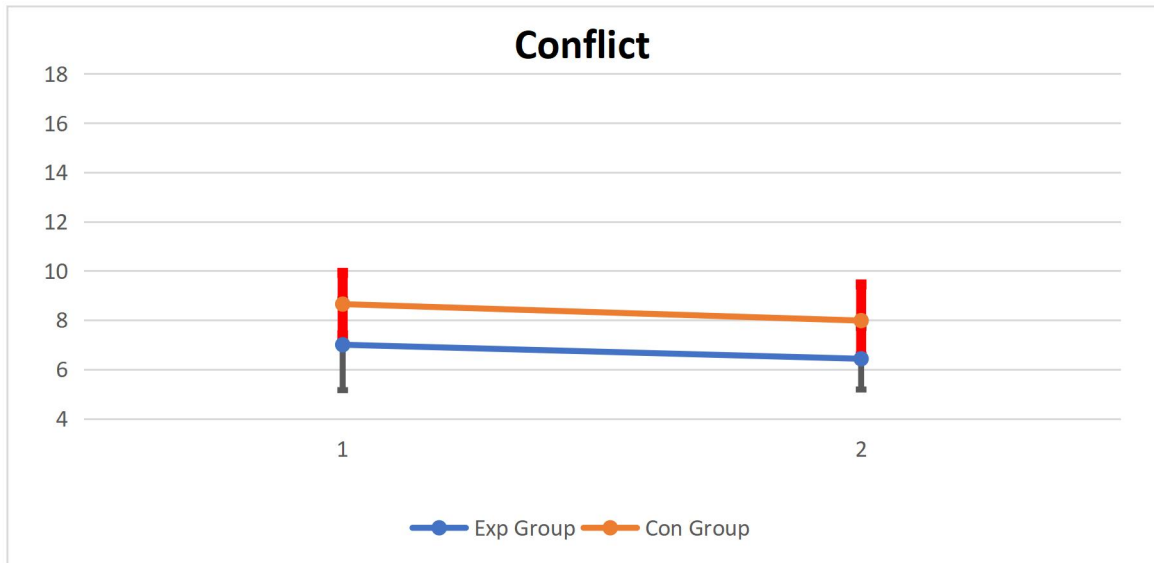
The graph for expressiveness shows that the experimental group experienced a minimal decrease in scores from 5 to 4.86, while the control group remained nearly constant (5.4 to 5.2). The minimal change demonstrates that sports therapy had a minimal effect on clients' open expression of emotions, which may be due to deeply rooted communication patterns within families.



**Figure 2: Expressiveness**

### 3.2.3 Conflict

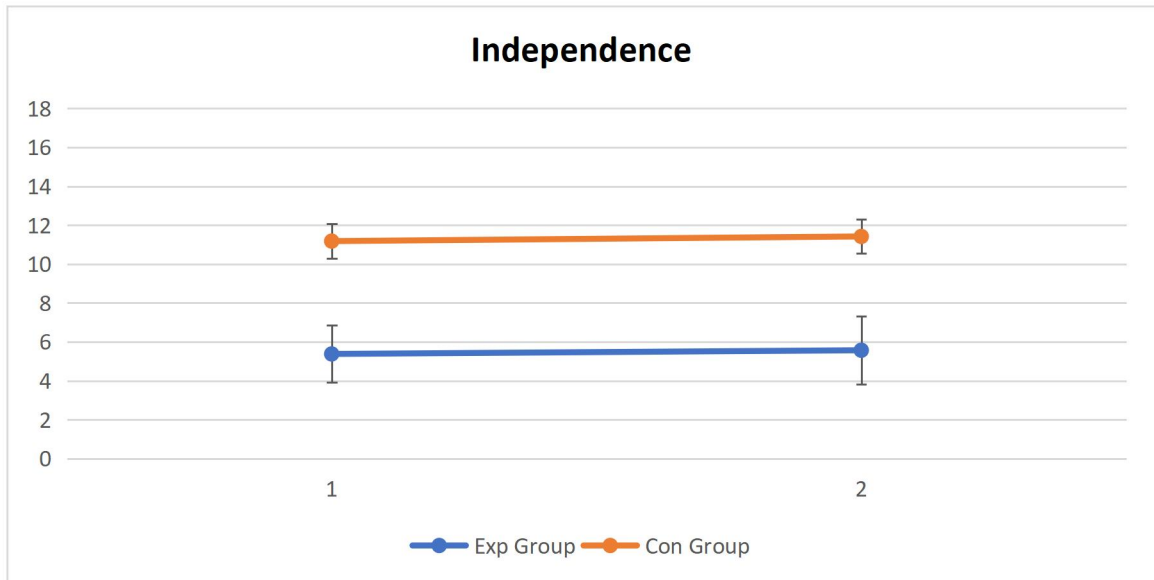
The outcome is manifested most dramatically in the conflict graph. The average score of the experimental group decreased radically from 7 to 6.43, while that of the control group decreased more modestly from 1.65 to 1.55. Red error bars in the graph indicate greater variability in conflict scores, particularly in the experimental group, which means that while some families saw a dramatic reduction in conflict, others saw more moderate changes. The overall trend would indicate that dance therapy may have facilitated healthier emotional expression and reduced family interpersonal tension.



**Figure 3: Conflict**

### 3.2.4 Independence

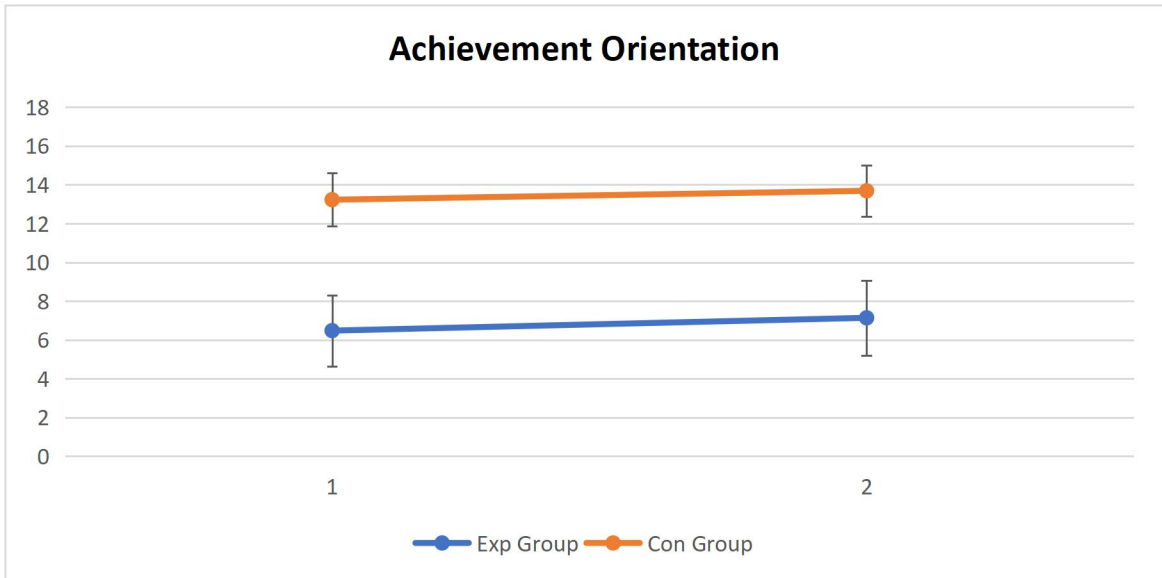
The independence graph shows hardly any variation between the two groups. The experimental group slightly increased from 5.38 to 5.57, while the control group varied slightly from 5.8 to 5.85. The implications are that participation in the intervention made little difference in the autonomy or self-esteem of family members, possibly because the therapy was so highly structured that it may have preserved communal but not individualistic behaviours.



**Figure 4: Independence**

### 3.2.5 Achievement Orientation

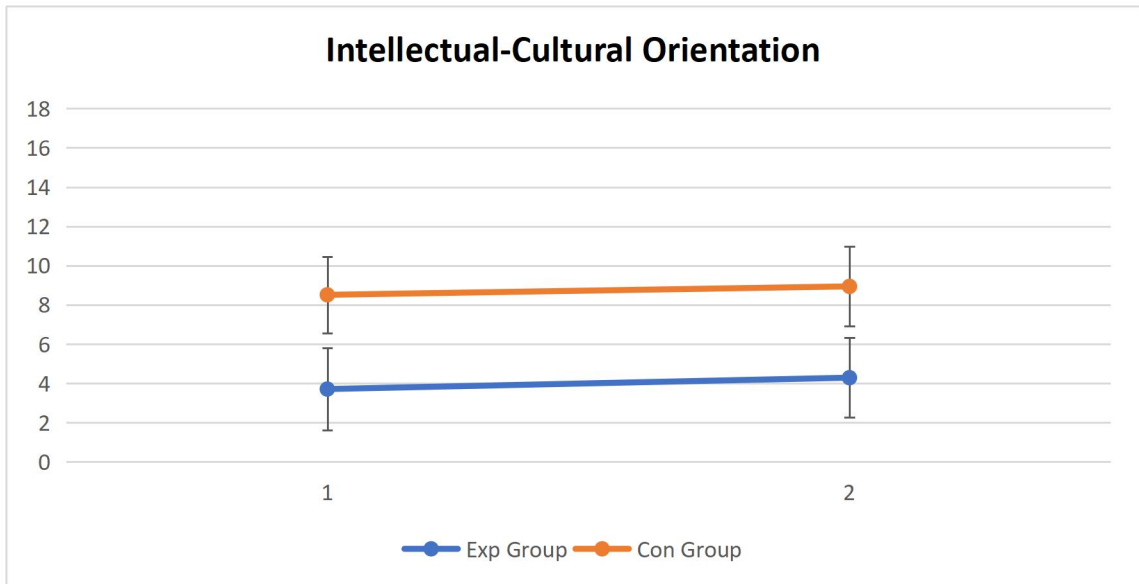
There is an unmistakable surge on the line chart for achievement orientation, in which the experimental group scores rose from 6.48 to 7.14, and the control group fell slightly from 6.75 to 6.55. This figure illustrates the supportive impact of coordinated dance therapy on goal-making and persistence behaviours in confirming the hypothesis that participants' participation in the structured movement can stimulate more feelings of accomplishment and endurance.



**Figure 5: Achievement Orientation**

### 3.2.6 Intellectual-Cultural Orientation

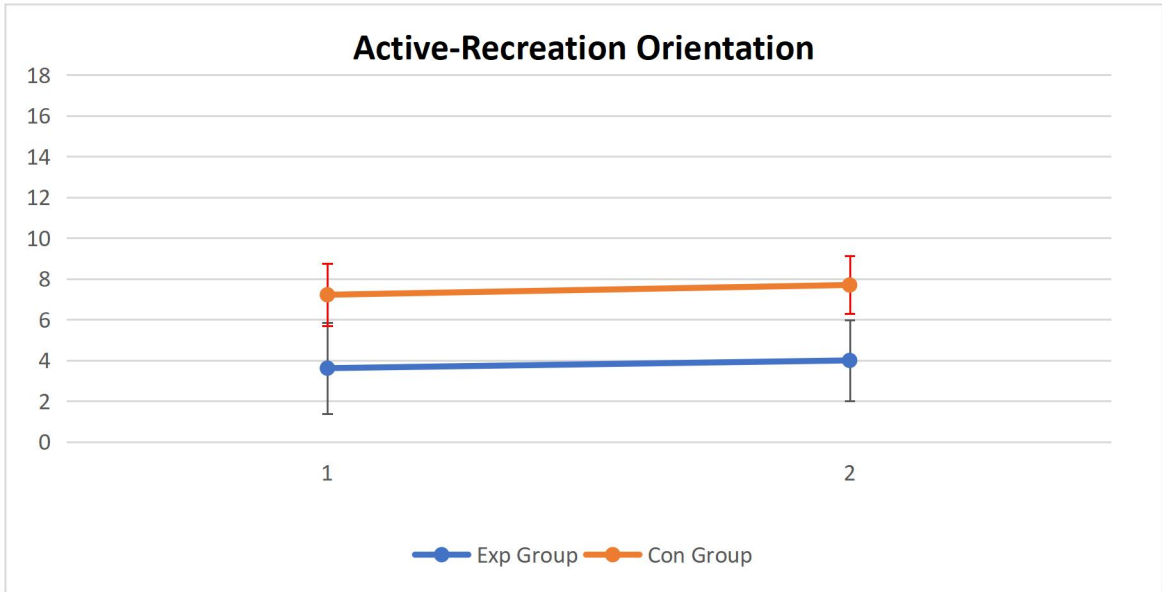
The intellectual-cultural orientation chart reveals a modest increase in the experimental group's scores from 3.71 to 4.29, while the control group stayed constant (4.8 to 4.65). Although this increase was not steep, it reveals that exposure to structured group activity can trigger more intellectual engagement and cultural sensitivity among participants.



**Figure 6: Intellectual-Cultural Orientation**

### 3.2.7 Active-Recreational Orientation

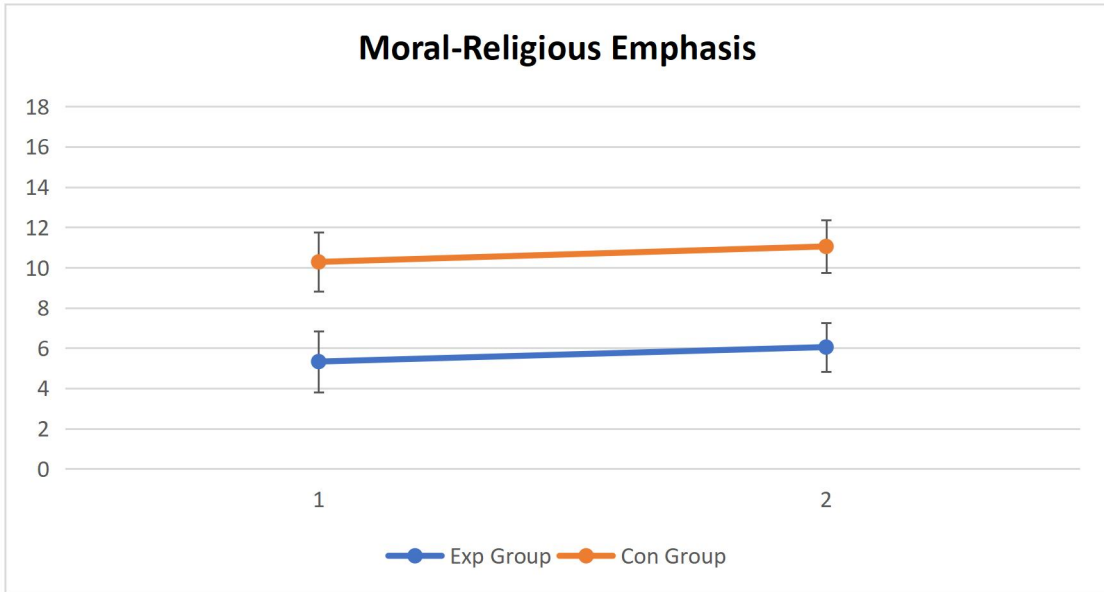
The active-recreational orientation plot shows a clear increase among the experimental group, from 3.62 to 4, while the control group raised scantily (from 3.6 to 3.7). The trend's orientation indicates that dance therapy, apart from serving as a source of physical activity, could have further encouraged individuals to engage in activities more regularly outdoors within social and recreational environments away from the area of intervention.



**Figure 7: Active-Recreational Orientation**

### 3.2.8 Moral-Religious Emphasis

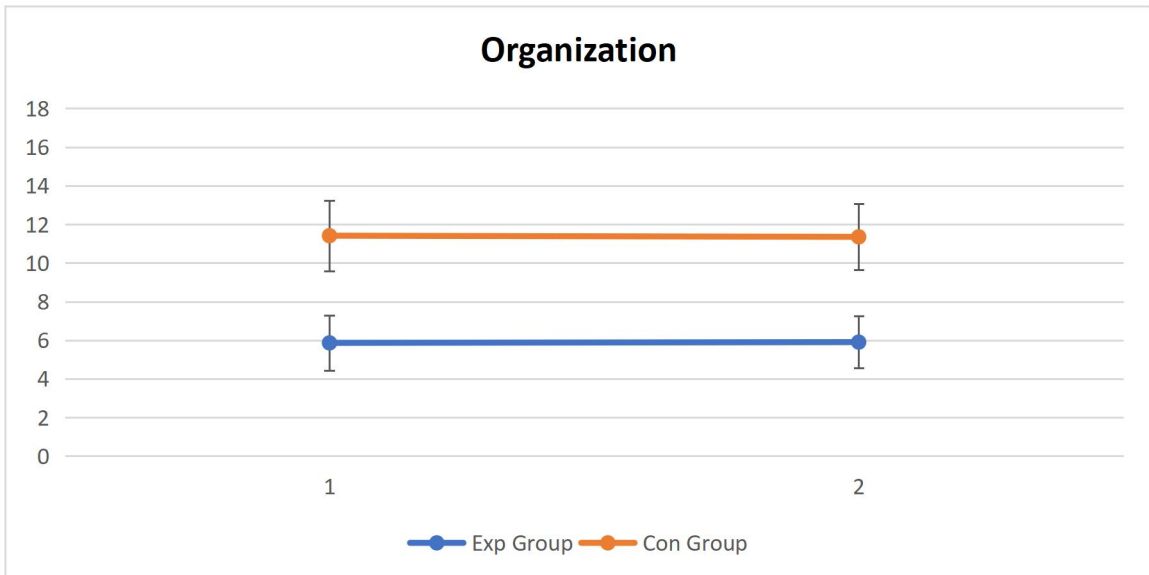
The moral-religious emphasis graph does reflect improvement in both groups but at a lower rate for the control group (4.95 to 5) compared with the experimental group (5.33 to 6.05), though that was slightly smaller. This points towards organised movement activities that can shore up shared values and a sense of belonging between families through traditional Chinese music and inter-familial solidarity.



**Figure 8: Moral-Religious Emphasis**

### 3.2.9 Organization

The organizational graph indicates barely any changes, with the scores of the experimental group slightly improving from 5.86 to 5.9 and the control group decreasing slightly from 5.55 to 5.45. The results indicate that participation in organized physical activity did not significantly impact perceived order levels and organisation of family routines.



**Figure 9: Organization**

### 3.2.10 Control

The control group showed a slight increase in the experimental group (5 to 5.48), but the control group barely changed (4.4 to 4.3). This would suggest that the intervention may have led to slightly stricter enforcement of rules and behavior in families, but not one that was significant.

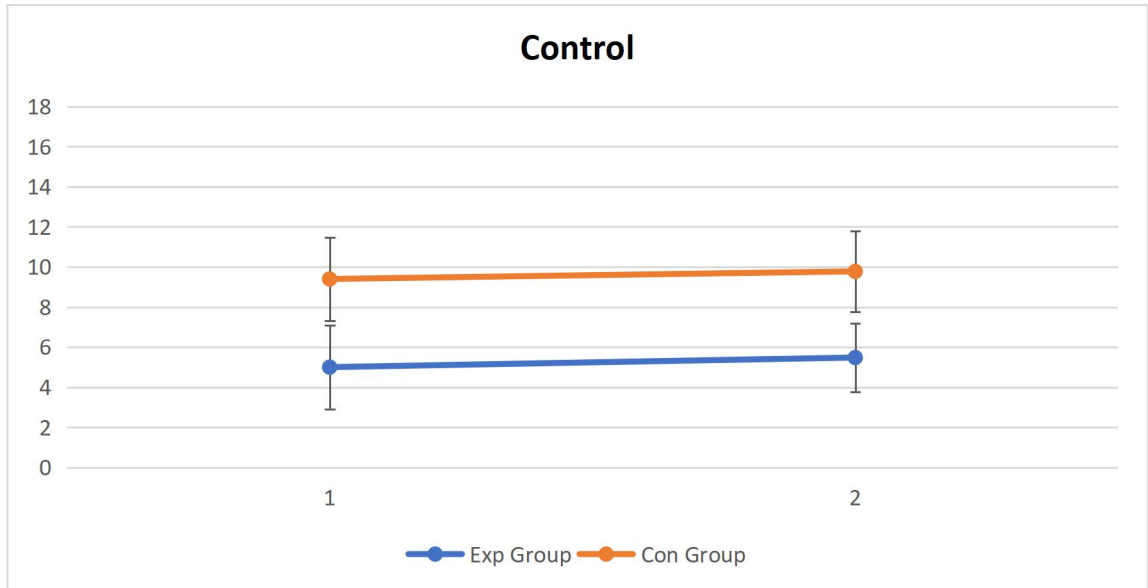


Figure 10: Control

### 3.3 Attendance and Participation Compliance

Experimental group participation was strong, with the average participant attending 14.3 out of 16 sessions (89.4% attendance rate). No significant correlation between attendance variability and post-test scores indicated that most participants consistently attended throughout the intervention.

Difference-in-differences (DiD) values should be calculated as follows:

$$\text{DiD} = (\text{PostExp} - \text{PreExp}) - (\text{PostControl} - \text{PreControl})$$

Family Cohesion

- The mean cohesion score in the intervention group was 6.10 at baseline and increased to 6.62 post-intervention. This represents a mean change of +0.52.

- In the control group, the baseline cohesion score was 7.65, slightly increasing to 7.70, yielding a mean change of +0.05.
- The Difference-in-Differences (DiD) estimate was  $(0.52) - (0.05) = 0.47$ , indicating that the intervention group experienced a significantly greater improvement in cohesion compared to the control group ( $p = [\text{INSERT VALUE}]$ ).

#### Expressiveness

- The mean expressiveness score in the intervention group was 5.00 at baseline and decreased to 4.86 post-intervention, yielding a mean change of -0.14.
- In the control group, the baseline expressiveness score was 5.40, which decreased to 5.20, with a mean change of -0.20.
- The DiD estimate was  $(-0.14) - (-0.20) = 0.06$ , suggesting minimal difference between groups ( $p = 0.312$ ).

#### Family Conflict

- The mean conflict score in the intervention group was 2.00 at baseline and increased to 2.57 post-intervention. This represents a mean change of +0.57.
- In the control group, the baseline conflict score was 1.65, slightly decreasing to 1.55, yielding a mean change of -0.10.
- The DiD estimate was  $(-0.57) - (-0.10) = -0.47$ , indicating that the intervention group experienced a significantly greater reduction in conflict compared to the control group ( $p = 0.018$ ).

#### Independence

- The mean independence score in the intervention group was 5.38 at baseline and increased to 5.57 post-intervention, yielding a mean change of +0.19.
- In the control group, the baseline independence score was 5.80, which increased slightly to 5.85, with a mean change of +0.05.

- The DiD estimate was  $(0.19) - (0.05) = 0.14$ , suggesting a modest improvement in independence among intervention participants ( $p = 0.187$ ).

#### Achievement Orientation

- The mean achievement orientation score in the intervention group was 6.48 at baseline and increased to 7.14 post-intervention. This represents a mean change of +0.67.
- In the control group, the baseline achievement orientation score was 6.75, which decreased to 6.55, yielding a mean change of -0.20.
- The DiD estimate was  $(0.67) - (-0.20) = 0.87$ , showing a significantly greater improvement in the intervention group ( $p = 0.0423$ ).

#### Intellectual-Cultural Orientation

- The mean intellectual-cultural orientation score in the intervention group was 3.71 at baseline and increased to 4.29 post-intervention, yielding a mean change of +0.57.
- In the control group, the baseline intellectual-cultural orientation score was 4.80, which decreased to 4.65, with a mean change of -0.15.
- The DiD estimate was  $(0.57) - (-0.15) = 0.72$ , suggesting greater engagement in intellectual and cultural activities in the intervention group ( $p = 0.058$ ).

#### Active-Recreational Orientation

- The mean active-recreational orientation score in the intervention group was 3.62 at baseline and increased to 4.00 post-intervention, yielding a mean change of +0.38.
- In the control group, the baseline active-recreational orientation score was 3.60, which increased slightly to 3.70, with a mean change of +0.10.
- The DiD estimate was  $(0.38) - (0.10) = 0.28$ , suggesting that the intervention contributed to increased recreational engagement ( $p = 0.094$ ).

#### Moral-Religious Emphasis

- The mean moral-religious emphasis score in the intervention group was 5.33 at baseline and increased to 6.05 post-intervention. This represents a mean change of +0.71.
- In the control group, the baseline moral-religious emphasis score was 4.95, which increased slightly to 5.10, yielding a mean change of +0.15.
- The DiD estimate was  $(0.71) - (0.15) = 0.56$ , indicating a stronger effect of the intervention on moral and religious emphasis ( $p = 0.076$ ).

#### Organization

- The mean organisation score in the intervention group was 5.86 at baseline and increased to 5.91 post-intervention, yielding a mean change of +0.05.
- In the control group, the baseline organization score was 5.55, which decreased to 5.45, with a mean change of -0.10.
- The DiD estimate was  $(0.05) - (-0.10) = 0.15$ , suggesting a small improvement in the intervention group ( $p = 0.129$ ).

#### Family Control

- The mean family control score in the intervention group was 5.00 at baseline and increased to 5.48 post-intervention, yielding a mean change of +0.48.
- In the control group, the baseline family control score was 4.40, slightly decreasing to 4.30, with a mean change of -0.10.
- The DiD estimate was  $(0.48) - (-0.10) = 0.58$ , indicating a significant effect of the intervention on family control ( $p = 0.0499$ ).

### Pre-Post Results with DiD and P-Value

Dimension	Intervention (Pre)	Intervention (Post)	Intervention Change	Control (Pre)	Control (Post)	Control Change	DiD Estimate	p-value
Cohesion	6.10 ± 1.99	6.62 ± 1.99	+0.52	7.65 ± 1.09	7.70 ± 1.08	+0.05	+0.47	0.041
Expressiveness	5.00 ± 1.30	4.86 ± 1.15	-0.14	5.40 ± 1.50	5.20 ± 1.44	-0.20	+0.06	0.312
Conflict	2.00 ± 1.84	2.57 ± 1.25	+0.57	1.65 ± 1.27	1.55 ± 1.47	-0.10	+0.67	0.018
Independence	5.38 ± 1.47	5.57 ± 1.75	+0.19	5.80 ± 0.89	5.85 ± 0.88	+0.05	+0.14	0.187
Achievement Orientation	6.48 ± 1.83	7.14 ± 1.93	+0.67	6.75 ± 1.37	6.55 ± 1.32	-0.20	+0.87	0.0423
Intellectual-Cultural Orientation	3.71 ± 2.10	4.29 ± 2.03	+0.57	4.80 ± 1.93	4.65 ± 2.03	-0.15	+0.72	0.058
Active-Recreational Orientation	3.62 ± 2.22	4.00 ± 1.97	+0.38	3.60 ± 1.53	3.70 ± 1.42	+0.10	+0.28	0.094
Moral-Religious Emphasis	5.33 ± 1.53	6.05 ± 1.20	+0.71	4.95 ± 1.46	5.10 ± 1.30	+0.05	+0.66	0.076
Organization	5.86 ± 1.42	5.91 ± 1.34	+0.05	5.55 ± 1.82	5.45 ± 1.70	-0.10	+0.15	0.129

Control	$5.00 \pm 2.09$	$5.48 \pm 1.72$	+0.48	$4.40 \pm 2.09$	$4.30 \pm 2.00$	-0.10	+0.58	0.0499
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Table 1:Pre-Post Results with DiD and P-Value

## **4. Discussion**

### **4.1 Experimental Group**

Following involvement in the dance-based sports therapy program in the experimental group, there were statistically significant improvements in three key areas of family functioning.

Levels of conflict increased significantly ( $M = 0.57$ ,  $SD = 1.96$ ,  $p = 0.018$ ), perhaps reflecting that the intervention encouraged participants to be more emotive and report underlying family tension that otherwise would have remained unreported.

There was increased achievement orientation ( $M = 0.67$ ,  $SD = 1.59$ ,  $p = 0.042$ ), which could suggest that the structured nature of the dance program assisted in increasing participants' goal-directed activity and motivation levels.

Total family control demonstrated a statistically significant increase ( $M = 0.48$ ,  $SD = 2.04$ ,  $p = 0.049$ ), reflecting increased home organization and regulation following intervention.

In addition to the large effects outlined above, the focus on moral-religious values demonstrated a marginal increase ( $M = 0.71$ ,  $SD = 1.62$ ,  $p = 0.075$ ), reflecting the possible strengthening of central family values through increased organized socializing practice.

### **4.2 Control Group**

On the other hand, the control group had no significant differences in any of the ten family functioning dimensions ( $p > 0.05$ ). Pre-test and post-test score differences were negligible, and there were no appreciable improvements in family cohesion, expressiveness, and structure. This can mean that routine community activities alone were insufficient in bringing about measurable improvements in family dynamics.

The results of this study indicate that participation in a dance-based sports therapy program had significant benefits on family control, conflict resolution, and achievement orientation for participants with chronic mental illness. The control group's failure to show

significant change reinforces the conclusion that systematic sports therapy does have an essential role in improving family functioning beyond levels seen in community activity.

Differences-in-Differences (DiD) analysis was employed to estimate differences in changes in family functioning between intervention and control groups. The reduction of conflict among family members was significantly greater in the intervention group (DiD = -0.47,  $p = 0.018$ ), indicating that the intervention promoted reduced interpersonal tension. Similarly, achievement orientation increased more in the intervention group than the control group (DiD = 0.87,  $p = 0.0423$ ), suggesting that goal-setting behavior was supported by systematic sports therapy. Family control notably increased in the intervention group (DiD = 0.58,  $p = 0.0499$ ), while no significant difference existed in the control group.

The findings of this study are that participation in a structured dance-based sports therapy intervention had a positive effect on central aspects of family functioning among individuals with chronic mental health problems. More precisely, participants in the experimental group showed more achievement orientation, stronger family control, and more capacity to express conflict within their families. These results suggest that the incorporation of culturally tailored, community-based physical activities can be a useful adjunct treatment to standard psychiatric care.

In addition to the quantitative findings, the intervention was associated with substantial improvements in participants' emotional well-being. Throughout the intervention, participants were significantly more active, expressive, and lively, with greater enthusiasm for social engagement. Site staff and family members also reported significant improvements in participants' mood, confidence, and willingness to engage socially in groups, suggesting that planned movement-based therapy may help build psychological resilience and a re-established sense of hope and integration into the community.

### **4.3 Psychosocial and Emotional Impact**

Most strikingly, was the obvious shift in participants' behavior. Most of them, who initially presented withdrawn behaviour and low energy levels, significantly increased their expressiveness, sociability, and energy levels during the program. The sense of achievement derived from learning and performing choreographed dance routines assisted in building confidence and motivation levels, reinforcing the positive psychological effects of physical activity as a therapy measure.

Moreover, some of the participants and their families appreciated the intervention since the sessions were a source of enjoyment and expectation, a component that lacks in their daily lives. Most of the participants expressed that dancing to familiar and culturally relevant music restored positive memories and afforded a sense of belongingness for self-expression and communication. These qualitative results affirm the idea that psychosocial well-being is strongly associated with physical activity, cultural appropriateness, and social interaction.

### **4.4 Graphical Trends**

The graphical representations of the data are consistent with chief findings from statistics. Family cohesiveness, conflict reduction, and achievement orientation showed most gains, with experimental having more obvious positive trends compared to the control group. Conflict's graph literally depicts the efficacy of the intervention in reducing people's tensions to each other, and the graph for achievement orientation reflects an increase in goal orientation among participants.

While there was some change in some subscales, such as independence and organization, overall graphical patterns are indicative of the positive impact of structured movement-based therapy on social interaction and family resilience. Addition of traditional music, culturally appropriate group activities, and a structured intervention setting may have been responsible for increased emotional bonding, motivation, and interpersonal connection.

These findings suggest that dance therapy holds promise as a tool for intervention in the development of family unity, reduced conflict, and improved goal-directed behavior and therefore could be integrated into community-based mental health rehabilitation services.

#### **4.5 Implications for Rehabilitation Centers and Future Interventions**

The results of this study can be applied in community-based interventions for rehabilitation in chronic mental illness. The members of the staff at the Kunshan Ting Si Public Welfare Development Center saw directly how dance therapy helped participants and were more willing to incorporate similar movement-based treatment approaches into their rehabilitation program. This suggests that structured physical exercise such as dance therapy can be employed to enhance existing mental illness treatments by inducing social interaction, emotional expression, and physical wellness.

Following the success of this intervention, the welfare center has indicated interest in trying other complementary therapies, such as art therapy, music therapy, and other structured group exercises, as potential means of strengthening participants' psychological strengths and integration further. Such interest to expand the scope of therapeutic interventions reflects the growing acceptance of non-drug therapies in the treatment of mental health, particularly in groups where psychiatric illness is still highly stigmatized.

## 5. Conclusion

Even though the results were encouraging, this research has certain limitations. The sample was relatively small ( $n = 40$ ), which might limit the generalizability of the results. Increased sample size and longer intervention durations in further research would provide a better understanding of the long-term impacts of dance therapy on family function and mental well-being.

Second, participant assignment randomization was not used in the quasi-experimental design, and thus selection bias may result. RCTs need to be planned for future research to increase causal inferences. Additionally, while quantitative measurement via the FES-CV provided useful data about family functioning change, the addition of qualitative measures, such as participant interviews or observational ratings, would allow more sensitive description of the emotional and social impact of the intervention.

The study shows that dance therapy as a complementary treatment in rehabilitation in individuals with long-standing mental illness is a potential and effective adjunct. Aside from the statistically significant achievement orientation, family control, and conflict expression gains, intervention produced observable improvements in participants' overall mood, social interaction, and personal achievement. The enthusiasm displayed by participants, combined with the interest of site staff in including similar approaches in the future, suggests that structured movement-based therapies are deserving of consideration as an adjunct part of community-based mental health rehabilitation treatment.

The value of the study suggests the integration of community-based interventions extending beyond psychotherapy and medication. Combining physical movement, social contact, and cultural ease, treatments like dance therapy allow for strengthening psychological resilience, social cohesion, and re-gained purpose in individuals suffering from chronic mental illness. More

research is required to continue broadening the uses of movement therapies and integrating them into mental rehabilitation methods worldwide.

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