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# Dancing towards Well-being: Effects of Flamenco Dance on Mood and Subjective Well-being in Older Women

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**Abstract:** This study investigated the effects of flamenco dance on mood and subjective well-being in older women. In a broader context, the question was raised about how participation in dance activities could influence the emotional well-being of this demographic group. Thirty-four older women, aged between 62 and 79 years, with a mean age of 70.11 years (SD = 5.13), voluntarily participated in the study after providing informed consent. All of them were enrolled in a 12-week flamenco dance workshop conducted by the Autoestima Flamenca Association, with one two-hour session per week. Mood measurements (sadness, anxiety, anger, and joy) were taken biweekly before and after each session, and subjective well-being assessments were conducted before and after the intervention. The results revealed significant improvements in the overall mood of the participants, as well as an increase in their subjective well-being. These improvements were observed at both the individual and group levels. In conclusion, participation in flamenco dance demonstrated a positive impact on the mood and subjective well-being of older women. These findings support the idea that physical and artistic activities, such as flamenco dance, can play an important role in promoting emotional well-being in this age group**.**

**Keywords:** Flamenco Dance; Mood; Subjective Well-being: Self-esteem; Social Dance; Older Women; Cultural identity

## 1. Introduction

The aging population and the increasing life expectancy in our contemporary society make the care of the elderly a particularly relevant issue [1]. This is a notably characteristic issue for women, given the increasing feminization of old age. For example, in Spain, in 2021, the elderly were predominantly women, exceeding men by 30.9% [2].

Among the many concerns surrounding this demographic group, mental health and overall well-being have emerged as priorities. Mental illnesses are one of the largest components of the global burden of disease and one of the main determinants of well-being [3]. In Spain, anxiety disorder and depressive disorder are the most prevalent mental health problems, affecting respectively 6.7% and 4.1% of the population. A higher prevalence is observed in women, with 8.8% for anxiety disorder and 5.9% for depressive disorder, compared to men, who show rates of 4.5% and 2.3%, respectively [4-5]. It is worth noting that the incidence of both disorders increases with age, registering a combined prevalence of 19% in the age group of 56 to 75 years, which rises to 28% in people over 75 years old [6]. Generally, in these age groups both disorders are usually the consequence of feelings of loneliness and social isolation, all of which very negatively affects their quality of life [7]. These data highlight

the urgent need to address the mental health and well-being of older women, especially in a context of loneliness and social isolation.

The situation is even more serious, if we consider that the prevalence of these mental health problems presents a social gradient related to the training received and the level of income. People with low incomes or educational levels, a common situation in the older adult population, are more likely to experience mental health problems such as depression and anxiety, and at the same time, they usually face more difficulties in accessing health services [8].

Historically, mental health has been an area that has not received adequate attention in the entire European Union [8], but particularly Spain still has not developed the reforms proposed more than two decades ago [9], highlighting the fact that only around 60% of public health centers have an offer for mental health care [5]. The combination of these accessibility problems and lack of services, along with the high economic cost of mental health care, which represents a significant proportion of the Gross Domestic Product (GDP) both in Spain [6,10] and in the EU [11], and the costly dependence on psychotropic drugs in the treatment of mental disorders [12], underscores the need to seek alternative and more accessible solutions.

Even more so, when despite this scenario, in recent decades there has been a growing recognition of the importance of mental health in all estates and segments of the population, intensifying the interest in effectively addressing mental health problems, especially in the wake of the COVID-19 pandemic, and increasing after this the unmet mental health care needs [8]. Considering these changes, it is imperative to seek effective solutions to address mental health problems [8,13], and to support initiatives that can contribute to the promotion of health and psychosocial well-being, among them, those that are more sensitive to the cultural framework in which they intervene [14].

In the face of this complex scenario, it is necessary to adopt a multidimensional and integrative approach that not only addresses the clinical aspects of mental health, but also promotes an active and healthy lifestyle, social inclusion, and cultural participation. A possible avenue for this would be non-pharmacological interventions based on physical activity and cultural expression, which are emerging as a promising strategy to improve mental health and well-being, particularly for older women. Indeed, despite the physical, social, and cultural barriers that can hinder the participation of these women in programs to promote physical activity [15-17], these not only improve physical performance and mobility but also have a positive impact on cognitive functioning, reduce feelings of loneliness, and promote social interaction and inclusion, thus helping to prevent mental health problems and promote this [18-21].

However, to achieve these benefits, the adoption and adherence to these programs is crucial, which depends on three key conditions [22]: a) that the exercise is social and enjoyable, b) that it is adapted to the person's abilities, and c) that it leverages group support to motivate participants to undertake other actions in favor of their health. These characteristics are typical of dance-based programs, which in this context, emerge as an attractive strategy. Beyond improving physical functioning and mobility control [23-26], dance enhances cognitive functioning and neuroplasticity [27-30], and promotes social interaction and inclusion, and cultural socialization [31-33]. Among the many forms of dance, flamenco stands out for its emotional intensity and rich culture [34-35] and could serve as an effective means to promote health and well-being. In fact, there is evidence that flamenco dancing can contribute to healthy aging [36] and improve aerobic condition, flexibility, balance, and strength in perimenopausal or menopausal women, as much or more than other physical activity programs. In addition, it generates greater adherence and represents a very reasonable cost for primary care services [37-40], extending its effects even to other healthy habits [41]. We also have data in favor of the effects of flamenco on self-esteem in people with severe mental disorders [42-43].

However, there is a need for more research to specifically explore the effect of flamenco on the psychological well-being of older women. While there is a large body of research showing the benefits of dance in general for preserving psychological well-being in old age [44-48], the potential of flamenco dance has not yet been fully explored. Given its emotional and cultural richness, flamenco could offer unique advantages to mitigate the loneliness and social isolation of this sector of the population, while strengthening their mental health and resilience. Therefore, it seems promising and of great value to deepen the investigation of the specific effects of flamenco dance on the health and

well-being of older women, as it could provide effective and culturally enriching strategies for managing emotions and improving quality of life.

The purpose of this study is to explore the potential of flamenco to improve the mood and subjective well-being of women over 60 years of age. To this end, this study will focus on two main objectives. First, it will seek to investigate the impact of a 12-week flamenco dance program on these women's moods. Second, it will examine how this style of dance can affect their subjective well-being. Based on existing literature, we hypothesize that participation in the flamenco dance program will result in improvements in mood and an increase in subjective well-being.

To test these hypotheses, we have established a methodology that involves selecting participants through an agreement with the Autoestima Flamenca Association. We will invite all women over 60 years of age enrolled in the flamenco dance workshop to voluntarily participate. The participants will undergo a 12-week flamenco dance program, with two-hour sessions per week. We will use the Mood Rating Scale (MRS) and the WHO's subjective well-being index to assess changes in mood and subjective well-being, respectively [49-50].

This study, if our hypotheses are confirmed, has the potential to make significant contributions to existing strategies for improving the mental health of older people, particularly women. We anticipate that our results will provide evidence that flamenco dance can be a useful tool for improving mood and subjective well-being in this group. If our hypotheses are validated, we could consider flamenco dance as an economical and acceptable option to complement traditional approaches to promoting mental health in older women.

It is important to note that this study has certain limitations, such as the sample size, which could limit the accuracy and statistical power of our findings. Furthermore, our results may not be generalizable to other populations or contexts due to the specific characteristics of our sample and the nature of the flamenco dance program. Despite these limitations, we believe that this study could fill an important gap in the existing literature and could have significant implications for the development of effective and culturally appropriate interventions to promote mental health in older women.

## 2. Results

### 2.1. Evaluation of mood measurement consistency using measures pretest..

In this study, posttest measures were excluded from the calculation of the intraclass correlation coefficient (ICC) due to the potential influence of the flamenco dance program on participants' mood. The main objective was to evaluate the consistency of the Mood Rating Scale (MRS) without intervention, so pretest measures were used.

By using pretest measures, a "baseline" of participants' mood was established before the intervention. This allowed for the assessment of stability and consistency of the sub-scales of sadness, anxiety, anger, and joy over time, independent of potential changes induced by the flamenco dance program.

The two-factor mixed effects model was applied to calculate the intraclass correlation coefficients (ICC). The ICCs for individual measures indicated moderate reliability: sadness (ICC = 0.382), anxiety (ICC = 0.356), anger (ICC = 0.384), and joy (ICC = 0.316). The F-tests were significant for all sub-scales: sadness ($F[33, 165] = 4.708$, $p < .001$), anxiety ($F[33, 165] = 4.323$, $p < .001$), anger ($F[33, 165] = 4.742$, $p < .001$), and joy ($F[33, 165] = 3.767$, $p < .001$), suggesting significant variance among scores from different measures.

When considering average measures in the pre-intervention period, an increase in reliability was observed for all sub-scales: sadness (ICC = 0.788), anxiety (ICC = 0.769), anger (ICC = 0.789), and joy (ICC = 0.735). These values indicate high reliability when averaging the six measurements taken during that period.

In summary, the pretest measures were used to establish a baseline of participants' mood and assess the consistency of the sub-scales of sadness, anxiety, anger, and joy. Moderate reliability was found in individual measures, but high reliability was achieved when averaging the pre-intervention

measurements. The significant F-tests support the existence of significant variance among scores from different measures.

In conclusion, using pretest measures and applying the two-factor mixed effects model, the consistency of the sub-scales of sadness, anxiety, anger, and joy in the MRS could be robustly evaluated. Although moderate reliability was found in individual measures, high reliability was achieved when considering average measurements in the pre-intervention period. These results support the reliability and stability of mood measurements, providing a solid foundation for their use in future analyses and evaluations.

### 2.2. Effects on Mood States

To evaluate the effects of the flamenco dance workshop on mood throughout the sessions, a repeated measures analysis of variance was conducted with the within-subject factors of "Session" (with six levels corresponding to the six sessions) and "Measure" (with two levels: Pre and Post). Table 1 displays the mean values and standard deviations (in parentheses) for each mood state across the six evaluated sessions.

**Table 1. Means and standard deviations (in parentheses) of mood states per session.**

| Sessions | Sadness | | Anxiety | | Anger | | Joy | |
|---|---|---|---|---|---|---|---|---|
| | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| 1 | 15.79 (7.19) | 4.35 (5.17) | 17.53 (7.91) | 5.03 (4.02) | 9.05 (7.18) | 2.67 (2.53) | 15.32 (5.65) | 33.88 (4.46) |
| 2 | 15.26 (6.74) | 4.91 (4.38) | 17.29 (7.02) | 5.44 (4.36) | 12.14 (8.30) | 3.58 (3.90) | 15.85 (5.90) | 30.67 (4.67) |
| 3 | 15.70 (8.61) | 4.20 (3.75) | 18.44 (6.58) | 4.94 (3.65) | 12.64 (7.51) | 3.26 (2.73) | 15.88 (4.85) | 31.23 (4.29) |
| 4 | 16.88 (6.41) | 3.65(2.42) | 16.29 (6.66) | 4.29 (2.78) | 14.20 (6.63) | 3.23 (2.42) | 15.52 (4.61) | 31.47 (2.68) |
| 5 | 17.44 (6.20) | 3.70 (2.43) | 16.47 (5.72) | 4.67 (1.19) | 14.05 (5.81) | 4.11 (2.48) | 16.08 (4.04) | 31.67 (4.36) |
| 6 | 14.73 (5.76) | 4.15 (4.15) | 15.38 (4.37) | 4.00 (2.86) | 13.17 (6.26) | 3.88 (3.28) | 14.85 (4.43) | 29.44 (3.13) |

### 2.2.1. Sadness

The descriptive data revealed that the average level of sadness before the intervention ranged from 14.71 to 17.44, with standard deviations of 5.76 and 6.20 respectively. On the other hand, the average level of sadness after the intervention was in the range of 3.65 to 4.91, with respective standard deviations of 2.42 and 4.38 (see Table 1).

The Mauchly's sphericity test revealed that the "Session" factor ($\chi^2$ (14) = 23.366; p = .055) met the assumption of sphericity, as the p-value exceeds the critical threshold of .05. Similarly, the interaction between the "Session" factor and the "Measure" factor also met the assumption of sphericity ($\chi^2$ (14) = 18.505; p = .186), as the p-value is greater than .05.

In the tests of within-subjects effects, the following was observed:

- The "Session" factor did not have a statistically significant effect on sadness (F (5, 165) = 0.378, p > .05, $\eta^2$ = .011), suggesting that differences in sadness levels did not vary significantly between sessions.
- The "Measure" factor had a highly significant effect on sadness (F (1, 33) = 277.738, p < .001, $\eta^2$ = .894), indicating a significant decrease in sadness levels after the intervention.
- No significant interaction was found between the "Session" and "Measure" factors (F (5, 165) = 2.094, p > .05, $\eta^2$ = .060), suggesting that the effect of the intervention on sadness levels did not vary significantly across different sessions.

In summary, these results suggest that the intervention was effective in reducing sadness levels. Although no significant differences were found between sessions or in the interaction between session and measure, the main result shows a significant decrease in sadness levels after the intervention. Therefore, it can be concluded that the intervention was effective in reducing sadness in the context of this study.

### 2.2.2. Anxiety

The descriptive data revealed that the average level of anxiety before the intervention ranged from 15.38 to 18.44, with standard deviations of 4.37 and 6.58 respectively. After the intervention, the average level of anxiety ranged from 4.00 to 5.44, with respective standard deviations of 2.86 and 4.36 (see Table 1).

The results indicated a violation of the assumption of sphericity for both the Session factor ($\chi^2$ (14) = 29.206; p = .010) and the interaction between Session and Pre/Post Measure ($\chi^2$ (14) = 30.028; p = .008). As such, Greenhouse-Geisser corrections were applied in the analyses of within-subjects effects to adjust the degrees of freedom.

In the corrected within-subjects effects tests, the Session factor did not have a significant effect on anxiety (F (3.996) = 1.831, p = .127, $\eta^2$ = .053). However, the Pre/Post Measure had a significant effect (F (1) = 295.665, p < .001, $\eta^2$ = .900), suggesting a significant impact of the intervention on participants' anxiety. Regarding the interaction between the Session factor and the Pre/Post Measure, no significant effect was found (F (3.776) = .710, p = .579, $\eta^2$ = .021).

It is important to note that the violation of the assumption of sphericity in the Session factor and its interaction with the Pre/Post Measure suggests that the differences in the variance of the differences are significant, so inferences made from the results of the analysis of variance (ANOVA) may not be accurate. Therefore, conclusions based on these results should be interpreted with caution.

### 2.2.3. Anger

The descriptive data revealed that the average level of anger before the intervention ranged from 9.05 to 14.20, with standard deviations of 7.18 and 6.63 respectively. After the intervention, the average level of anger ranged from 2.67 to 4.11, with a respective standard deviation of 2.53 and 2.48 (see Table 1).

Regarding the Mauchly's sphericity test, the results indicated that the assumption of sphericity was met for both the Session factor ($\chi^2$ (14) = 14.308; p = .428) and the interaction between Session and Pre/Post Measure ($\chi^2$ (14) = 12.586; p = .561).

In the within-subjects effects tests, the Session factor had a significant effect on anger (F (5) = 3.836, p = .003, $\eta^2$ = .104). Furthermore, the Pre/Post Measure also had a significant effect (F (1) = 203.348, p < .001, $\eta^2$ = .860), suggesting a substantial impact of the intervention on participants' anger. Finally, a significant interaction effect was found between the Session factor and the Pre/Post Measure (F (5) = 3.169, p = .009, $\eta^2$ = .088), indicating that the effect of the intervention varied depending on the session.

In summary, the intervention appears to have had a significant effect in reducing anger levels, and this effect seems to have varied depending on the session.

### 2.2.4. Joy

The results showed that the average level of joy before the intervention ranged from 14.85 to 16.08, with respective standard deviations of 4.43 and 4.04. On the other hand, the average level of joy after the intervention ranged from 29.44 to 33.88, with standard deviations of 3.13 and 4.46 respectively (see Table 1).

The results of the Mauchly's sphericity test indicated that both the Session factor ($\chi^2$ (14) = 14.967, p = .382) and the interaction between Session and the Measure factor ($\chi^2$ (14) = 19.389, p = .152) met the assumption of sphericity.

The within-subjects effects tests revealed a significant effect of the Session factor on joy (F (5, 165) = 2.295, p = 0.048, $\eta^2$ = 0.065) and a significant effect of the Measure factor (F (1, 33) = 539.423, p < 0.001, $\eta^2$ = 0.942), but no significant effect of the interaction between the two factors (F (5, 165) = 1.770, p = 0.122, $\eta^2$ = 0.051).

In summary, the results indicate that both the Session factor and the Measure factor have a significant effect on the measurement of joy. The Measure factor appears to be more influential, while the interaction between the two factors does not show a significant effect on joy. These findings

suggest the importance of considering these factors in the study of the experience of joy and may have implications for interventions aimed at improving emotional well-being.

### 2.2.5. Summary

Regarding the analysis of mood states, significant effects were observed for sadness, anxiety, anger, and joy. The intervention had a significant impact on reducing sadness levels, with no significant variation across different sessions. For anxiety, the intervention significantly decreased anxiety levels, while session effects were not significant. The intervention also led to a significant decrease in anger levels, with variations observed across different sessions. Lastly, the intervention significantly increased joy levels, with session effects being significant as well.

These findings highlight the effectiveness of the flamenco dance workshop in positively influencing mood states. The intervention was particularly successful in reducing sadness and anxiety levels and increasing joy. These results provide valuable insights for designing interventions aimed at enhancing emotional well-being and indicate the potential benefits of incorporating flamenco dance as a therapeutic approach.

### 2.3. Subjective Well-being

### 2.3.1. Reliability of the WHO-5 Subjective Well-being Index and correlations with mood scores.

The pretest of the WHO-5 Subjective Well-being Index showed a Cronbach's alpha coefficient of 0.76, indicating that its items were moderately correlated with each other and that the test had an acceptable level of internal consistency.

Average correlations were obtained between the pretest scores of the WHO-5 well-being index and the six pretest measures of each mood state measured by the MRS; that is, 204 pairings. The results revealed a non-significant negative correlation with sadness ($r = -0.1335$; $p > .05$), a non-significant positive correlation with anxiety ($r = 0.103$; $p > .05$) and with anger ($r = 0.052$; $p > .05$), and a significant average correlation, of a positive nature, with joy ($r = 0.240$; $p < .02$), but weak. These results suggest that there is a statistically significant relationship between joy and overall well-being, although the strength of the relationship is relatively low.

The same procedure was followed with the posttest measures of subjective well-being and mood states, but in this case, none of the average correlations were statistically significant. The obtained values were sadness ($r = -0.065$, $p > .05$), anxiety ($r = 0.09$, $p > .05$), anger ($r = 0.086$, $p > .05$), and joy ($r = 0.139$, $p > .05$).

### 2.3.2. Effects on the Subjective Well-being Index

A significant increase in average scores was observed after the flamenco dance program. Prior to the program, the average score was 52.35 (SD = 12.23), while it increased to 72.35 (SD = 10.85) afterward. Due to the lack of normality assumption, the Wilcoxon signed-rank test was utilized and found a test statistic of 483.5. The standardized test statistic was 4.622 ($p = 0.0001$). This indicates that there is a statistically significant difference in well-being scores before and after the flamenco dance program.

Analyzing the intervention's impact on subjective well-being, 76.5% of participants (n=26) achieved a Clinically Significant Change (CSC), defined as an increase of 10 points or more [50]. Using a binomial test, the null hypothesis of equal probability for CSC (Yes) and (No) categories was rejected, with a test statistic of 26,000 and an asymptotic significance of p=0.004. The estimated success rate for CSC (Yes) was 0.765 (CI 95%: 0.588 – 0.893). These findings are significant for our study.

Taking a score equal to or less than 50 as indicative of the risk of depression [50], it was found that before the intervention, 58.8% of participants (n=20) did not present indicators of depression, while 41.2% (n=14) did. However, after the intervention, the results changed significantly: 91.2% (n=31) of participants no longer showed indicators of depression and only 8.8% (n=3) did. This significant change was confirmed by the McNemar change test for related samples ($\odot 2 = 6.667$, df = 1, p

= 0.007). These results indicate that the intervention was effective in reducing the indicators of depression among the participants.

In summary, the flamenco dance program had a significant positive effect on subjective well-being scores. Over 75% of participants experienced substantial increases in their well-being, surpassing the 10% of total score criterion. Furthermore, there was a significant decrease in the proportion of participants at risk of depression, demonstrating a beneficial effect of the program on psychological well-being.

*2.4. Individual differences.*

No significant association was found between age and mood state measures or subjective well-being, both before and after the flamenco dance program. Nor was there any association with the Clinically Significant Change (CSC) measures and depression screening.

Regarding the education level with two tiers (basic education and medium/higher education), only a moderate positive correlation was found with the state of sadness, both before and after the second session, with respective Rho values of 0.492 (p = .003) and 0.363 (p = .041). The education level also does not seem to influence the CSC, nor the depression screening measured before the exposure to the flamenco dance program.

Kruskal-Wallis tests were conducted to determine if there were differences between the categories of the marital status variable in the different mood state and subjective wellbeing measures. Initially, statistically significant differences were found in the Anxiety mood state measured before the flamenco dance program, in the second (H = 7.145, df = 2, p = 0.028) and third session (H = 6.738, df = 2, p = 0.034). However, in both cases, after applying the Bonferroni correction, the differences between pairs of categories no longer reached the threshold of adjusted significance. This suggests that the differences found in these comparisons might have been due to chance. On the other hand, we also found no results indicating that this variable influenced the CSC measure and depression screening before exposure to the program.

## 3. Discussion

This study sought to explore the potential of flamenco dance as an intervention to improve mood and subjective well-being in women over 60 years of age. The data obtained confirmed the hypotheses that participation in a 12-week flamenco dance program would lead to improvements in mood and an increase in subjective well-being.

The significant improvement in all four mood states (sadness, anxiety, anger, and joy) measured by the MRS after the flamenco dance program is promising. These results align with previous research that has identified dance as an effective intervention for improving both objective and subjective health indicators [28], as well as promoting well-being and joy [32-33, 48]. Dance has been shown to have a beneficial effect on health-related quality of life including self-perception of mood and emotion [44-45, 47], and an effective way to promote mental health in older people [46], which is one of our proposals.

Notably, flamenco dance, with its emphasis on rhythm, expression, and connection, may provide additional mental health benefits beyond those typically associated with physical activity [18-22]. Flamenco, as an expressive dance form, has the potential to promote emotional expression, social interaction, and cultural connectedness, which may contribute to the observed improvements in mood [34-36].

Interestingly, the age of the participants, which we would anticipate influencing mood and well-being, did not demonstrate a significant correlation in our findings. This reinforces the idea that flamenco dance may be beneficial in improving mood and subjective well-being in older women, regardless of their age.

Our study revealed that flamenco dancing has a differential impact on different mood states. In general terms, an improvement was observed in all the mood states studied (sadness, anxiety, anger, and joy) when comparing the initial values with those at the end of the dance program.

Sadness and anxiety showed a significant reduction at the end of the program, indicating the cumulative beneficial effect of flamenco dancing on these emotional states. However, no significant changes were observed after each individual session, which could indicate that the benefits of dance on these mood states are obscured by daily fluctuations caused by other factors of daily life.

Anger, which in the MRS framework is closely linked to feelings of frustration [49], showed a significant decrease both throughout the program and after each individual session. The magnitude of this reduction varied from session to session. This finding suggests that anger and frustration may be especially sensitive to the immediate effects of flamenco dancing. In addition to the physical component, flamenco dancing fosters social contact and a sense of community, which may provide emotional support, decrease isolation, and increase understanding and empathy, thus helping to reduce frustration and anger.

Joy increased overall throughout the program and after each individual session. However, the increase in joy was consistent and did not depend on the specific session, suggesting that the benefits of flamenco dance on joy are consistent and do not vary from session to session. These findings underscore the efficacy of flamenco dance as a tool for improving different mood states, although the benefits appear to manifest in different ways depending on the mood state in question. In the future, it would be useful to explore factors that might be moderating these effects, as well as to further investigate the causes of these differences in the response of different moods to flamenco dancing.

A surprising finding of our study was that education level did not appear to have a significant effect on CSC, nor on depression screening. However, we observed a moderate positive correlation between education level and sadness before and after flamenco dance sessions. This finding suggests that education level may be related to how older women experience and express certain mood states, especially sadness, in the context of flamenco dance.

In addition, this study found a significant increase in subjective well-being after the flamenco dance program. This aligns with previous research highlighting the positive impact of dance interventions on general well-being in older adults [48]. The observed increase in subjective well-being could be attributed to several aspects of the flamenco dance program, such as physical activity, social interaction, and learning new skills, all of which have been shown to contribute to increased well-being [22].

The study findings provide valuable insight into the potential benefits of flamenco dance as a preventive and even therapeutic intervention. It not only highlights its therapeutic potential from a physical standpoint, but also as a meaningful social activity. Flamenco contributes to social identity [34], encourages participation and integration [42-43], especially beneficial factors in people with mental disorders.

Regarding the marital status of the participants, some differences in anxiety were identified before the flamenco dance program. However, after applying the Bonferroni correction, these differences were no longer significant. This could indicate that, although marital status may influence how older women experience anxiety, its influence may be less significant in the context of a flamenco dance program, or that these initial differences could be attenuated through regular participation in dance activities such as those proposed in our program.

In this sense, flamenco could be an effective, cost-effective, and culturally appropriate intervention to promote mental health and well-being in older women. This has important implications for the development of public health strategies aimed at improving the mental health and well-being of the aging population, underscoring the need to consider interventions that integrate both physical and social aspects for a more holistic approach to mental health.

The present study plays a crucial role from both academic and practical perspectives. From the academic perspective, this research expands our current understanding of the benefits of dance, specifically flamenco dance, as a positive intervention to improve the health and well-being of older people. While previous studies have recognized the benefits of dance in general, our work delves deeper into flamenco dance and suggests that its focus on rhythm, expression, and connection may bring additional benefits beyond those typically associated with physical activity. Furthermore, we challenge the existing premise that age may be a limiting factor in the benefits of these interventions, as our findings indicate that flamenco dance can be effective regardless of the age of the participants.

From a practical perspective, our findings have notable relevance for public health and health policy. The results indicate that flamenco dance may constitute an effective, culturally sensitive intervention to promote mental health and well-being in older women. This information is valuable for health professionals and health policy makers, who might consider including culturally meaningful dance programs in their strategies to promote public health.

Finally, the study challenges the belief that education level has a significant impact on Clinically Relevant Change (CRC) and depression screening. This finding may have important implications for how interventions are designed and implemented to improve the mental health and well-being of older people.

In summary, this study provides significant contributions to the existing literature and offers new insights that can inform future practice and research in this field.

However, it is critical to keep in mind the limitations of this study. The results may not be generalizable to other populations due to the specific characteristics of the sample and the nature of the flamenco dance program. In addition, the small sample size may limit the precision and statistical power of our findings. Future research should aim to confirm these findings in larger and more diverse samples and explore possible mechanisms underlying the observed benefits of flamenco dance.

In conclusion, the results of this study provide preliminary evidence supporting the use of flamenco dance as a therapeutic intervention in improving mood and subjective well-being in older women. The practical implications of these findings are broad. For example, health professionals and policy makers could consider including culturally meaningful dance programs, such as flamenco dance, in public and community health strategies to promote mental health and well-being in older people.

Finally, it should be noted that this study provides a foundation for future research to further explore flamenco dance as an intervention to improve mental health and well-being. Future research could benefit from a more rigorous study design, including a control group, a larger sample, and additional measures to examine the mechanisms underlying the observed benefits. Additionally, it would be useful to explore the durability of the observed benefits and to assess whether the positive effects are maintained in the long term after cessation of the intervention.

In summary, flamenco dance could be a valuable tool for improving the mental health and well-being of older women, providing a valuable complement to existing strategies for improving quality of life in old age.

## 4. Materials and Methods

A quasi-experimental single-group design was used with repeated measures of emotional states, and pretest-posttest assessment of subjective well-being. The group consisted of 34 women who voluntarily enrolled to attend a 12-week flamenco dance workshop, with a weekly two-hour session, taught by members of the Self-esteem Flamenco Association. These workshops are free, as they are subsidized by the Honorable City Council of Seville (Local Administration). The foundations and contents of these workshops can be consulted at the following web address: https://www.autoestimaflamenca.es/contenidos/.

Before the start of the workshop, we held a meeting with the group, explained the objective of the study and collected their informed consent to participate in it, always guaranteeing the compliance with European and Spanish regulations on personal data protection [54-55] and the ethical principles established in the Belmont Report [56].

All of them agreed to participate, whose main sociodemographic characteristics are set out in Table 2. It is worth noting that no withdrawals or dropouts occurred throughout the study.

The measures of the dependent variables were taken as follows: Subjective well-being was measured before the start of the first workshop session and one month after it ended. On the other hand, moods were measured before and after the even-numbered sessions. Therefore, six pretest measures and six posttest measures were obtained. For this, the instruments described below were used.

**Table 2.** Sociodemographic characteristics of women participants.

| Variables | Statistics | Values | |
|---|---|---|---|
| Age | Mean | 70.12 | |
| | S.D. | 5.13 | |
| | Min. | 62 | |
| | Max. | 79 | |
| | **Categories** | **Frequency** | **Percentage** |
| Marital Status | Married | 17 | 50 |
| | Single | 3 | 8.8 |
| | Widow | 13 | 38.2 |
| | Divorced | 1 | 2.9 |
| Education | Elementary | 28 | 82.4 |
| | Secondary | 4 | 11.8 |
| | Higher | 2 | 5.9 |
| Work | No | 32 | 94.1 |
| | Yes | 2 | 5.9 |

To assess mood, the MRS [49] was used. An instrument designed to measure transient mood in different situations. This scale consists of 16 items, each represented by a 11-point Likert-type graphic scale, ranging from "nothing" (0) to "a lot" (10).

The MRS has been initially developed with university students but has also been applied and validated in other populations, both non-clinical (for example, adults from the general population) and clinical (for example, adult patients with major depressive disorder, adult patients with persecution delusions, patients with anxiety disorders).

The 16 items of the MRS are formulated with a similar structure, starting with the phrase "I feel" followed by an adjective representing a specific mood state (for example, "I feel sad", "I feel cheerful"). These adjectives define four subscales that assess states of anxiety, anger-hostility, sadness-depression, and joy. Each subscale is composed of four items and all items within each subscale are formulated in the same direction.

In summary, the MRS is an instrument that allows to evaluate transient mood state in different contexts, using an 11-point Likert-type graphic scale and four subscales that cover anxiety, anger-hostility, sadness-depression, and joy states of mood. Its goal is to provide an accurate and concise measure of mood at a given time.

As for its reliability, the MRS has shown good reliability; specifically, in a multi-sample analysis, it found average internal consistency reliability coefficients of 0.88 for the sadness-depression subscale, 0.92 for the anxiety subscale, 0.93 for the anger-hostility subscale, and 0.92 for the joy subscale. Additionally, it has shown a good factorial structure.

To measure subjective well-being, the WHO Well-Being Index [52] was used, widely used to measure this construct defined by WHO itself as "the state in which the individual uses his own abilities can face the normal stressors of life, can work productively and profitably and is capable of making a contribution to his community" [53, p.13].

This instrument consists of five items referring to how often the person being evaluated has felt good and satisfied,

## 5. Conclusions

The study investigated the potential of flamenco dance as an intervention to improve the mood and subjective well-being of women over 60 years of age, reaching the following conclusions:

1. Results confirmed hypotheses that participation in a 12-week flamenco dance program would lead to improvements in mood and an increase in subjective well-being.
2. Significant improvements in all four moods (sadness, anxiety, anger, and joy) were observed, aligning with previous research that

identifies dance as an effective intervention for enhancing health indicators.

3. Flamenco dance, with its emphasis on rhythm, expression, and connection, may provide additional mental health benefits beyond those typically associated with physical activity.

4. The age of the participants, which might have been expected to influence mood and well-being, did not show a significant correlation in the study's findings. This reinforces the idea that flamenco dance can be beneficial for improving mood and subjective well-being in older women, regardless of their age.

5. Different moods experienced varying impacts from the flamenco dance program. Specifically, sadness and anxiety showed a significant reduction, while anger significantly decreased both throughout the program and after each individual session. Joy increased generally throughout the program and after each individual session.

6. An unexpected finding was that the level of education did not seem to have a significant effect on clinically significant change (CSC) nor on depression screening. However, a moderate positive correlation was observed between the level of education and the state of sadness.

7. The study found a significant increase in subjective well-being after the flamenco dance program, supporting previous research that highlights the positive impact of dance interventions on overall well-being in older adults.

8. The findings provide valuable insights into the potential benefits of flamenco dance as a preventive and even therapeutic intervention. Not only does it underscore its therapeutic potential from a physical standpoint, but also as a meaningful social activity.

9. The study plays a crucial role from both academic and practical perspectives, expanding our current understanding about the benefits of dance, specifically flamenco dance, as a positive intervention for improving the health and well-being of older people. It also challenges the existing premise that age can be a limiting factor in the benefits of these interventions.

10. From a practical perspective, the findings are notably relevant for public health and health policies. Flamenco dance could be an effective, culturally sensitive intervention for promoting mental health and well-being in older women.

11. Finally, the study challenges the belief that the level of education has a significant impact on clinically relevant change and depression screening. This could have important implications for how interventions to improve mental health and well-being of older people are designed and implemented.

Despite these promising findings, it's important to consider the limitations of the study. The results may not be generalizable to other populations due to the specific characteristics of the sample and the nature of the flamenco dance program. Moreover, the small sample size could limit the precision and statistical power of the findings.

In conclusion, the results of this study provide preliminary evidence supporting the use of flamenco dance as a therapeutic intervention to improve mood and subjective well-being in older women. The practical implications of these findings are broad. For example, healthcare professionals and policymakers might consider including culturally significant dance programs, such as flamenco

dance, in public and community health strategies to promote the mental health and well-being of older people.

**Author Contributions:** For research articles with several authors. a short paragraph specifying their individual contributions must be provided. The following statements should be used "Conceptualization. J.M.LR. and C.R.R.; methodology. J.M.L.R.; formal analysis. J.M.L.R.; investigation. C.R.R.; resources. C.R.R.; data curation. J.M.L.R..; writing—original draft preparation. J.M.L.R.; writing—review and editing. J.M.L.P.; validation: F.J.C.S.; supervision. J.M.L.R.; project administration. C.R.R.; funding acquisition. C.S. and J.M.L.P. All authors have read and agreed to the published version of the manuscript.

**Institutional Review Board Statement:** The study was conducted in accordance with the ethical principles of the Belmont Report [56] for the protection of human subjects in biomedical and behavioral research, and in compliance with European and Spanish regulations on the protection of personal data [54-55]. These are essential requirements to obtain funding from the University of Seville and the City Council of Seville, and we refer to the corresponding grant files for further information..

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** The anonymized research data are available to any researcher upon written request to the first author. The request should indicate the purpose for which the data will be used and must be accompanied by a sworn statement of compliance with European and Spanish regulations governing the protection of personal data. It should also adhere to the ethical principles derived from the Belmont Report for the protection and safety of human subjects in biomedical and behavioral research. Additionally, the requester must commit to citing the original source in any scientific output resulting from the use of this data.

**Conflicts of Interest:** The authors declare no conflicts of interest. One of the authors (Carlos Sepúlveda) is a member of the Autoestima Flamenca Association and participated in the study due to his dual role as a psychologist and designer of the flamenco workshop, as well as being a flamenco dancer. Although this affiliation and participation are acknowledged, it is not considered to generate any conflicts of interest regarding the results or their interpretation. His role in the study was limited to establishing the workshop content and delivering it, without participating in data collection, analysis, or interpretation. Furthermore, it is stated that the funders had no role in the design of the study, data collection, analysis, interpretation, manuscript writing, or decision to publish the results**.**

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