

ORIGINAL ARTICLE

Psycho-emotional effects of flower therapy in nursing professionals: prototypical analysis*

HIGHLIGHTS

1. "Tired" and "Anxious" were the terms most frequently mentioned.
2. The intervention group noticed a trend toward improvement with therapy.
3. Evocation and prototypical analysis were appropriate for outcome analysis.

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ABSTRACT

Objective: To evaluate the perceived effect of Bach flower therapy on the psycho-emotional states of nursing professionals in primary health care. **Method:** Randomized clinical trial conducted with 75 nursing professionals in the cities of Osasco and São Paulo, SP, Brazil, from October 2021 to June 2022. The intervention group received the standardized flower formula, and the placebo group received an inert diluent. The data were collected through free word evocation and analyzed using prototypical analysis. **Results:** The terms most frequently mentioned before the intervention in both groups remained core elements after the intervention. Ultimately, the placebo group had a higher total number of categories than the intervention group. **Conclusion:** The intervention group showed an improvement in their psycho-emotional state. Evocation and prototypical analysis can be used as auxiliary tools in assessing the effect of integrative practices in clinical trials.

KEYWORDS: Complementary Therapies; Floral Therapy; Flower Essences; Emotions; Nurse Practitioners.

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INTRODUCTION

Flower therapy is part of Integrative and Complementary Health Practices (IChP) and was developed by English physician Edward Bach in the 1930s. It is composed of 38 essences, which are natural, odorless, and highly diluted liquid extracts from flowers that are intended to balance mental and emotional problems¹⁻². IChP are healthcare approaches that do not involve the complex medical systems and therapeutic resources of conventional Western medicine³. In Brazil, these practices were introduced in the 1980s and are regulated by the National Policy on Integrative and Complementary Health Practices¹.

A characteristic of IChP is its unique approach, which is tailored to the individual's specific needs. This particularity makes it difficult to measure the effects obtained with these interventions during quantitative studies. These studies are conducted in a controlled environment, using pre-established protocols and a robust statistical design to evaluate the results. The use of these parameters to evaluate IChP outcomes may result in an incomplete or even flawed assessment, as it is based on criteria that were not the ultimate goal of the care process⁴. For this reason, it is necessary to explore complementary tools to assess the effect of these practices in quantitative studies. Among them, we can highlight Free Word Evocation (FWE).

The FWE is a projective test that originated in clinical psychology, enabling spontaneous, quick, and objective mental projections to be captured. It is a technique used in the field of social thought, propagated through the theory of social representations⁵.

The exploration of words evoked within social representation theory is carried out through prototypical analysis, which organizes them into central and peripheral ideas by group, using Jean-Claude Abric's Central Core theory. According to this theory, the central core constitutes the common basis of representations, is collectively shared, has a limited number of ideas, is stable, and is resistant to change. In the peripheral system, ideas, which are more numerous, revolve around the central core. This system is characterized by being evolutionary and sensitive to the immediate context, allowing the integration of individual experiences and supporting the heterogeneity of the group and its contradictions⁶⁻⁸.

Based on Abric's theory, it can be inferred that the terms evoked belonging to the central core express how the group thinks about a particular object. Authors Rosfort and Stanghellini⁹ present the thesis that thought and feeling are inseparable. Although FWE is traditionally used to access social representations, in this study, it is assumed that it can also reflect affective dimensions, considering the interdependence between thought and emotion proposed by the authors cited above.

Thus, the question that the research seeks to answer is: "How do primary health care (PHC) nurses perceive the effect of Bach flower therapy on their psycho-emotional states?" Based on this question, the objective of this study was to evaluate the perceived effect of Bach flower therapy on the psycho-emotional states of nursing professionals in primary health care.

METHOD

This is a pragmatic, parallel, two-arm, double-blind, placebo-controlled randomized clinical trial (RCT) conducted from October 2021 to June 2022, written following the

CONSORT (Consolidated Standards of Reporting Trials) recommendations for reporting clinical trials¹⁰.

The sample consisted of nurses, nursing assistants, and nursing technicians working in 32 of the 40 Basic Health Units in the municipality of Osasco, São Paulo, Brazil, and at the Geraldo de Paula Souza General Health Center in São Paulo, São Paulo, Brazil. The inclusion criteria were: self-identification as stressed and having worked at the institution for at least six months. Subjects who self-reported alcoholism (due to the presence of alcohol in formulas), who were on vacation or away from their duties during the data collection period, and who were using other ICHP during the study were excluded¹¹.

Eligible participants received via WhatsApp® the initial electronic form created on the Google Forms platform, containing the biosociodemographic instrument and the self-perception assessment of psycho-emotional state. After completing the questionnaires, each participant was assigned a number, and a randomization list was created, assigning participants to either the intervention group (IG) or the placebo group (PG)¹¹.

The IG received the flower formula composed of two drops of each of the following essences: Cherry Plum (emotional self-control), Elm (overload of obligations), Hornbeam (mental fatigue), Olive (physical exhaustion), Star of Bethlehem (comfort in grief and loss), Walnut (preservation of individuality) and White Chestnut (excessive worry), diluted in a mixture of mineral water and brandy at 30%¹¹⁻¹³. The PG received the placebo formula, a mixture of mineral water and 30% brandy. The recommended dosage was four drops, four times a day, every day, for a period of four weeks. After this period, participants received a link via WhatsApp® to complete the electronic closing form, containing questions on psycho-emotional self-perception¹¹.

The self-perceived outcome of the psycho-emotional state was assessed using the FWE technique. Participants were asked to write down the first five words that came to mind in response to the question "How are you feeling right now?", ranking their answers in order of importance, from most important (1) to least important (5). The FWE aimed to assess the emotional states of participants before and after the intervention to verify whether there would be a difference in the core words between the study groups.

Prototype analysis was used to evaluate FWE, which involves combining the frequency and Mean Order of Evocation (MOE) of words to create a four-quadrant table representing the elements central to the group under study⁶. In the present study, four *corpora* were generated, one *corpus* for each study group, before and after the intervention.

The processing of the terms began with the download of the files in Excel® spreadsheet format. Spelling correction was performed, followed by lemmatization (grouping by root), to prevent similar words from being considered different. For example, the terms "Anxious," "Anxiousness," and "Anxiety" were grouped into the category "Anxious," which was the term that appeared most frequently.

Next, each *corpus* was submitted to the free online software *openEvoc* 0.94, which compiled a list of evoked words in alphabetical order, calculated the total frequency, the frequency of evocation in each position, and the MOE, and organized the evocations into four-quadrant tables¹⁴.

Regarding the frequency cutoff point, this study used half of the most frequently occurring evocation frequency in the *corpus* as the threshold value. The minimum

frequency for a term to be included in the analysis was calculated by dividing the total frequency of evocations by the number of different evocations¹⁵.

In this study, the average order of importance was used as the MOE, since the participants themselves ranked the terms. The MOE considers the position in which the individual and its frequency evoked the word. The MOE is calculated using the formula $\frac{\sum_{1}^n En \times n}{f}$, where En refers to the number of times the term was evoked in a given hierarchy, n corresponds to the hierarchy (1, 2, 3, 4, 5), and f is the frequency of the term. To establish the MOE cutoff point for the table, in surveys that request the recall of an odd number of words, the median is used, which in this study corresponded to the number three¹⁵. The MOE indicates the degree of importance of each word, with values ranging from one to five, where values close to one are considered most relevant.

Once the cut-off points were defined, the software constructed the four-quadrant tables. The first quadrant consists of elements from the Central core. The second quadrant contains the First periphery. The third quadrant covers the Contrast zone. The Second periphery can be seen in the fourth quadrant⁸.

To assess the perceived effect of the formula on the participants' psycho-emotional states, the composition of the four quadrants of the PG and IG was compared before and after the intervention. The words evoked were categorized into terms with positive and negative connotations. This categorization was achieved through consensus among the researchers.

The project was authorized by the participating institutions and approved by their Research Ethics Committees, with opinions numbered 4,804,586 and 5,489,450. Its execution followed the standards recommended by Resolution No. 466/2012, the guidelines of the National Council of Ethics in Research (CONEP) for data collection in a virtual environment, and the General Data Protection Law 13.709/2018. The study was approved and published in the Brazilian Registry of Clinical Trials (ReBEC) under code RBR-4wzz4xy.

RESULTS

A total of 113 nursing professionals completed the electronic form expressing their intention to participate. Of these, 26 did not participate in the study, two because they did not meet the inclusion criteria (removed from their duties due to medical leave) and 24 because they withdrew before completing the initial electronic form, resulting in a sample of 87 participants randomized between the groups: 44 (51,0%) in the PG and 43 (49,0%) in the IG. Eight participants in the PG and four in the IG were lost to follow-up because they did not respond to the closing questionnaire, resulting in a final sample of 75 participants, 36 in the PG (48,0%) and 39 in the IG (52,0%).

The sample consisted of 93.3% women ($n=70$), with a mean age of 44 (± 9.1) years, 61.3% married or in a stable relationship ($n=46$), with an average of 1.6 (± 1.2) children. Regarding the professional category, 72.0% of participants were technical-level professionals ($n=54$), with an average of 14.6 (± 7.9) years since graduation and 8.1 (± 7.8) years of work experience in nursing. The average number of hours slept per night was 6.4 (± 1.3), and most participants reported regular sleep quality ($n=41$; 54.7%).

The IG *corpus* at the beginning of the study consisted of 195 evocations, grouped into 16 categories, and the minimum frequency of evocation was three words. The cutoff point for frequency was 11 words and for MOE was three. The composition of the IG categories before the intervention is shown in Chart 1.

Chart 1. Composition of the Central core, Contrast zone, and Peripheries of the IG before intervention (n=39). Osasco and São Paulo, SP, Brazil, 2022

Central core			First periphery		
Frequency ≥ 11 and MOE < 3.0			Frequency ≥ 11 and MOE ≥ 3.0		
	Freq.	MOE		Freq.	MOE
Tired	21	2.2			
Anxious	19	2.7			
Contrast zone			Second periphery		
Frequency < 11 and MOE < 3.0			Frequency < 11 and MOE ≥ 3.0		
	Freq.	MOE		Freq.	MOE
Concerned	10	2.9	Drowsy	9	3.2
Happy	9	2.1	Discouraged	7	3.1
Irritated	7	2.7	Distressed	6	3.2
Stressed	6	2.8	Sad	6	3.2
Well	3	1.0	Unmotivated	5	3.2
			Impatient	4	3.5
			Hopeful	4	3.8
			Nervous	4	4.0
			Fear	3	4.3

Source: The authors (2022).

The PG *corpus*, prior to intervention, consisted of 175 evocations. The minimum frequency of evocation was three words. Sixteen categories were analyzed. The frequency cutoff point was 12 words. The MOE cutoff point of three. One questionnaire was excluded because the participant used the same word in all five responses. The composition of the PG categories before the intervention is shown in Chart 2.

When observing the components of the Central core, both in the IG and PG, there was a prevalence of evocations with negative connotations, with the terms "Tired" and "Anxious" being the most evoked in both groups.

The IG *corpus*, after the intervention, consisted of 195 evocations. The minimum frequency of evocation was three words. Seventeen categories were analyzed. The frequency cutoff point was eight words. The MOE cutoff point of three. The composition of the IG categories after the intervention is shown in Chart 3.

After the intervention, the PG *corpus* consisted of 175 evocations. The minimum frequency of evocation was two words. Twenty-nine categories were analyzed. The frequency cutoff point was eight words. The MOE cutoff point of three. The questionnaire of the participant who used the same word in all five evocations was excluded. The composition of the PG categories after the intervention is shown in Chart 4.

Chart 2. Composition of the Central core, Contrast zone, and Peripheries of the PG before intervention (n=35). Osasco and São Paulo, SP, Brazil, 2022

Central core			First periphery		
Frequency ≥ 12 and MOE < 3.0			Frequency ≥ 12 and MOE ≥ 3.0		
	Freq.	MOE		Freq.	MOE
Tired	23	2.2			
Anxious	19	2.2			
Concerned	12	2.3			
Contrast zone			Second periphery		
Frequency < 12 and MOE < 3.0			Frequency < 12 and MOE ≥ 3.0		
	Freq.	MOE		Freq.	MOE
Upset	3	2.0	Sad	11	3.6
Peaceful	3	2.3	Drowsy	8	3.6
			Stressed	7	3.3
			Thoughtful	6	3.0
			Confident	6	3.2
			Happy	6	4.2
			Fear	5	3.0
			Discouraged	5	3.6
			Hopeful	3	3.3
			Distressed	3	4.0
			Insecure	3	4.0

Source: The authors (2022).

Chart 3. Composition of the Central core, Contrast zone, and Peripheries of the IG after intervention (n=39). Osasco and São Paulo, SP, Brazil, 2022

Central core			First periphery		
Frequency ≥ 8 and MOE < 3.0			Frequency ≥ 8 and MOE ≥ 3.0		
	Freq.	MOE		Freq.	MOE
Tired	16	2.3	Confident	13	3.7
Happy	12	2.4	Hopeful	11	3.6
Anxious	10	2.6			
Contrast zone			Second periphery		
Frequency < 8 and MOE < 3.0			Frequency < 8 and MOE ≥ 3.0		
	Freq.	MOE		Freq.	MOE
Calm	7	1.9	Relaxed	5	3.2
Concerned	7	2.4	Irritated	5	3.6
Peaceful	7	2.9	Drowsy	5	3.6
Grateful	5	1.4	Excited	4	4.0
Sad	5	2.0	Pain	3	4.7
In peace	5	2.6			
Distressed	3	2.3			

Source: The authors (2022).

Chart 4. Composition of the Central core, Contrast zone, and Peripheries of the PG after intervention (n=35). Osasco and São Paulo, SP, Brazil, 2022

Central core			First periphery		
Frequency ≥ 8 and MOE < 3.0			Frequency ≥ 8 and MOE ≥ 3.0		
	Freq.	MOE		Freq.	MOE
Tired	16	2.1	Thoughtful	8	3.3
Hopeful	9	2.2			
Peaceful	9	2.3			
Anxious	8	2.9			
Contrast zone			Second periphery		
Frequency < 8 and MOE < 3.0			Frequency < 8 and MOE ≥ 3.0		
	Freq.	MOE		Freq.	MOE
Calm	7	2.0	Sad	6	3.3
Happy	7	2.9	Confident	5	3.0
Concerned	6	2.0	Faith	4	3.3
In peace	4	2.3	Happy	4	3.5
Grateful	3	2.0	Drowsy	4	4.3
Unmotivated	3	2.3	Optimistic	3	3.3
Comfortable	2	1.0	Well	2	3.0
Discouraged	2	1.5	Motivated	2	3.0
Tense	2	2.0	Frustrated	2	3.5
			Reflective	2	3.5
			Unsatisfied	2	3.5
			Relaxed	2	4.0
			Excited	2	4.0
			Determined	2	4.5
			Happy	2	4.5

Source: The authors (2022).

When analyzing the composition of the Central core at the end of the study, it was observed that, although there was a reduction in the frequency of the most frequently mentioned terms initially ("Tired" and "Anxious"), they remained present as elements of the core. In the PG, the term "Concerned" moved from the Central core to the Contrast zone, but was already positioned on the borderline between these quadrants. In addition, both groups introduced new positive semantic categories. The term "Happy" appeared in the IG, and the terms "Peaceful" and "Hopeful" appeared in the PG.

When analyzing the total number of categories at the end of the intervention, it was observed that this number was 41.4% lower in the IG than in the PG.

DISCUSSION

The terms most frequently mentioned during the study are consistent with the findings in the literature. Tiredness is a limited phenomenon that manifests itself after excessive expenditure of physical and/or mental resources. It is a universal phenomenon, in which energy is replenished with proper rest¹⁶. Tiredness is a common occurrence in the daily routine of healthcare professionals, especially nurses. A study conducted among PHC workers in India revealed that 61.2% of them reported moderate to high levels of tiredness¹⁷. Nurses over the age of 40 in an Australian study reported tiredness because of the quantity and poor quality of sleep due to the nature of nursing care, which is physically and emotionally exhausting¹⁸. The pandemic has exacerbated tiredness among nursing professionals. Although data collection was carried out at a time when it was already under control, this may have been one of the factors that led participants to report tiredness. A study conducted with Brazilian nurses revealed that one of the participants' primary complaints was tiredness, attributed to excessive work and increased hours resulting from colleagues' absences due to COVID-19 infections.

Chronic anxiety is related to burnout syndrome and job dissatisfaction. Negative working conditions are associated with the development of anxiety²⁰. A high level of perceived stress and significant emotional and psychological demands characterizes the work environment of PHC professionals. For this reason, they are at greater risk of developing anxiety than the rest of the population.

In addition, the COVID-19 pandemic has had a major impact on the mental health and quality of life of these professionals²¹. One study indicated that the prevalence of anxiety among PHC nurses before the COVID-19 pandemic was 26.1%²², and a systematic review pointed out that the prevalence of moderate to severe anxiety symptoms among nurses during the pandemic increased to 29.6%²³. A study conducted with PHC workers showed that nursing staff are at greater risk of developing anxiety disorders when compared to other workers at this level of care²⁰. Factors that predispose nursing professionals to anxiety include being female²³ and being over 31 years of age²⁰, which is the profile of the participants in this study.

A prototypical analysis revealed that the terms most frequently mentioned before the intervention remained as core elements after the study concluded, indicating that there was no difference in the psycho-emotional states of the participants between the study groups, regardless of the formula received.

Even with the flower formula containing two essences that address tiredness (Olive, for physical exhaustion, and Hornbeam, for mental fatigue)¹²⁻¹³, the IG did not report a better perception of effect than the PG in this regard. One possible explanation may be the quantity and quality of sleep, which was found to be deficient in the study participants, since adequate rest should be sufficient to restore energy and vitality¹⁶. Regarding anxiety, due to its multifaceted nature, a more individualized approach is required in the indication of essences, based on its primary cause.

Another reason for the reduced effects on IG tiredness and anxiety could be explained by the Central Core theory, which defines the central core as more stable and resistant to changes⁶. Based on this principle, using the formula for only four weeks would not be sufficient; a longer period would be necessary for changes in the core elements to be observed.

The emergence of positive categories in both study groups can be explained by two factors: the intrinsic characteristics of the groups and the presence of a contextual

effect. When examining the four-quadrant table, it can be observed that some of the positive categories present in the Central core at the end of the study were already present in the peripheral system of both groups. In the IG, the term "Happy" was found in the Contrast zone, just as the term "Peaceful" was found in the same quadrant of the PG. The Contrast zone can refer to central ideas of a subgroup within a group⁸, indicating that some participants were still able to find positive feelings in the stressful situation they were experiencing. The term "Hopeful" was part of the PG's Second periphery, indicating an idea that did not seem so important within the group at the beginning of the study, but became important at the end.

Contextual factors may also have contributed to the emergence of positive terms at the end of the study. Factors such as the participant's expectation of improvement, their memories, the location where the intervention is performed, and the interaction between the participant and the intervention provider can create a therapeutic environment that has the potential to influence study outcomes positively. According to a meta-analysis, 54% of the effects observed in randomized clinical trials can be attributed to the contextual factors²⁴. In other words, the very fact that they received intervention and were encouraged to engage in self-analysis may have had a therapeutic effect on participants in both groups.

A notable difference between the groups lies in the number of categories evoked at the end of the study, which reflects the participants' psycho-emotional state. The IG proved to be more concise (especially in the Second periphery), with more organized emotions, while the PG proved to be more scattered, with a greater number of categories. This difference between the groups can be explained by the use of two essences that made up the flower formula used by the IG participants. Cherry Plum is associated with mental and emotional control, and is recommended for stimulating clarity of feelings and restoring harmony. Walnut, in turn, plays an important role in preserving individuality, helping to protect the individual from the influences of the environment and other people¹². This modest result found in the IG can be attributed to the use of flower therapy, despite the short period of time the formula was used.

Among the limitations of the study is the formula's duration of use of only four weeks, since the literature recommends a treatment period of at least 60 days for results to begin to appear²⁵. However, for prolonged use of flower therapy, it is necessary to adjust the formula according to new needs that arise, which would not be possible in this study. Another important limitation is the use of the standardized formula. Bach flower remedies, like other ICHP, work best when prescribed according to the individual characteristics and needs of the user. The use of a standardized formula may have reduced the effectiveness of the intervention. The use of FWE as a tool for measuring emotional changes concretely can also be considered a limitation, since this technique is intended to investigate cognitive and symbolic representations.

To the best of our knowledge, this is the first study to use FWE and prototypical analysis as an assessment method in RCTs. Further studies are needed to verify the suitability of these techniques across different practices, outcomes, and contexts.

CONCLUSION

The terms most frequently mentioned at the beginning of the study in both groups, "Tired" and "Anxious," remained core elements after the end of the clinical trial period, indicating that there was no difference in the participants' psycho-emotional states in

relation to these terms. However, the categories mentioned by the intervention group at the end of the study were more concise and organized when compared to the placebo group, suggesting a perception of improvement in the general psycho-emotional state of these participants, which can be attributed to the use of the flower formula.

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