

Engagement of people diagnosed with schizophrenia in a five-month exercise program: CORTEX-SP study

Participación de personas con esquizofrenia en un programa de ejercicio físico de cinco meses: estudio CORTEX-SP

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Abstract. Exercise programs represent useful non-pharmacological resources in preventing and treating mental disorders such as schizophrenia (SZ), but there are aforementioned reasons, (i.e., low rates of participation). The study aimed to explore the engagement of people diagnosed with SZ in a five-month exercise program. Therefore, purposive criterion sampling was utilized to recruit 35 participants who were diagnosed with SZ. Qualitative data was collected using semi-structured interviews; these were recorded and transcribed verbatim. The data was subsequently analyzed using thematic analysis. Three themes were identified from the analysis: intrapersonal factors (characteristics and clinical consequences of the SZ and pharmacotherapy), interpersonal factors (relationships with people that participate, health professionals, and family and friends), and environmental factors (exercise program organization and participants' perception regarding the program). In conclusion, the symptoms and pharmacological treatments for the illness were perceived to be the primary barriers to engaging in exercise for the participants. Participants gave great importance to interpersonal factors, they perceived the group atmosphere and the program environment to be fundamental axes of the program. The presence of healthcare professionals, as well as the support, were also perceived to facilitate engagement in the exercise program.

Keywords: schizophrenia, community exercise, qualitative methods, environmental health, mental health.

Resumen. Los programas de ejercicio representan recursos no farmacológicos útiles en la prevención y el tratamiento de trastornos mentales graves como la esquizofrenia (SZ), pero existen razones ya mencionadas (es decir, bajas tasas de participación). El objetivo del estudio era explorar la participación de las personas diagnosticadas de SZ en un programa de ejercicio de cinco meses de duración. Se utilizó un muestreo de criterio intencional para reclutar a 35 participantes diagnosticados de SZ. Los datos cualitativos se recogieron mediante entrevistas semiestructuradas, que se grabaron y transcribieron literalmente. Posteriormente, los datos se analizaron mediante un análisis temático. A partir del análisis se identificaron tres temas: factores intrapersonales (características y consecuencias clínicas del SZ y la farmacoterapia), factores interpersonales (relaciones con las personas que participan, profesionales sanitarios y familiares y amigos) y factores ambientales (organización del programa de ejercicio y percepción de los participantes respecto al programa). En conclusión, los síntomas y los tratamientos farmacológicos para la enfermedad, fueron percibidos como las principales barreras para realizar ejercicio físico para las personas participantes. El grupo de participantes otorgaron gran importancia a los factores interpersonales, percibieron el ambiente de grupo y el entorno del programa como ejes fundamentales del mismo. La presencia de profesionales sanitarios, así como el apoyo, también se percibieron como facilitadores del compromiso con el programa de ejercicio a la hora de participar en el programa.

Palabras clave: esquizofrenia, ejercicio comunitario, métodos cualitativos, salud ambiental, salud mental.

Fecha recepción: 21-11-23. Fecha de aceptación: 07-02-24

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Introduction

Schizophrenia (SZ) is a serious and lifelong mental disorder that affects approximately 24 million people worldwide (Abi-Dargham, 2014). It is characterized by positive symptoms (additions to normal behavior), negative symptoms (loss of functions), and cognitive symptoms (attention, concentration, and memory problems) (Lieberman & First, 2018). In this sense, people with SZ often have numerous barriers and limitations that hinder their participation and inclusion in society (American Psychiatric Association, 2013).

Individuals with SZ present a shorter life expectancy (i.e., ~28.5 years less) than the general population (Olsson et al., 2015). They also demonstrate poorer physical, physiological, and biochemical profiles with overweight/obesity; atherogenic index, low cardiorespiratory fitness (CRF), ventilatory capacity, and high mean heart rate (Tous-Espelósín et al., 2021).

In this regard, exercise programs represent useful non-pharmacological resources in preventing and treating

mental disorders such as SZ (Bueno-Antequera & Munguía-Izquierdo, 2020; Callaghan, 2004; Crone & Guy, 2008; Firth et al., 2020). World Health Organization 2020 guidelines on physical activity and sedentary behavior recommendations for people with SZ do not differ from the general population (Bull et al., 2020). For example, participating in exercise programs has been shown to improve the symptoms caused by SZ, helping to enhance the quality of life of people living with the disease (Stubbs et al., 2018) and increasing CRF levels (Tous-Espelósín et al., 2023c).

Yet, a challenge with this population is that, due to the characteristics of SZ, some individuals do not engage in exercise unless staff members encourage and incentivize them to participate in exercise programs (Soundy et al., 2014). Moreover, it has been recommended that people with SZ consult with professionals in the area, such as health professionals or exercise specialists about the type and amount of activity appropriate for their abilities and chronic conditions (Stubbs et al., 2016). Furthermore, there have been international calls to incorporate the use of exercise programs into the treatment plans of people with mental health

problems. These programs would aim to ensure an overall culture change, improvements in infrastructure, and staff training increasing the prevalence of exercise in the holistic treatment of people with mental health problems (Rosenbaum et al., 2018).

In this way, psychiatric hospitals provide a favorable environment for initiating exercise and thus they offer a wide variety of exercise programs to their inpatients (Brand et al., 2016). Nevertheless, only 25%-50% of hospitalized patients participate in such programs, usually due to a lack of motivation and low levels of CRF. In addition, once they are discharged, they are no longer able to participate in these in-hospital programs (Brand et al., 2016), and find it difficult to maintain exercise habits, either due to lack of out-of-hospital programs, lack of family or health care support, environment, personal economy or social context (Karlsson & Danielsson, 2020). In this sense, building a continuation plan for participation is also imperative to ensure sustainable and longer-term participation in such programs. The location of the program appears important to consider (*i.e.*, out-of-hospital), as does the constitution of the group, the type of people, and the exercise program itself (Tous-Espelousin et al., 2023a). To fully understand the engagement of people diagnosed with SZ in exercise programs, it is important to capture and investigate the actual experiences of this population participating in exercise interventions (Riddoch et al., 1998).

Considering the aforementioned reasons (*i.e.*, low rates of exercise among the population with SZ), the present study aimed to explore the engagement of people diagnosed with SZ in a five-month exercise program.

Methods

Design

This study adopted a qualitative design, aimed at capturing an in-depth understanding of the participants' engagement in a five-month exercise program including their views on facilitators and barriers to their participation. A socio-ecological framework has been taken into consideration, a multidimensional approach that interrelates individual, social, and environmental factors that influence people's (non-) participation in exercise and sports (Sallis & Owen, 1999). The phenomenological theory, which is centered on the subjects, uses the interpretative paradigm (Urcia, 2021). The data was collected via semi-structured interviews. These were adopted in line with the research aims and to allow for an in-depth understanding of the participant's experience of the exercise program to be gained. Furthermore, the use of semi-structured interviews enabled the researcher to guide the areas of inquiry while leaving space for the participant to offer new meaning to the topic (Eatough & Smith, 2008). The interviews were approximately 30 minutes and were carried out following an interview schedule. Data collection finished when data saturation had been reached as determined by the research team members (Saunders et al., 2018).

Setting – Exercise program characteristics

The participants trained for three days per week under the supervision of exercise specialists. All sessions began and ended with blood pressure monitoring, and the intensity of training was dictated by individual heart rate responses to optimize exercise training (Polar Electro, Kempele, Finland) and rate of perceived exertion (Borg's 6-20 point). Each session included a 5-10 minute warm-up and a 10-minute cool-down. Participants received an intensive concurrent exercise program lasting 5 months at out-of-hospital facilities. Concurrent training is defined as performing both endurance and resistance training within the same training program (Bishop et al., 2019). The endurance part of each training session consisted of a range of aerobic exercises of 20 minutes on the bike (BH Fitness equipment). The intensity was individually tailored to each participant's heart rate at moderate (R2) or vigorous intensities (R3), adjusting the power and speed on the exercise bike; and the resistance training comprised a circuit made up of nine posts for 20 minutes. Every session was conducted with music.

Study Participants

The CORTEX-SP study was conducted between May 2018 and July 2021. The study comprised a total of 35 participants (mean age 41.6 ± 10.3 years, 26 men and 9 women) diagnosed with SZ from a Psychiatric Hospital and the Mental Health Network in the Basque Country (Spain). It included hospital inpatients, people living in foster care (16 participants), and people living in their own homes (19 participants). Purposive sampling was utilized to recruit the participants, all patients met the diagnostic criteria for SZ according to the Structured Clinical Interview for DSM-5 (American Psychiatric Association, 2013), with a disease evolution time greater than two years, stable, and at least moderate cognitive impairment in the MATRICS variables. The selection criteria (exclusion and inclusion criteria) and procedures for the CORTEX-SP study (*i.e.*, cognitive rehabilitation and training with exercise for the SZ population for five months) have been previously described (Tous-Espelousin et al., 2021; Tous-Espelousin et al., 2023c). The study was approved by the Research Ethics Committee of the Basque Country (PI2017044), and written informed consent was obtained from all participants before any data was collected (Clinical Trials.gov identifier, NCT03509597). Quotations are presented in italics, with pseudonyms to preserve the participants' confidentiality. Quotations are included to provide the lived experience of participants and to assist in ensuring trustworthiness (Erlandson et al., 1993).

Data collection

The interviews were held individually after agreement with each participant according to their availability and in each case agreeing on the time and place. The interviewee and the interviewer were placed on the same level, setting aside social boundaries and stigmas. Furthermore, an

attempt was made to create a suitable, close, and friendly context to eliminate any misgivings that the interviewees might have before the interview and confirm that the information provided by the participant was valued and appreciated. Each participant provided written informed consent before their interview. The interviews were audio recorded.

Data analysis

Data from personal semi-structured interviews were transcribed verbatim. The transcripts were analyzed using thematic analysis techniques (Braun & Clarke, 2006). This involved the principal researcher reading the transcripts over and over again to familiarize themselves with the data. The research team then generated codes of interest by extracting and collating pertinent excerpts from the data. Emerging codes were then organized into themes that reflected the content and meaning of the data and reflected the study aims, in an inductive-deductive (Gibbs, 2013) coding process, based on a socio-ecological approach (Sallis et al., 2006). Themes were subsequently reviewed and refined and given a label to reflect the essence of the data. Trustworthiness and credibility of the study were established by peer review and member check triangulation, discussing the emerging themes, and establishing them among the members of the research team. The Nvivo10 program (QSR International) was used to facilitate the data analysis process.

Results

Three themes emerged from the data analysis: Intrapersonal factors, interpersonal factors, and environmental factors. (Sallis & Owen, 1999) These, along with their associated sub-themes, are presented in Table 1 and discussed, in turn, below.

Table 1.
Themes and sub-themes from the analysis

Themes	Sub-themes
Intrapersonal factors	Characteristics and clinical consequences of the disease
	Pharmacotherapy
	People outside the program
	Health professionals
Interpersonal factors	Family and friends
	Relationships associated with the practice
	Group-individual
Environmental factors	Only patients-mixed
	Exercise program organization
	Participants' perception regarding the program

Intrapersonal factors

Clinical consequences of the disease

Most participants reported that their illness and the symptoms of SZ varied greatly depending on time and context; "There are days of sadness and days of joy" (Arthur). As such, the participants portrayed exercise adherence to be challenging because their motivation fluctuated considerably in line with their symptom presentation; "It was a big challenge for me to make the program" (Peter). On the one hand, the participants presented negative symptoms of the

illness (i.e., feeling listless, apathetic, and sad); "Well look, if I don't take my antidepressant pill, I'm crying all day long" (Jenny), which, in many cases, led them towards social isolation and to not wanting to participate in group activities. In addition, some participants preferred to exercise alone and avoided conversing with the other participants because of the difficulties they had; "I'm a very solitary person and I don't usually hang out with people, it's tough for me to start talking to people and all that, and to meet and... well... it's tough for me" (Peter).

On the other hand, the participants presented positive symptoms of SZ (i.e., disorders); "My problem is that I am thinking all the time about things, things that have happened to me and that don't go away, and if I don't take my medication, I would be thinking about my things all the time, talking to myself and laughing alone" (John). Despite such symptoms having positive connotations the participants expressed that delusions and hallucinations associated with their disorder made it difficult for them to exercise.

The effects of pharmacological treatment on exercise experiences

Most participants agree that pharmacological treatment has very serious side effects, mainly on day-to-day energy; "Medication leaves you with no energy, you don't feel like doing anything" (William). They also added that the lack of energy caused you to be unmotivated and physically inactive; "I was crushed, like numb, I had no motivation or desire for anything" (George). Most agreed that the two biggest effects were continued fatigue and weight gain; "I gained a lot of weight, but I don't know if it was due to me not doing anything because of fatigue or directly because of the medication" (Noah).

Interpersonal factors

Interpersonal relationships also influence patients with SZ when they participate in an exercise program such as the one implemented in this study. Interactions with the different agents involved and the consequences of these on the experiences of people with SZ can result in driving or deterring patients from the program. The relational networks according to the different agents and their roles within the program are presented below.

People outside the program, external relationships

Attitudes towards external relationships were differentiated into relationships with health staff members and relationships with friends and family.

Participants presented an important relationship with staff members. The psychiatrist who was directly responsible for the referral to the program was key in accepting the participation of the participants, mainly because of their closeness and support; "My psychiatrist gives me a lot of security. I have been with her for many years, and she has helped me a lot in the process of my illness, and since I know that she is supervising this intervention, that reassures me" (Poppy). Another key external relationship on a day-to-day basis was provided

by friends and family. Participants commented that especially their family as well as some friends were supportive of their participation in the program. Many felt that family and friends were an indispensable part of maintaining adherence to the program, which manifested itself through reminders to attend, reinforcing a more physically active lifestyle through activities of daily living, engaging with them, and helping them plan strategies to maintain their exercise habits; *"My flatmate usually goes running, and I went running with him the other day"* (Robert), but also expressing disappointment when participants stopped going to sessions; *"When I stopped, a family member of mine seemed upset and blamed me for it"* (Liam). However, not all participants needed this external support; for example, Harry claimed to be intrinsically motivated to attend; *"I don't care if my family encourages me, I'll do my own thing"*.

Relationships associated with the practice: inter-group experiences

In terms of relationships with peers, two broad categories emerged, whether the exercise was carried out in groups or individually and whether the program was carried out with only diagnosed patients or with the general population.

On the one hand, two clear ideas were differentiated regarding the social performance of exercise: in a group or individually. The fact of attending a group program, as well as the commitment established towards the group, contributed to creating more adherence; *"If you go with a group it forces you more because if it is on my own, one day I might do something, another day I might not feel like going, but the other way, since you have already signed up, you have to go not to look bad"* (Tom).

Exceptionally, some participants stated that the fact of doing the activity with other people would not influence, either positively or negatively, their level of participation and that they would continue to do it, even with other people or alone; *"I would at least sign up, because I don't care about the people I go with"* (Diane).

Regarding what type of people they would include in the program groups, two opinions were highlighted regarding the characteristics of individuals that the participants liked to exercise with. In the first, a preference of participating with people with a history of pathology was defended, as there was a feeling of rejection, prejudice, and insecurity from those who do not have the disease; *"The gestures, the looks, the comments"* (Brad). It is also true that to avoid situations where negative comparisons can be made about each person's ability, participants prefer to exercise with people at their level; *"That way we are all equal, we do as much as we can and there are no comparisons"* (Anthony).

Other participants, however, suggested that it would be better to participate with all kinds of people to normalize the illness and not always be marginalized; *"Better to be with other people so that it's not a ghetto so that sick people are not pushed into a corner"* (Peter). In this way, people with SZ can improve their quality of life by rebuilding a sense of self and

social identity. In this sense, Marilyn commented; *"I like meeting all kinds of people, not sick people"*.

Environmental factors

In this theme, the experiences of the participants were collected regarding the characteristics of the project carried out, such as how the exercise program was organized, as well as the timetable and duration.

Exercise program organization

In general, most of the participants were happy with the type of exercise performed. They felt that concurrent training was enjoyable because of the change of exercises; *"It was good because it was diversified, it wasn't a whole hour doing the same exercise all the time"* (Arthur). Participants perceived that they felt more and more agile, with better mobility, better CRF, and even slimmer; *"Physically I did notice a change because at the beginning it was very difficult, then it was less difficult, and I got into a rhythm. It's like they say, you do a bit of running, you do a bit of running and then you get into the rhythm"* (John).

The participants argued that the role of music was a key indicator of their participation in the program. The vast majority of the participants in this study highly appreciated conducting the sessions with music; *"With music better, livelier, more at ease"* (Anthony).

Timetable and program duration

Regarding the timetable, the perceptions were different for the hospitalized participants and for those who lived outside the hospital. The hospitalized patients had a scheduled calendar with activities that included two free hours in the evening, so they all preferred to do the exercise before those hours; *"I had problems with the psychiatrist because he sent me to the exercise program in my free time"* (Reece). However, some of them felt that during autumn-winter they did not like going to the program in the evening, when it was dark outside, as this created a feeling of sadness or even fear; *"It is not the same, no, better early in the afternoon because in the evening you are already tired and that is when paranoia and hallucinations are more common"* (Amelia).

Finally, the participants' perceptions concerning the duration were that, although many found the five-month stay very long at the beginning, they were comfortable with it and at the end, it went quickly; *"In the beginning, it seemed like a lot and now it is not so long"* (Peter).

Discussion

The present study was conducted to explore the engagement of people diagnosed with SZ in a five-month exercise program. The three master themes identified were: intrapersonal, interpersonal, and environmental factors.

According to the experiences of the participants intrapersonal factors, about the disease symptoms (*i.e.*, positive, negative, and cognitive symptoms (Strassnig et al., 2015)), and pharmacological treatment, are limiting factors

for exercise and can influence their level of participation in the program (*e.g.*, due to the social isolation resulting from the disease (Firth et al., 2016). Such factors directly influence the participant's engagement in exercise due to a more negative emotional state and/or less motivation for exercise (Karlsson & Danielsson, 2020). Thus, the consequences of the different stages and treatment of the symptoms of SZ and the characteristics of the participants about these issues should be considered when promoting exercise programs since it could have an impact on the level of exercise and the level of adherence and their motivation (Vancampfort et al., 2021). As stated by Saez and Caravaca (2021), having fun in the sessions is fundamental for participation and compliance with an exercise program in people with mental health problems to improve their health and quality of life (Soares et al., 2021).

The symptoms associated with the illness have a direct relationship with the pharmacological treatment for SZ, in that they are associated with extrapyramidal neurological side effects and symptoms that affect the individual's motor skills (Miyamoto et al., 2012). However, participants in this study who took antipsychotic medication regularly, because it helped them to feel better, found it easier to be physically active (Rastad et al., 2014). Nevertheless, although no serious side effects were experienced among the interviewees, they did report other lighter side effects such as tremors, feeling more tired, drowsiness, and loss of strength, which in many cases led to weight gain (Maayan et al., 2010). In addition to weight gain, the negative impact on body image is another of the side effects associated with the pharmacological treatment (Johnstone et al., 2009), a factor that, together with the characteristics of the illness, does not favor exercising among people with SZ (Soundy et al., 2014).

Thus, it is important to highlight the benefits of exercise as a non-pharmacological treatment of SZ (Bueno-Antequera & Munguía-Izquierdo, 2020; Vancampfort et al., 2016; Yung & Firth, 2017), and the benefits associated with PA for the health and well-being of the population with mental illness and the prevention of cardiovascular diseases. This aligns with the recommendations of the World Health Organization for the promotion of exercise and the prevention of acquiring sedentary habits (Bull et al., 2020). The recommendations refer specifically to the population of adults with SZ, highlighting the additional benefits of exercise on their health, due to an improvement in physical and cognitive functioning and associated cognitive benefits, as well as a possible improvement in their quality of life (Bull et al., 2020). In recent years, exercise programs have been promoted as an interesting and useful non-pharmacological resource in preventing and treating mental disorders such as SZ due to their benefits and better health patterns promotion (Bueno-Antequera & Munguía-Izquierdo, 2020; Vancampfort et al., 2016; Yung & Firth, 2017).

Taking into account interpersonal factors, people with SZ are vulnerable to negative comparisons with others and have a reduced sense of self-esteem and confidence, as such

their participation in exercise programs can be negatively influenced (Roberts & Bailey, 2013). For this reason, it could be considered that external personnel who are not directly involved in the program but are very well informed of everything that happens in it due to their proximity with the participant, such as various social-health agents (*i.e.*, the psychiatrists, and friends and family), may help participants (Karlsson & Danielsson, 2020). Patients need to establish good relationships with health professionals, especially with their psychiatrists (Soundy et al., 2007), and indeed, participants in this study did so and concurred that this relationship was an important aspect of their engagement. The relationship established with the psychiatric staff based on trust, as in Peter's case, is one of the main reasons for participating in the program (Karlsson & Danielsson, 2020). In addition, this results in a decrease in the fear of being discriminated against and labeled by staff outside the healthcare facility, since the staff that pushes them to participate in the program assures them that everything will be fine (Karlsson & Danielsson, 2020). In this line, in previous research health professionals have seen exercise as an important part of holistic care and therefore they also underline its importance to provide informational support to people with serious mental illness (Happell et al., 2012). Supporting previous findings some participants in this study commented that if it had not been for the perseverance and encouragement of the practitioner, they would not have been encouraged to participate, therefore, support from health professionals could become a facilitator for engagement in exercise (Soundy et al., 2014).

In terms of relationships with friends and family, in general, all participants agreed that their relatives thought that it was a good idea for them to participate in the program (Gandhi et al., 2019; Pitschel-Walz et al., 2001). An indispensable part of the overall strategy for the treatment of the disease is associated with the support of family and friends (Gandhi et al., 2019), and for that reason, in this study, when a participant missed a session or dropped out of the program, relatives were disappointed. Family members can help patients by implementing prompts, reminders, and reinforcing activities of daily living (Gandhi et al., 2019), including accompanying participants in their activities, exercising with them, or helping them to plan strategies to maintain exercise habits (Karlsson & Danielsson, 2020).

Carrying out the program with more people (*i.e.*, as a group rather than individually) is associated with greater involvement due to the commitment acquired not only with the program but also with the people who participate in it (Gross et al., 2016). Therefore, to avoid creating suspicions by not attending the other participants encourage them not to fail because of "what they will say". Further, it was found that attending structured and guided sessions helped participants to participate, results that coincide with those obtained by a previous researcher, where planned activities were valued as a meaningful and motivating occupation (Bryant et al., 2005). Attending previously scheduled activities included in the daily routines is a great help both for

the interactions among participants and for adherence to the program (Firth et al., 2016), since it is given more seriousness and is included in the weekly agenda. Furthermore, being part of an exercise group has many benefits for patients, including providing positive relationships and connection with others, giving a reason to be active, helping to motivate people and providing a forum for modeling behavior, and helping patients to initiate other activities (Soundy et al., 2014), since building a sense of cohesion and belonging with other patients facilitates participation and reduces anxiety levels (Soundy et al., 2014). Although some participants in this study agreed that exercising as a group was beneficial, others stated that they preferred to exercise on their own, either because they had always done so or because they felt that exercising alone helped them to make the most of their time. Therefore, it seems that most of the participants would prefer to participate in a group, but consideration should be given to how to respect people who come and prefer to do it alone to respond to the interests of the intergroup relations of the study population (Gross et al., 2016).

Being in a group with other people who also experience symptoms of the disease, as well as being in a physical or emotional place where they do not feel threatened, is associated with a sense of safety and comfort (Mason & Holt, 2012). It is also true that to avoid situations where negative comparisons can be made about each person's ability (Chapman et al., 2016), participants prefer to exercise with people of their level.

People with mental illness have negative and discriminatory experiences when interacting with people without such illnesses, as ignorance and prejudice lead to discrimination from people without SZ towards those with SZ or mental illness (Rastad et al., 2014). This tendency could be based on the different statuses associated with each group, excluding people with mental illness or SZ in various contexts (Pettigrew, 1998).

Moreover, Carless argues that some patients feel that by normalizing their lives they will achieve a more positive identity and a sense of independence from the culture of mental illness (Carless & Sparkes, 2008). Therefore, it would be interesting to carry out this type of study relating participants with and without SZ in the same group, to analyze how interpersonal relationships are established and to analyze whether or not bonds associated with different statuses are established according to the disease.

Finally, in the environmental factors, according to previous research, concurrent exercise has greater benefits than separate aerobic and strength exercises and it is therefore considered a good non-pharmacological strategy for the treatment of SZ (Ho et al., 2012). Furthermore, exercise is known as an important and low-cost therapeutic tool, where two sessions per week with a progressive load are sufficient to produce benefits (Silva et al., 2015). These results reinforce the general guidelines and put aside the idea of "one size fits all" recommending an exercise program designed in a systematic and individualized

manner in terms of the frequency, intensity, time, and type (*i.e.*, FITT principle) (Bull et al., 2020; Pescatello et al., 2015).

All sessions were conducted with music because this has been shown to provide more positive affective responses, improve physical performance, help reduce perceived exertion, and improve the person's physiological efficiency (Terry et al., 2020). In addition, music therapy seems to address motivational, emotional, and relational aspects, which help patients with SZ improve their performance (Geretsegger et al., 2017), and can influence their quality of life and activity levels (Gomes et al., 2014).

Many people who have attended an exercise program would like to be able to continue attending programs of this type, but the offer is still very small (Brand et al., 2016). Although weather and time have also been perceived as barriers in other studies (Karlsson & Danielsson, 2020), they are not seen as an impediment to doing exercise because they are usually short and momentary interruptions. However, it could be interesting to see whether the inclement weather, which is so common in this geographical context, and the fact that the program was carried out at a different time of the year or in a different location would influence this aspect since it could hinder the adherence of the participants to the program, as has been shown in other studies (Karlsson & Danielsson, 2020).

The factors intrinsic to the person analyzed in the intrapersonal category, together with the extrinsic factors analyzed in the interpersonal and environmental category determine the participation of people with SZ in an exercise program. Personal barriers derived from both the disease and the treatment are factors to take into account when designing an exercise program for people with SZ (Chapman et al., 2016), however, external factors to the person, such as interpersonal and environmental relationships are as important as intrapersonal factors for participation (Tous-Espelousin et al., 2023b). In this sense, the relationships developed with the rest of peers, with the physical-sports education professionals in charge of supervising the sessions as well as with the social-health personnel who encourage their participation are vital for their participation. At the same time, the fact that the program is out-of-hospital is fundamental for the program to be successful.

Limitations and strengths of the study

The current study has several strengths. Considering the difficulties involved in recruiting volunteers with mental disorders in an exercise intervention, we could argue a relatively large sample ($n = 35$) and, with interviews being 30 minutes each, data can be considered rich. Secondly, participants were familiar with, liked, and trusted the interviewer and had a prolonged engagement.

This facilitated a trusting relationship which, in turn, encouraged more honest and detailed discussions.

Conclusions

In summary, the symptoms of SZ, as well as pharmacological treatments for the illness, were perceived to be the primary barriers to engaging in exercise for the participants in this study. Participants gave great importance to interpersonal relationships. The presence of trust and confidence in healthcare professionals, as well as the support of family and friends, were perceived as factors that could facilitate engagement in the exercise program. There were differences in experiences regarding the number of people and the characteristics of the people that the participants liked to exercise with. However, they all agreed with the fact that the program was helpful for their exercise motivation, being a facilitator to their participation in it. Finally, the findings offer some recommendations that can be taken into consideration when designing an exercise program for people with SZ, such as intrapersonal factors (characteristics and clinical consequences of the SZ and pharmacotherapy), interpersonal factors (relationship with people participating in the program, people outside of the program, health professionals, and family and friends) and environmental factors (exercise program organization and participants' perception regarding the program).

Acknowledgments

Our special thanks to Sara Maldonado-Martin for making the impossible, possible, and the Vitoria-Gasteiz City Council because the facilities of the Physical Activity and Health Research Center are essential to carrying out the intervention with exercise. Thanks to the GIZARTEA, KIROLA eta ARIKETA FISIKOA Ikerkuntza Taldea (GIKAFIT) that we are part of. Finally yet importantly, thanks to all the participants for their willingness that has made this project possible, to all the undergraduate students who collaborated on this project, especially to Enara Foncea for her hard work, and to IJB7 for his selfless friendship.

Funding

This study was supported by the Spanish Ministry of Economy and Competitiveness "Fondo de Investigación Sanitaria del Instituto de Salud Carlos III" (PI16/01022). MTE was supported by the University of the Basque Country (UPV/EHU, PIF19/40) predoctoral grant. The Council of Vitoria-Gasteiz provides the facilities of the Physical Activity and Health Research Centre for exercise intervention. The authors have no conflicts of interest to declare.

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